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Welcome to the Spring issue of the *Gundersen Medical Journal*. This issue features 3 reports of original research, 2 interesting case reports, and a review of disease management, in addition to our regular “Ethical Considerations” and “Gundersen History” features.

Emily Quandt and colleagues at the University of Wisconsin-La Crosse conducted a study to determine changes in heart rate and core temperature in individuals performing Bikram yoga. Bikram yoga is performed in a hot, humid environment and is different from other styles of “hot yoga” in a number of ways, including its more exacting heat and humidity requirements and its patented 26 poses, which are performed twice and in the same order in every class.

Madeline Anderson and coauthors, including Ms Anderson’s summer research fellowship mentor, Dr David Hartman, conducted a retrospective review of the medical records of patients admitted to the hospital for acute stroke. The purpose of their study was to determine whether the results of screening and diagnostic procedures for dysphagia were predictive of development of aspiration pneumonia.

In their case report, Drs Silva and Anil of Mayo Clinic Health System-Franciscan Healthcare in La Crosse describe ultrasound-guided surgical removal of a failed pregnancy in a woman with dense intrauterine adhesions. They stress the importance of diligent birth control following endometrial ablation because the risk of miscarriage and related complications is high.

Drs Nambron and Short present an unusual case of unilateral spontaneous adrenal hemorrhage in pregnancy, as well as a review of other such cases reported in the literature.

Drs Pratt and Dolan provide an up-to-date review of the diagnosis and management of chronic obstructive pulmonary disease (COPD). They also introduce the addition of COPD to the menu of disease management tools on the Gundersen Health System intranet system, and to the quality tracking tools in EPIC.

Dr Harter describes an ethics consultation in which, in the course of performing a surgical procedure for an unrelated condition, a surgeon discovered that the patient would require an additional procedure—whether now or in the future. The author uses the case to illustrate the role of time in medical decision making.

Dr A. Erik Gundersen, grandson of the founder of Gundersen Clinic, recounts the visit that famed photographic portrait artist Yousuf Karsh made to La Crosse in early 1970. The portraits Karsh took of 4 of the Gundersen brothers were recently moved to the new hospital building.
The Supplement section features abstracts of presentations made by Gundersen staff in 2014 and is intended to acquaint you with the breadth of research being conducted by Gundersen staff.

We hope you enjoy this issue of the *Journal* and find elements that are useful, informative, and thought-provoking.

William A. Agger, MD, FACP, FIDSA
Interim Editor
*Gundersen Medical Journal*
Yoga is a popular group exercise class that ranked 10th in the top 20 worldwide fitness trends for 2014, an increase from 14th in 2013.1 Yoga is a form of mind-body exercise that combines static postures with fluid, low-impact motions.2 There are many potential health benefits of yoga including increases in overall strength, flexibility, lung function, and overall exercise capacity.3 Yoga also has the potential to be utilized as a therapeutic intervention for chronic illness and degenerative diseases in women.4

Recently, practicing yoga in a heated environment (“hot yoga”) has become increasingly popular. Hot yoga is practiced in a room heated to between 80°F (26.7°C) and 105°F (40.5°C), with humidity controlled between 40% and 60%.2 The heat of the room purportedly makes it easier to stretch deeper into certain poses, and hot yoga advocates believe that practicing yoga in a heated environment further improves the mind-body connection, allowing participants to focus more intently on breathing and posture.5 In the 1970s, hot yoga evolved into an even more disciplined practice called Bikram yoga. Bikram yoga is a specific variant of hot yoga, combining strict Hatha yoga with thermal therapy. A standard class lasts 90 minutes and repeats a series of 26 poses. Rooms are heated to 105°F and kept at 40% humidity.2

Research investigating the responses to Bikram yoga is limited. Tracey and Hart6 conducted a study examining the effects of Bikram yoga on various parameters of general physical fitness. After 8 weeks, subjects had an increase in dead lift strength, shoulder flexibility, and modestly decreased percent body fat. Bikram yoga has also been studied as an intervention for glucose intolerance and insulin resistance in people at high risk of developing metabolic disease.7 These researchers found that Bikram yoga improved overall glucose tolerance and insulin resistance in older, at-risk adults.

Despite the reported benefits of hot yoga and Bikram yoga, the effect of exercising in the extreme heat has been one of the main controversies surrounding this practice. It is well documented that exercising in a hot and humid environment (especially while not drinking water) places participants at risk for exertion-related heat illness (eg, heat cramps, heat exhaustion, heat syncope, heat stroke).8-10

A recent study by Nereng et al11 examined the core temperature (Tc) and heart rate responses (HR) during hot yoga compared with those during regular Hatha yoga. Neither HR nor Tc differed significantly between the classes; thus, it was concluded that hot yoga did not elevate Tc to unsafe levels. However, the average room temperature in the study was only 92.7°F, and humidity averaged 35%. These are at the lower end of the recommended ranges for a hot yoga class.2

Based on the aforementioned work of Nereng et al,11 hot yoga appears to be a safe form of exercise and does not result in unsafe Tc or HR responses. However, it remains unclear whether exercising at the higher temperature and humidity levels utilized during Bikram yoga (ie, 105°F and 40% humidity) will increase Tc and HR to dangerous levels. Therefore, the purpose of this study was to determine the Tc and HR responses during a Bikram yoga class.

METHODS
Subjects
Twenty healthy volunteers, 7 men and 13 women, from 28 to 67 years of age were recruited. All of the participants were regular practitioners of Bikram yoga and were familiar with the 26 poses. Rooms are heated to 105°F and kept at 40% humidity. This study examined the heart rate (HR), core temperature (Tc), and rating of perceived exertion (RPE) responses during a standard Bikram yoga class.

INTRODUCTION: Bikram yoga classes are 90 minutes long and are held in a room heated to 105°F and 40% relative humidity. This study examined the heart rate (HR), core temperature (Tc), and rating of perceived exertion (RPE) responses during a standard Bikram yoga class.

METHODS: Twenty volunteers (7 men and 13 women) participated in a Bikram yoga class taught by a certified Bikram yoga instructor. During the class Tc was measured every 10 minutes via an ingestible core temperature sensor and HR was measured every minute via radiotelemetry. At the end of the class participants rated their perceived effort (RPE) using the Borg category ratio scale (CR10) scale. Standard descriptive statistics were used to characterize the HR, Tc, and RPE responses.

RESULTS: There was a steady increase in Tc throughout the class, with the highest temperature occurring at the end of the class for all subjects (mean of 102.4 ± .87°F). The highest temperature recorded for an individual was 104.1°F, and 7 other participants had temperatures higher than 103°F. Heart rate fluctuated during the class according to the poses being performed, with average HR equaling 75% of predicted maximal HR. Average RPE was 8.0 ± 1.67 for the class.

CONCLUSION: Based upon these results, it appears that a 90-minute Bikram yoga class presents an increased risk of exertional heat illness.

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All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.
standard poses used during the class. The experience level of each participant was rated by the instructor on a scale of 1 to 10 (1=low experience; 10=high experience). Descriptive characteristics of the volunteers are presented in Table 1. Prior to participating in the study, subjects provided written informed consent. Approval from the University human subjects committee was obtained prior to the study.

Table 1. Descriptive Characteristics of Study Participants

<table>
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<tr>
<th>Characteristic</th>
<th>Mean ± SD</th>
<th>Range</th>
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<tr>
<td><strong>Age, y</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>50.9 ± 7.75a</td>
<td>43–67</td>
</tr>
<tr>
<td>Women</td>
<td>42.2 ± 8.16</td>
<td>28–56</td>
</tr>
<tr>
<td><strong>Height, cm</strong></td>
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<tr>
<td>Men</td>
<td>180.3 ± 6.87a</td>
<td>170–188</td>
</tr>
<tr>
<td>Women</td>
<td>164.3 ± 7.27</td>
<td>152–175</td>
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<tr>
<td><strong>Weight, kg</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>81.6 ± 13.20a</td>
<td>62–97</td>
</tr>
<tr>
<td>Women</td>
<td>60.8 ± 7.67</td>
<td>46–75</td>
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*Significantly different from women (P < .05).

**Procedures**

The study took place at a Bikram yoga studio near Chicago, Illinois. Subjects participated in a 90-minute Bikram yoga class regularly offered at the studio, and the class was taught by a certified Bikram yoga instructor. Target room temperature and relative humidity were 105°F and 40%, respectively. Temperature and humidity were measured at the beginning and end of the class. At the beginning of the class the temperature was 104.9°F, and relative humidity was 37%. By the end of the class, room temperature had increased to 105.8°F and humidity was 38%.

The night prior to the class, participants swallowed a CorTemp Ingestible Core Body Temperature Sensor (HQ, Inc., Palmetto, FL) in order to monitor Tc. Core temperature was recorded prior to the exercise session and every 10 minutes during the Bikram yoga class using a hand-held, digital monitor. Researchers circulated among the participants, entered the code for each sensor, and manually recorded a digital read-out of each participant’s Tc. During the class, participants also wore a Polar heart rate monitor (HRM USA INC., Warminster, PA). Minute-by-minute HR data were stored on the monitor and downloaded at the conclusion of the exercise session. Average exercise and peak exercise HRs were determined for each participant. Average HR was also represented as a percentage of predicted maximal HR. Maximal HR was predicted using the equation of Gellish et al.12 At the conclusion of the class, participants were asked to provide an overall session rating of perceived exertion (RPE) using the Borg category ratio scale.13 They were also asked if they drank any water during the class.

**Statistical Analysis**

Standard descriptive statistics were used to characterize the subject population and to summarize HR, Tc, and RPE responses to the Bikram yoga class. Potential differences in responses between men and women were assessed using independent sample t tests. Alpha was set at P < .05 to achieve statistical significance for all analyses. All analyses were conducted using the Statistical Package for the Social Sciences (Version 21; SPSS Inc., Chicago, IL)

**RESULTS**

All 20 subjects completed the entire 90-minute Bikram yoga class. Data relative HR, RPE, and Tc are presented in Table 2. Heart rate and Tc responses are graphically presented in Figures 1 and 2 (page 5), respectively. Average HR, maximal HR, and RPE were not significantly different between men and women; however, when the average and highest HRs attained were represented as a percentage of predicted maximal HR, men had significantly higher values than women. Core temperature steadily increased throughout the 90-minute class for both men and women. The highest temperature for all subjects occurred at the end of the class and was significantly higher in men than in women. Heart rate fluctuated throughout the class depending upon the postures being performed.

Table 2. Average Responses in Men (n=7) and Women (n=13) to the 90-minute Bikram Yoga Class

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± SD</th>
<th>Range</th>
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<tr>
<td><strong>Predicted HRmax, bpm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>171 ± 5.4</td>
<td>160–177</td>
</tr>
<tr>
<td>Women</td>
<td>178 ± 5.7</td>
<td>168–187</td>
</tr>
<tr>
<td><strong>Average HR, bpm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>137 ± 13.2</td>
<td>96–156</td>
</tr>
<tr>
<td>Women</td>
<td>128 ± 12.2</td>
<td>102–145</td>
</tr>
<tr>
<td><strong>Average %HRmax</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>80 ± 7.5a</td>
<td>73–93</td>
</tr>
<tr>
<td>Women</td>
<td>72 ± 7.7</td>
<td>61–83</td>
</tr>
<tr>
<td><strong>Highest HR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>158 ± 13.5</td>
<td>145–184</td>
</tr>
<tr>
<td>Women</td>
<td>151 ± 10.8</td>
<td>137–164</td>
</tr>
<tr>
<td><strong>Highest %HRmax</strong></td>
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<td></td>
</tr>
<tr>
<td>Men</td>
<td>92 ± 7.5a</td>
<td>85–107</td>
</tr>
<tr>
<td>Women</td>
<td>85 ± 6.2</td>
<td>77–96</td>
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<tr>
<td><strong>Rating of perceived exertion</strong></td>
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<td></td>
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<tr>
<td>Men</td>
<td>8.9 ± 1.07</td>
<td>7–10</td>
</tr>
<tr>
<td>Women</td>
<td>8.0 ± 1.67</td>
<td>3–10</td>
</tr>
<tr>
<td><strong>Highest temperature, °F (°C)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>103.2 ± 0.78a (39.6 ± 0.43)</td>
<td>101.2–104.1 (38.9 ± 0.40.1)</td>
</tr>
<tr>
<td>Women</td>
<td>102.0 ± 0.92 (38.9 ± 0.51)</td>
<td>100.7–103.8 (38.2 ± 39.9)</td>
</tr>
</tbody>
</table>

Abbreviations: HRmax, maximal heart rate; SD, standard deviation; HR, heart rate; bpm, beats per minute.

*Significantly different from women (P < .05).
HEART RATE AND CORE TEMPERATURE RESPONSES

A previous study from our laboratory compared the HR and Tc responses to hot yoga with those of a regular Hatha yoga class. The class was 55 minutes in length and took place in a room with an average temperature of 92.7°F and 35% relative humidity. That study found no difference in average Tc between the 2 classes (99.7°F vs 99.3°F), and the highest Tc recorded for an individual was 102.4°F (vs 104.1°F in the current study). Obvious differences between the studies were (1) the length of the class, (2) differences in the temperature and humidity of the exercise studio, and (3) during the study by Nereng et al, participants were encouraged to hydrate before, during, and after the class. In the present study, participants were not actively encouraged to drink water, but they did have the choice of whether to drink during the class. Those who drank water had significantly lower core temperatures (102.2°F ± 1.0°F) than those who chose not to drink (103.2°F ± 1.9°F). However, only 3 participants decided not to drink, so any conclusions regarding fluid intake are purely speculative.

The average HR in the current study was 75% of predicted maximal HR. This is similar to the findings of Pate and Buono, who assessed the HR responses to Bikram yoga in novice and experienced practitioners. They found that novice practitioners exercised at an average of 72% of maximal HR, and experienced practitioners exercised at an average of 86%. In the aforementioned study by Nereng et al, the average HR during the hot yoga class was 57% of maximal. The poses in the hot yoga class and the Bikram yoga class were very similar, so it is likely that the increased HR response was due primarily to the increased temperature and humidity of the environment, as well as to the longer length of the class.

Maintenance of Tc during exercise is a balance between heat production and heat loss. The intensity of the poses during Bikram yoga has been measured to be between 6.0 and 12.9 mL/kg/minute and would be considered “light” exercise. Accordingly, heat production was probably not the cause of the steady increase in Tc observed in the current study. It is hypothesized that heat gain was likely responsible for the increase in Tc. Since room temperature was higher than Tc, heat would be gained from the environment throughout the class. Additionally, participants performed some poses while lying on the floor, which was also hotter than Tc. This would result in a conductive transfer of heat from the floor to the body. In addition to this heat gain, participants were unable to effectively dissipate heat by means of evaporation because of the high humidity and high room temperature. Collectively, these factors likely contributed to an overall steady increase in Tc throughout the 90-minute class.

It was thought that experience with Bikram yoga might have played a role in the elevation of Tc between individuals. Participant experience level was ranked by the Bikram instructor and correlated to the highest temperature recorded for individual subjects. However, no correlation (r = -.19) was found between experience level and highest temperature recorded.

In summary, this study primarily evaluated the Tc responses to practicing Bikram yoga. Although an extreme Tc (>104°F) was observed in only 1 participant, a high percentage of subjects (40%) reached a Tc greater than 103°F. Exercising in hot and humid environments can place participants at risk for severe exertion-related heat illness, which can sometimes be fatal. Therefore, it is recommended that instructors of Bikram yoga be educated on

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Figure 1. Heart rate responses to 90-minute Bikram yoga class by minute.

Figure 2. Core temperature responses to 90-minute Bikram yoga class by minute.

DISCUSSION

One of the main concerns that has been widely expressed surrounding Bikram yoga is the potentially dangerous increase in Tc as a result of exercising for a prolonged period of time in an extremely hot and humid environment. The present study evaluated the Tc responses to a standard Bikram yoga class. During the class, Tc increased in a linear fashion in both men and women. The average highest was 102.4 ± .87°F, with men having significantly higher responses. One man in the study had a Tc of 104.1°F by the end of the 90-minute class, and 7 other participants had Tc greater than 103°F. These temperatures are concerning because they are at or near the critical value of 104°F, where many signs and symptoms of heat-related illness manifest themselves and may become threatening. The National Athletic Trainer’s Association (NATA) and the American Council of Sports Medicine (ACSM) both state that exertion-related heat illness and heat stroke can occur at a Tc above 104°F. Common signs and symptoms of heat-related illness include hypotension, tachycardia, dizziness, syncope, hyperventilation, nausea, vomiting, muscle cramps, and seizures. All of these conditions have been reported in the past at this location (personal communication with the studio owner).
the prevention and recognition of heat-related illness, as well as on the potential risks associated with severely elevated Tc. Future investigations about the effects of various hydration strategies, as well as lowering the temperature and humidity in the exercise studio, on the Tc responses during Bikram yoga are warranted.

REFERENCES
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Aspiration Pneumonia After Screening and Diagnostic Procedures for Dysphagia Following Acute Stroke

ABSTRACT

Background: Aspiration pneumonia (AP) accompanies as many as one-third of stroke events and has the highest mortality of all stroke-related medical complications. Dysphagia, a major independent risk factor for AP, occurs in 19% to 81% of patients with acute stroke.

Objective: The goal was to determine the prevalence and outcomes for hospitalized patients diagnosed with AP following acute stroke.

Methods: Medical records of patients admitted to our community hospital for acute stroke between January 2007 and December 2013 were retrospectively reviewed.

Results: Of the 2020 patients who were admitted through an Acute Stroke Care Pathway (ASCP), 59 (2.92%) developed AP. Forty (67.8%) of these patients were administered the Gundersen Lutheran Acute Dysphagia Screen (GLADS) by trained nursing staff or speech pathologists. Twenty-five patients passed and progressed to safe, oral nutrition. Eighteen (30.5%) of the 59 patients had pneumonia on admission, and 41 (69.5%) developed pneumonia after admission. Twenty-three patients (39.0%) died, most due to stroke, pneumonia, or a combination thereof.

Oropharyngeal dysphagia (OpD) and aspiration pneumonia (AP) are common sequelae to acute stroke. Pneumonia complicates nearly one-third of all strokes; thus, with over 15 million strokes occurring each year, the worldwide incidence of stroke-related pneumonia exceeds 5 million annually. Approximately 19% to 81% of acute stroke patients are diagnosed with dysphagia, and nearly half of dysphagic stroke patients develop pneumonia. Conversely, about half of patients who are diagnosed with pneumonia do not have a diagnosed dysphagia. Dysphagia may occur at various sites along the upper alimentary tract and may be termed oropharyngeal or esophageal, depending on the location in which it is manifested. The current study focused on OpD, which can lead to a number of life-threatening complications, including AP, dehydration, and malnutrition. Aspiration occurs when a foreign material enters the airway and is not expelled reflexively. Although aspiration is frequently blamed for post-stroke pneumonia, other risk factors include severe neurological communicative and cognitive deficits, age greater than 65 years, decreased mobility, bacterial dental infections, and prolonged intubation or tube feedings. Behavioral therapy and feeding tubes are commonly employed for dysphagia following stroke. Nakajoh and colleagues found that orally fed patients developed AP at a rate over 40% higher than that of tube-fed patients; however, evidence to show that feeding tubes significantly reduce AP risk for patients with neurogenic dysphagia is lacking. Moreover, Partik et al. found that patients with swallowing dysfunction following long-term intubation exhibited assorted forms of aspiration. Alessi and colleagues suggest that intubation should be avoided except in critical clinical circumstances.

Both OpD and AP significantly increase the morbidity and mortality for stroke victims, particularly if not recognized and addressed early. Screening for dysphagia and aspiration has had varying degrees of success, specificity, and sensitivity. The bedside swallow is a safe, efficient, inexpensive, and noninvasive screen. Furthermore, screening for dysphagia early in a patient’s disease course can help safeguard against AP, resulting in improved outcomes, reduced cost of medical care, and shortened length of hospitalization.

In 2009, Hartman and colleagues reported that the Gundersen Lutheran Acute Dysphagia Screen (GLADS) used in conjunction with an Acute Stroke Care Pathway (ASCP) was potentially effective for identification and prevention of OpD and AP. Using GLADS (described in the 2009 publication) in conjunction with the ASCP, the prevalence of AP following acute stroke for 753 patients was 1.73%, much lower than most reported figures. When diagnosis and quantification is necessary for swallowing and dysphagia, videofluorographic or fiberoptic endoscopic studies of swallow (VFSS or FESS, respectively) are used. These imaging studies offer visualization of the swallowing process for diagnostic purposes and are particularly valuable for detection of silent aspiration, that is, aspiration unaccompanied by choking or any of the other signs associated with aspiration. The VFSS and FESS are also important for developing therapeutic protocols.
screening alone, and silent aspiration may contribute to the approximately 80% of dysphagia that goes undiagnosed in stroke patients.

The primary purpose of the current investigation was to determine the prevalence of AP for patients seen in our community hospital through an ASCP between January 2007 and December 2013 and to compare the results with those of a study similarly conducted in 2009. We were also interested in dysphagia, morbidities, diagnostic procedures, and outcomes during hospitalization.

METHODS

The study was approved by the Gundersen Clinic, Ltd. Human Subjects Committee/Institutional Review Board. Patients admitted through an ASCP between January 2007 and December 2013 were identified through a query of our electronic health record system. The medical records of these patients were reviewed for demographic data, relevant premorbidities and comorbidities, any screening and diagnostic procedures for dysphagia and aspiration, stroke type, site of lesion, and outcomes. Descriptive measures, including proportions, means, standard deviations, and median values, were calculated. Fisher exact tests were employed for comparison of prevalence. All analyses were conducted using SAS Version 9.3 (Cary, NC).

RESULTS

Two thousand twenty patients were admitted through an ASCP between January 2007 and December 2013. Of these, 59 (2.92%) developed AP during their hospitalization for acute stroke—43 (72.9%) men and 16 (27.1%) women ranging in age from 32 to 94 years (mean=70.6, standard deviation [SD]=13.88). Twenty-three (39.0%) of the patients who developed AP had received pneumococcal vaccine within the 5 years prior to their hospitalization for acute stroke. Sixteen of these 23 patients, who tended to be older, died within 30 days of hospitalization. Only 3 of the 16 passed GLADS and went on to an oral diet. Whether age, illness, or combinations thereof were factors for death in these or any of the other 13 patients was unclear.

In general, for the 59 patients with AP, those with previous or current large supratentorial strokes had prominent communicative or cognitive deficits, as well as swallowing difficulties. Relevant premorbid and comorbid conditions of the 59 patients who developed AP are provided in Table 1. Sixteen patients had diagnoses of aphasia, apraxia of speech, dysarthria, or dementia prior to admission, and 28 had these diagnoses with the current admission.

Of the 59 patients with AP, 18 (30.5%) were admitted with pneumonia, and 41 (69.5%) were admitted without pneumonia but developed AP at some time during their hospitalization. Forty of these 59 patients (67.8%) were administered GLADS. Twenty-five (42.4%) passed, and 15 (25.4%) failed. For a variety of reasons, including impaired consciousness, severity of neurological deficit, prolonged intubation, and death prior to administration, GLADS was not administered to 19 (32.2%) patients.

After admission but prior to being administered GLADS, 2 (3.4%) patients were on an oral diet. Nine (15.3%) patients who passed GLADS went on to develop AP, as did 4 (6.8%) patients who passed VFSS and began an oral diet. Based on dysphagia screening and diagnostic testing, 25 (42.4%) patients developed OpD subsequent to the current stroke. This included patients who attempted GLADS but never passed, attempted GLADS more than once, and all patients who failed VFSS.

Feeding tubes (either nasogastric or gastrostomy) were placed for 30 (50.9%) patients. Of these patients, 8 (26.7%) had AP on admission, and 22 (73.3%) developed AP after admission but prior to having a feeding tube. Eighteen of the patients who received enteral nutrition were administered GLADS at some point during hospitalization; 13 of these 18 patients (72.2%) had both a feeding tube and pneumonia before attempting the screen. Of the 59 patients with AP, 8 (13.6%) patients were intubated and on a ventilator for over 5 days. Four (6.8%) patients had a tracheotomy during hospitalization.

Stroke type, site of lesion, and, if applicable, cause of in-hospital death, are provided in Table 2. (Page 9) Hemispheric strokes constituted 76.3% of all strokes, with 25 (42.4%) occurring in the left hemisphere and 20 (33.9%) in the right hemisphere; 10 (17.0%) were bitemporal. Two (3.4%) patients had a brainstorm stroke. The site of lesion was undetermined for 2 (3.4%) patients. Twenty-three patients died during hospitalization from stroke, pneumonia, comorbidities or combinations thereof.

The prevalence of AP in the 2009 study was not significantly different from that of the current study (1.73% vs 2.92%, respectively; \( P = .105\), Fisher exact test).

DISCUSSION

The prevalence of AP following acute stroke between January 2007 and December 2013 was 2.92%. The prevalence reported in the 2009 study, which included admissions between 1998 and 2006, was 1.73%. Statistically, the difference in prevalence was non-significant. It is worthwhile to consider the different population sizes of the 2 studies. Seven hundred fifty-three acute stroke patients were included in the 2009 study, which is about one-third the number of patients included in the current investigation. Even with a larger sample size, the results of the current study support...
VFSS or FESS,\textsuperscript{24-27} may have merit for detecting silent aspiration. Further ongoing research is warranted. In addition, aspiration manifests uniquely in each patient, as Partik et al\textsuperscript{17} found in a study of patients following long-term intubation. Diagnostic methods such as VFSS and FESS provide visualization of the swallowing process necessary to achieve this detection and develop a treatment plan specialized for each patient’s disorder.\textsuperscript{22} Considering that only 11 of 2020 patients (0.545\%) admitted through an ASCP over a 6-year period developed AP that was not predicted by screening, this finding is of lesser concern; however, diagnostic studies, such as VFSS or FESS, may have been helpful a posteriori.\textsuperscript{7}

### Pneumococcal Vaccine

Approximately 40\% of the total population received the pneumococcal vaccine within 5 years of hospitalization for stroke, and 16 (70\%) of these patients died within 30 days. Considering that 23 deaths occurred within the full scope of this study, patients who were vaccinated comprised a majority of the total deaths. The reason for this result is unclear and merits further investigation. Several meta-analyses have attempted to evaluate the efficacy of the pneumococcal vaccine, with discrepant results.\textsuperscript{28-32} Moreover, very little evidence exists for the vaccine’s protective ability in high-risk elderly patients, particularly with regard to pneumonia incidence and mortality.\textsuperscript{28} Musher et al\textsuperscript{33} suggest that primary vaccination and re-vaccination within 5 years provide equal antibody protection. The current study involved mainly high-risk and elderly patients who developed AP. However, because our medical center has had such a low prevalence of AP since 1998, statistical analysis of our small sample was not indicated. Conversely, the high mortality rate for vaccinated patients within the current study and the discrepant results from previous research indicate a need for additional research. Using a mouse model, Prass and colleagues\textsuperscript{34} found that bacterial AP could be readily induced through intranasal application of suspended Streptococcus pneumoniae in mice that had an induced middle cerebral artery stroke. It would be interesting to investigate demographics and outcomes of vaccinated patients who developed AP associated with stroke and consider whether the pneumococcal vaccine contributes to patient morbidity and mortality.

### Pneumonia on Admission

Eighteen patients had a diagnosis of AP on admission through an ASCP, although the origin of this diagnosis was unclear. Half of these patients had a history of previous stroke, half underwent GLADS, 8 (44.4\%) had been started on tube feeding, and 13 (72.22\%) died (including the 8 with tube feeding) during hospitalization. Interestingly, none of these patients were on a ventilator for longer than 5 days. Of the patients who had pneumonia on admission and died, nearly all had a history of previous stroke, none underwent GLADS, and all were on a feeding tube.

A key question was whether the 18 patients had AP or another form—for example, community-acquired or nosocomial pneumonia. Evidence for AP diagnosis was primarily collected from reports and chest radiograph results; however, VFSS or FESS could have facilitated confirmation of aspiration (and dysphagia) to support diagnoses of AP.\textsuperscript{7} In the current study, most patients admitted with stroke and pneumonia were already in very poor health, making timely screening difficult. Six patients did pass GLADS; if aspiration was the cause of pneumonia in these patients,
it is possible that symptoms and signs had either resolved by the time GLADS was administered or that aspiration prior to admission was silent in nature.\textsuperscript{6,13,22,23,35} Although we were unable to verify that these stroke patients developed pneumonia due to aspiration, their respiratory compromise was generally associated with severe and repeated stroke. It would be beneficial to determine how the cause and type of pneumonia affects prognosis, treatment, and outcome.

Lastly, although 23 patients with AP following stroke died, 36 survived and were discharged from the hospital. Of these, 8 died within 1 month of discharge due to complications from their stroke.

CONCLUSION

We determined that the prevalence of AP in patients admitted through an ASCP at our medical center between January 2007 and December 2013 was 2.92%, which is very low compared with national reports.\textsuperscript{1-4,14-17,20,22} This result did not significantly differ from the reported prevalence of 1.73% between 1998 and 2006. GLADS appears to be an effective screening tool for dysphagia and aspiration, allowing patients to receive appropriate and specialized care for optimal recovery. Although the prevalence of AP in stroke patients was very low, 39% died from stroke and/or pneumonia. Future investigations could focus on the efficacy of the pneumococcal vaccine, particularly in at-risk patients, the accuracy of premorbid diagnoses of AP, and the effect of bacterial dental infections, prolonged intubation, and feeding tubes on pneumonia development in stroke patients. Prospective studies are recommended to address the questions and concerns posed by the current study.

ACKNOWLEDGMENTS

The authors thank Gundersen Medical Foundation, which supported the project, and Cathy Mikkelson Fischer, MA, ELS, for her assistance in preparing this manuscript for publication. The authors also thank the Foundation and the endowed Joan Curran Memorial Summer Research Fellowship, which supported Ms. Anderson's work.

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All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

Ultrasound-Guided Removal of a Failed Pregnancy in a Patient with a History of Radio Frequency Endometrial Ablation with Dense Intrauterine Adhesions

ABSTRACT

Significant numbers of women conceive after endometrial ablation, despite the recommendation for reliable contraception. Embryonic or fetal demise is a common outcome. In such cases there may be ultrasonographic or clinical evidence of dense intrauterine adhesions and distortion of the endometrial cavity. Little detailed information is available to guide the clinician in managing these difficult cases. We present our experience with a patient with an embryonic demise complicated by extensive intrauterine adhesions who was successfully treated by ultrasound-guided hysteroscopic lysis of adhesions with suction evacuation of the products of conception. This case reinforces the need for long-term, sustained, reliable contraception after endometrial ablation.

Endometrial ablation has become a common and effective option for treatment of abnormal uterine bleeding. It has been estimated that 0.7% of women may conceive after endometrial ablation, despite the recommendation for reliable contraception. Miscarriage has been reported in 21% of cases after endometrial ablation. In cases of embryonic or fetal demise after endometrial ablation, ultrasound may be useful in showing evidence of intrauterine adhesions and distortion of the endometrial cavity, alerting the clinician to the risk of perforation with dilatation and curettage. In our review of the medical literature, we found little detailed information to assist in the management of such difficult cases. Accordingly, we present our experience with a patient with an embryonic demise complicated by dense intrauterine adhesions who was successfully treated by ultrasound-guided hysteroscopic lysis of adhesions with suction evacuation of the products of conception. This case also reinforces the need for long-term, sustained, reliable contraception after endometrial ablation.

CASE REPORT

A 39-year-old gravida 5, para 3, SAB 1 woman who had undergone an uncomplicated, radio frequency endometrial ablation (NovaSure, Hologic Inc, Bedford MA) 6 years prior presented to our clinic with a positive home pregnancy test. She had been using contraception inconsistently. The patient had a medical history of multiple lower abdominal surgeries, including 2 cesarean sections, 2 incisional hernia repairs with mesh, and a panniculectomy.

A transvaginal ultrasonogram (Figure 1) showed there to be an embryonic demise at 6 weeks 4 days gestational age by a crown-rump length of 0.7 cm. There was evidence of intrauterine adhesions with loss of the normal appearing endometrial stripe in the lower endometrial cavity over a 1.5 cm length. The endometrium in the lower uterus was discontinuous, with a maximal thickness of 0.3 cm, and an echo dense cesarean section scar area was also noted. The initial β-human chorionic gonadotropin (β-hCG) concentration was 72 220 IU/L.

Following a careful discussion with the patient about surgical and medical management options and noting the lack of well-established clinical guidelines, the patient was initially treated with 2 doses of 50 mg/m² intramuscular methotrexate and 2 courses of 600 µg vaginal misoprostol. After an initial drop in β-hCG concentration to 83 IU/L, the levels oscillated in the 30 to 88 IU/L range over the following 3 months. Loss of the gestational sac, with the remaining echogenic area in the upper endometrial cavity measuring 2 cm, was visible on ultrasonogram. Options were discussed with the patient again. She did not wish further expectant or medical treatment, and she preferred not to undergo hysterectomy. In addition to the usual suction dilatation and curettage, the patient was consented for hysteroscopy in the event it became necessary; a consent was also obtained for hysterectomy in case the hysteroscopy was not technically feasible or perforation occurred.

Figure 1. Transvaginal ultrasound image of uterus showing gestational sac in upper endometrial cavity.
After attempts to dilate the cervix for the usual dilatation and curettage failed, the patient underwent an outpatient ultrasound-guided hysteroscopic lysis of dense intrauterine adhesions with suction evacuation of the products of conception under the same general anesthesia as follows. She was treated with 800 µg misoprostol vaginally the day before surgery. Transvaginal ultrasonography was performed immediately before and after the procedure, and transabdominal ultrasonography was performed during the procedure to aid the surgeon in maintaining the instruments within the uterine cavity. The bladder was kept partially full to improve the transabdominal imaging. Immediately prior to the hysteroscopy, dilute vasopressin (approximately 10 ml of 20 units in 100 ml normal saline) was injected paracervically in a circumferential fashion for preventive hemostasis. Initially only the lower 3 cm of cervix could be dilated. Following this, through a combination of hysteroscopic scissors and cervical dilators, the tiny scarred channel of the upper cervix and lower endometrial cavity was widened to a 10-mm tubular cavity. The upper endometrial cavity was further opened until the products of conception could be visualized (Figure 2), and an 8-mm suction curette was used to evacuate the products of conception (Figure 3). The surgery proceeded with little blood loss (estimated blood loss = 50 ml) and without complication including no evidence of perforation. The patient was discharged home 2 hours after surgery. There was complete resolution of the pregnancy with a rapid fall in quantitative β-hCG to normal levels by 3 weeks after the surgery. The pathology report showed partially necrotic placental and decidualized tissue, consistent with products of conception with the aggregate of tissue measuring 5.2 × 3.8 × 1.0 cm. The patient was treated with combination hormonal contraception.

**DISCUSSION**

Many serious obstetrical complications including placentaion disorders and perinatal deaths have been reported in patients conceiving after endometrial ablation. Evidence-based guidelines are lacking, so much of the advice available to the clinician is through reviewing case reports. In comparing our case with the available literature (and to future readers’ cases), it should be noted that our specific case is of a first trimester demise (Figure 1) in which there was a suspicion of significant intrauterine adhesions. The initial ultrasonogram showed a loss of the normal endometrial stripe over a 1.5 cm segment of the lower endometrial cavity with the maximum thickness of the discontinuous endometrium in this area being 0.3 cm. Dense lower endometrial adhesions were later confirmed at surgery. Pregnancy normally causes a thick, dense, echogenic endometrium that generally slowly tapers towards the cervix. Lo and coauthors showed that in the nonpregnant uterus in patients with Asherman syndrome, a thin endometrium was associated with uterine outlet obstruction due to intrauterine or upper cervical adhesions. In our case, 2 doses of intramuscular methotrexate (50 mg/m²) and 2 courses of vaginal misoprostol failed to fully necrose or expel the products of conception. However, there was loss of the gestational sac and, based on the β-hCG levels and ultrasonographic appearance, significant reduction in the amount of viable trophoblastic tissue. Following this, outpatient ultrasound-guided hysteroscopic lysis of intrauterine adhesions (Figure 2) with suction evacuation of products of conception (Figure 3) allowed for removal of the products of conception without complication. Kresowik and coworkers reported in nonpregnant patients that ultrasound guidance was found to be better than laparoscopic guidance in difficult hysteroscopic cases including patients with intrauterine adhesions; their results showed a lower cost and low incidence of uterine perforation.

A literature review revealed little detailed information from comparable cases. Lee and coauthors reported a patient who conceived an anembryonic pregnancy after endometrial ablation with a similar initial β-hCG level of 53 206 IU/L (our patient’s initial β-hCG level was 72 220 IU/L). The ultrasonogram showed evidence of distortion of the endometrial cavity, and they believed that there would be increased risk of uterine perforation with a dilatation and curettage. They used ultrasound-guided local injection of methotrexate to resolve the pregnancy without complication. They concluded that local injection of methotrexate may be a safe and effective treatment option. However, they did point out the risks involved (significant bleeding and sepsis) and the necessity of a clinician experienced in diagnostic and interventional ultrasound.
ULTRASOUND-GUIDED REMOVAL OF A FAILED PREGNANCY

We would suggest considering the following approach in patients with first trimester demise after endometrial ablation when there is ultrasound evidence of significant endometrial adhesions. Based on our experience, the other similar case report,7 and reports of ultrasound-guided lysis of adhesions in the nonpregnant patient,8,9 it seems reasonable to try systemic or local methotrexate with or without vaginal misoprostol first. If these treatments and the usual type of dilatation and curettage are not successful, ultrasound-guided hysteroscopy with evacuation of the remaining products of conception may be attempted, with the patient prepared to undergo hysterectomy if perforation occurs or the procedure is not technically feasible.

Reoperative hysteroscopy after prior endometrial ablation requires a hysteroscopist experienced in treating intrauterine adhesions and familiar with ultrasound guidance. Wortman and coworkers reported a series of 50 symptomatic nonpregnant patients who underwent ultrasound-guided reoperative hysteroscopy after prior endometrial ablation without perioperative complications; however, they pointed out that considerable experience with operative hysteroscopy would be required for these procedures.9 Because pregnancy is contraindicated after endometrial ablation, if initial attempts at medical therapy and traditional dilatation and curettage fail, hysterectomy also remains a reasonable choice. Our patient's history of multiple lower abdominal surgeries, including two hernia repairs with mesh, strongly influenced us against hysterectomy unless all other acceptable options were exhausted; our patient also preferred a procedure with minimal recovery time. Hysterectomy is more widely available and does not require specialized equipment or experience with ultrasound guidance, interventional ultrasonography, or difficult hysteroscopic procedures. If surgical intervention other than hysterectomy is undertaken, a concomitant sterilization procedure should be considered.

CONCLUSION

The many reports of complications at various stages of pregnancy occurring after endometrial ablation serve to emphasize the need for adequate contraception or sterilization when ablation is performed. The current case, which occurred 6 years after ablation and at a time when the patient reported that she had become lax in her contraceptive use, emphasizes the need for sustained contraception. Our case shows that ultrasound-guided removal of a first trimester demise in a postendometrial ablation patient with dense intrauterine adhesions may be an effective treatment. Further cases will need to be reported to determine the rate of complications, such as uterine perforation and failure to technically complete the procedure.

REFERENCES
Unilateral Spontaneous Adrenal Hemorrhage in Pregnancy

ABSTRACT

Exact incidence of spontaneous adrenal hemorrhage in pregnancy is unknown, but it may be more common in pregnancy than reported. All-cause autopsy studies have reported its incidence to be from 0.14% to 1.1%. A 19-year-old woman 35 weeks into her second pregnancy was transferred to our hospital from a regional facility with persistent nausea, vomiting, and pain in the upper right quadrant of her abdomen. She was taking antibiotics for urinary tract infection and had been given narcotic pain medication with no substantial relief. Computed tomography scan with contrast revealed a 4.5-cm enlarged right adrenal gland suggestive of an acute adrenal hemorrhage. We managed the patient conservatively with intravenous hydration and analgesia, and her vital signs, hemoglobin, adrenal function, glucose, and electrolytes were carefully monitored. She was discharged on day 2. She continued to have mild pain, so she was admitted for induction of labor at 38 weeks. Her condition resolved on its own in the postpartum period without complication. We present our patient’s clinical, laboratory, and imaging findings, and we review related reports in the literature.

CASE REPORT

A 19-year-old woman in the 35th week of her second pregnancy with ongoing right upper quadrant abdominal pain was transferred from a local community hospital to our medical center. At the local facility she had been treated with antibiotics for urinary tract infection. She was also given narcotic pain medication with no substantial relief. She was transferred to our facility due to persistent nausea, vomiting, and abdominal pain.

The patient was obese (body mass index of 35, calculated as weight in kilograms divided by height in meters squared), and she had a history of depression, tobacco use, and polysubstance abuse. She also had iron deficiency anemia. She had a low-lying placenta at second trimester that resolved spontaneously in the third trimester.

Examination on admission revealed a woman in distress. Her temperature was 36.7°C. She had tachycardia, but her blood pressure and respiratory rate were stable. She had diffuse and severe right flank pain on palpation, and costovertebral angle tenderness was elicited. The remaining examination findings were unremarkable.

Système International (SI) conversion factors for all relevant analytes to which this article refers are provided after the conclusion. Results of the initial laboratory evaluation were a hemoglobin concentration of 9.4 g/dL, white blood cell count of 14 010/μL, and platelet count of 381×10^3/μL. Serum glucose concentration was 80 mg/dL. Results of the electrolyte panel, lipase, and bilirubin tests were normal, as were those of the coagulation tests and urine analysis.

Initial ultrasonogram showed normal kidneys, liver, gall bladder, pancreas, and aorta. A computed tomography (CT) scan with contrast was performed, which revealed a 4.5-cm enlarged right adrenal gland with an appearance indicating an acute right adrenal hemorrhage (Figure 1). Differential diagnosis included spontaneous adrenal hemorrhage, acute bleeding inside an adrenal neoplasm, and adrenal adenoma. These imaging findings prompted evaluation of the patient’s adrenal function. Serum cortisol (pm) was 44 μg/dL (reference range 2-18 μg/dL), AM cortisol was 24 μg/dL.
µg/dL (reference range 7-28 µg/dL), and dehydroepiandrosterone sulfate (DHEA-S) concentration was 35 µg/dL (reference range 50-450 µg/dL). Random serum aldosterone concentration was 43 ng/dL, and renin activity was 13.0 ng/ml/hr. Plasma metanephrine and normetanephrine concentrations were < 0.20 nmol/L and 0.21 nmol/L, respectively. Tests were negative for antiphospholipid and anticardiolipin antibodies.

We managed the patient conservatively with careful monitoring of vital signs, hemoglobin, adrenal function, glucose, and electrolytes. She was treated with intravenous hydration and analgesia. She was discharged on day 2. Mild pain persisted through the patient’s pregnancy, so she was admitted for induction of labor at 38 weeks. At the time of delivery, she was managed with stress-dose steroids. She progressed well, and a healthy female infant was delivered without complication. The patient’s postpartum course was uncomplicated, and she was discharged home on day 2. A follow-up CT scan (Figure 2) with and without contrast was done 3 months after the initial CT scan. The scan showed normal adrenal glands bilaterally, with complete resolution of the right adrenal hemorrhage.

**DISCUSSION**

The earliest published cases of adrenal hemorrhage were reported by Dewhurst, Crawford, and Cardwell. Published autopsy reports indicate the incidence of this condition from all causes to be 0.14% to 1.1%. In certain conditions, such as trauma, pregnancy, and sepsis, the prevalence of this condition may be higher. The exact incidence of this condition in pregnancy is unknown. It can be unilateral or bilateral. The single largest case series of adrenal hemorrhage, published by Vella et al in 2001, suggests that SAH may more commonly involve a single adrenal gland. In that series of 141 cases of adrenal hemorrhage in adults, 16 patients were categorized as having SAH, 3 of whom had adrenal insufficiency.

The imaging findings for the evolution of non-traumatic SAH have been described for CT, ultrasonogram, and MRI by Kawashima et al. Magnetic resonance imaging (MRI) is the diagnostic modality of choice. Postpartum reevaluation with follow-up imaging and evaluation of adrenal function are essential to confirm resolution and exclusion of underlying tumor.

Conservative management is recommended except in the case of massive hemorrhage with circulatory collapse. Seven cases of SAH in pregnancy that have been conservatively managed successfully are published in the medical literature (Table). Adrenal function was evaluated in all of them, and the patients were treated with steroids if found to have adrenal insufficiency. Our patient was managed conservatively with serial follow-ups, and labor was induced at 38 weeks. She was given stress-dose steroids during delivery.

**CONCLUSION**

It is important to consider SAH in the differential diagnosis for abdominal pain and symptomatic adrenal masses in pregnancy. There are no clear-cut recommendations for future pregnancies. A high index of suspicion and close prenatal care are warranted, especially in patients with preeclampsia or eclampsia, because the risk of a future hemorrhage is higher.

**Système International Conversion Factors**

Aldosterone: to convert to pmol/L, multiply value by 27.74.

Cortisol: to convert to nmol/L, multiply value by 27.588.

Dehydroepiandrosterone sulfate (DHEA-S): to convert to µmol/L, multiply value by 0.027.
### Table. Published Reports of Spontaneous Adrenal Hemorrhage during Pregnancy

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
<td>20</td>
<td>20</td>
<td>41</td>
<td>25</td>
<td>24</td>
<td>35</td>
<td>27</td>
</tr>
<tr>
<td>Gravidity</td>
<td>2</td>
<td>1</td>
<td>not reported</td>
<td>not reported</td>
<td>1</td>
<td>not reported</td>
<td>2</td>
</tr>
<tr>
<td>Pregnancy stage at presentation</td>
<td>week 29</td>
<td>week 33</td>
<td>not reported</td>
<td>~week 3</td>
<td>week 24</td>
<td>week 38</td>
<td>week 35; week 37</td>
</tr>
<tr>
<td>Presentation</td>
<td>left upper quadrant pain, cramping</td>
<td>severe right flank pain, nausea, fever</td>
<td>right flank pain and nausea</td>
<td>right upper quadrant pain</td>
<td>right upper quadrant pain</td>
<td>12 hours after induced delivery of twins, developed breathlessness and dry cough, rapid pulse, and low blood pressure, then severe right flank pain</td>
<td>severe right flank pain, nausea; then severe left flank pain 2 weeks later</td>
</tr>
<tr>
<td>Comorbidities</td>
<td>none</td>
<td>morbid obesity</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Diagnostic imaging</td>
<td>renal and obstetric sonograms; ventilation-perfusion lung scan; chest radiograph; abdominal CT scan with contrast</td>
<td>abdominal sonogram and MRI</td>
<td>sonogram and MRI</td>
<td>abdominal sonogram and MRI; percutaneous US-guided needle biopsy and repeat MRI</td>
<td>abdominal sonogram; CT pulmonary angiogram; MRI</td>
<td>Radiograph; sonogram; abdominal CT scan with contrast</td>
<td>abdominal MRI at 35 and 37 weeks</td>
</tr>
<tr>
<td>Side</td>
<td>left</td>
<td>right</td>
<td>right</td>
<td>right</td>
<td>right</td>
<td>right</td>
<td>bilateral</td>
</tr>
<tr>
<td>Treatment</td>
<td>analgesics; at 36 weeks, and after IV MgSO and hydroalazine, labor was induced due to pre eclampsia; discharged on oral hydroalazine</td>
<td>IV antibiotic, hydration, and antiemetic medication; analgesia</td>
<td>conservative management</td>
<td>IV antibiotics; steroids for suspected premature rupture of membrane, then IV fluids and antispasmodics for pain</td>
<td>therapeutic anticoagulation</td>
<td>oxygen, blood transfusion, IV fluids, antibiotics, dopamine</td>
<td>analgesic; at pregnancy week 37, hydrocortisone, with cesarean delivery a few days later</td>
</tr>
<tr>
<td>Outcome</td>
<td>repeat abdominal CT 1 month after delivery revealed resolving adrenal hemorrhage</td>
<td>repeat CT scan 3 months after diagnostic imaging showed complete resolution of right adrenal hemorrhage</td>
<td>resolution</td>
<td>premature delivery of healthy infant; follow-up MRI 11 days later showed complete resolution of hemorrhage</td>
<td>postpartum MRI showed complete resolution of the adrenal hemorrhage</td>
<td>contrast CT scan 4 weeks later showed resolving retroperitoneal hematoma with a thick-walled adrenal cyst around the adrenal gland; contrast CT scan 8 weeks later showed complete resolution of the hematoma</td>
<td>discharged 10 days after delivery on prednisone, with taper after 1 month and discontinuation after 2 months</td>
</tr>
</tbody>
</table>

Abbreviations: MRI, magnetic resonance imaging; CT, computed tomography; IV, intravenous

Glucose: to convert to mmol/L, multiply value by 0.0555.
Hemoglobin: to convert to g/L, multiply value by 10.0.
Platelet count: to convert to x10^9/L, multiply value by 1.0.
Renin: to convert to pmol/L, multiply value by 0.0237.
White blood cell count: to convert to x10^9/L, multiply value by 0.001.

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Disease Management: Chronic Obstructive Pulmonary Disease

ABSTRACT

Chronic obstructive pulmonary disease (COPD) is a common, treatable condition that affects an estimated 24 million Americans. We describe the means by which COPD may be definitively diagnosed, appropriate treatment at various stages of the disease, and strategies to prevent exacerbations. We also describe the addition of COPD to Gundersen Health System’s chronic disease management program, and the new tools that are now available to providers in EPIC and on Gladiator (Gundersen Health System’s intranet) to track their performance on key measures for their COPD patients.

Chronic obstructive pulmonary disease (COPD) is a common, treatable disease. By definition, COPD is characterized by persistent, usually progressive airflow limitation and is associated with an exaggerated, chronic inflammatory response to noxious particles or gases. The latter, inflammatory exacerbations, contribute to the overall severity in patients. Other obstructive lung diseases, such as cystic fibrosis, bronchitis, and asthma, have airflow obstructions but are considered separate airway diseases not included in COPD.

DIAGNOSIS

The clinical diagnosis of COPD should be considered in any patient who has dyspnea or chronic cough with or without sputum production, especially if associated with a history of exposure to risk factors for the disease. In this clinical context, spirometry is required to make the diagnosis. For example a 50-year-old who has smoked and has a chronic cough may have COPD, but the differential includes heart disease, anemia, renal failure, or other causes of shortness of breath. The fact that a patient smoked or otherwise fits into this clinical situation does not confirm the diagnosis of COPD. In fact, only 20% of people who smoke develop COPD.

If a smoker with a 20 pack-year smoking history does not have significant obstruction as measured by spirometry by age 40 years, later development of COPD is unlikely. Surprisingly, 15% of people with COPD in the United States have never smoked. Smoking is the most common cause of COPD worldwide, but in non-smokers, COPD is more frequent in women, especially in developing countries where it can be caused by exposure to smoke from wood, dung, or coal used to cook and heat homes.1

Chronic obstructive pulmonary disease is the third leading cause of death in the United States, causing approximately 134 000 deaths in 2010 of which 70 000 were women and 64 000 were men. For 11 straight years, more women than men have died from COPD. In 2010, COPD was responsible for an estimated 715 000 hospital admissions and for $49.9 billion in healthcare costs in the United States.2 In 2011, an estimated 12.7 million Americans had a diagnosis of COPD.

One of the measures tracked by the Centers for Medicare Services (CMS) is readmission rate for COPD. If a hospital’s rate exceeds the average in the United States, its Medicare reimbursement will be lowered.

SPIROMETRY

As noted, spirometry is needed to establish the diagnosis of COPD and to formulate a treatment plan.3,p.xv It not only confirms the diagnosis, but also helps assess the severity of the disease and determines treatment. Spirometry is relatively inexpensive, and it also can give you an estimate of a prognosis. Table 1 gives the range of mild-moderate and severe COPD, which helps delineate therapy.

Table 1. Spirometric Classification of COPD Severity Based on Postbronchodilator FEV1 (GOLD Criteria)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Spirometric Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>FEV1/FVC &lt;.70 FEV1 ≥ 80% predicted</td>
</tr>
<tr>
<td>Moderate</td>
<td>FEV1/FVC &lt;.70 FEV1 between 50% and 80% predicted</td>
</tr>
<tr>
<td>Severe</td>
<td>FEV1/FVC &lt;.70 FEV1 between 30% and 50% predicted</td>
</tr>
<tr>
<td>Very Severe</td>
<td>FEV1/FVC &lt;.70 FEV1 &lt;30% predicted or FEV1 &lt;50% predicted + chronic respiratory failure</td>
</tr>
</tbody>
</table>
PREVENTION OF EXACERBATIONS

The severity of COPD is based on the patient's symptoms and signs, the severity of spirometric abnormality, and the risk of exacerbations. The latter, exacerbations, are what pulmonologists focus on. Roughly 70% of people with COPD have at least 1 exacerbation per year requiring medical intervention. About 40% of the population with COPD has frequent exacerbations, defined as 2 or more exacerbations each year that require medical intervention. These patients have a poorer quality of life, higher medical expenses, and are more likely to die from their underlying lung disease.

Appropriate pharmacologic therapy can reduce COPD symptoms, reduce frequency and severity of exacerbations, hospitalizations, and improve quality of life. Most patients needing therapy have at least moderate COPD. Because patients with mild COPD have few symptoms, it is unusual to diagnose mild COPD by spirometry. The standard initial therapy is short-acting β-2 agonist inhaler or inhaled short-acting anticholinergics, on an as-needed basis.

Unfortunately, patients have often progressed beyond mild COPD by the time they are diagnosed. Most moderately severe COPD cases require maintenance therapy initially with either a long-acting anticholinergic or long-acting β-2 agonist (LABA) or a combination. These are now co-formulated as combination drugs and give better bronchodilation than either alone (Table 2). In the last couple of years, data have suggested a shift regarding the conditions under which combination therapy should be prescribed. Previously, it was believed that an inhaled corticosteroid was not helpful; however, it is now recommended that patients with (1) 2 or more exacerbations a year requiring medical intervention or with (2) forced expiratory volume in 1 second (FEV1) of less than 60% as measured by spirometry, use inhaled corticosteroid in combination with a long-acting bronchodilator. This combination reduces exacerbations, hospitalizations, and costs, along with

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**Table 2. Recommended Medications for the Treatment of Chronic Obstructive Pulmonary Disease by Disease Stage**

<table>
<thead>
<tr>
<th>Brand/Generic Prescription</th>
<th>Active ingredient</th>
<th>Delivery system</th>
<th>Drug class</th>
<th>Cost$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1 – Mild</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ProAir</td>
<td>albuterol</td>
<td>HFA</td>
<td>SABA</td>
<td>$60.02</td>
</tr>
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| **Stage 2 – Moderate**     |                   |                       |           |       |
| Spiriva HandiHaler         | tiotropium        | DPI                   | LAAC      | $357.37|
| Spiriva Respimat           | tiotropium        | aerosol solution inhalation capsule | LAAC | $357.37|
| Foradil Aerosizer          | formoterol        | DPI                   | LABA      | $210.55|
| Ser莨vent                  | salmeterol        | DPI                   | LABA      | $180.66|
| Daliresp                   | roflumilast       | oral tablet           | PDE4 inhibitor | $309.46c|

| **Stage 3 – Severe**       |                   |                       |           |       |
| Symbicort 80/4.5 μg        | formoterol/budesonide | HFA                 | ICS/LABA  | $228.90|
| Symbicort 160/4.5 μg       | formoterol/budesonide | HFA                 | ICS/LABA  | $261.65|
| Advair 45-21 μg            | fluticasone/salmeterol | HFA             | ICS/LABA  | $192.83|
| Advair 115-21 μg           | fluticasone/salmeterol | HFA             | ICS/LABA  | $192.83|
| Advair 230-21 μg           | fluticasone/salmeterol | HFA             | ICS/LABA  | $285.98|
| Advair 100-50 μg           | fluticasone/salmeterol | DPI              | ICS/LABA  | $137.70|
| Advair 250-50 μg           | fluticasone/salmeterol | DPI              | ICS/LABA  | $137.70|
| Advair 500-50 μg           | fluticasone/salmeterol | DPI              | ICS/LABA  | $224.44|

| **Stage 4 – Very Severe**  |                   |                       |           |       |
| Combination therapy (ICS/LABA + LAAC: Advair or Symbicort + Spiriva), with oral steroids as needed | | | | |

Abbreviations: HFA, hydrofluoroalkane; SABA, short-acting β-2 agonist; SAAC, short-acting anticholinergic; DPI, dry powder inhaler; LAAC, long-acting anticholinergic; LABA, long-acting β-2 agonist; PDE4, phosphodiesterase type 4; ICS, inhaled corticosteroid.

$ Costs are average wholesale price; price to patient is typically higher, depending on pharmacy mark-up.

$ Add inhaled corticosteroid if exacerbations occur; consider adding PDE4 inhibitor (Daliresp [roflumilast]) for recurrent exacerbations.

For 30 tablets.

Oral steroid burst for exacerbations.
improving quality of life. Furthermore, data suggest that inhaled corticosteroids sometimes improve pulmonary function. 6

Three inhaled corticosteroid/LABA combinations are currently available, 2 of which we know have been shown to reduce exacerbations and hospitalizations by about 25% to 30%. 7 In addition, a currently available long-term anticholinergic (another will be coming out in early 2016) shows about a 14% reduction 8 in exacerbations and hospitalizations.

DISEASE MANAGEMENT

The risk of death in the first 30 days after a COPD exacerbation is 8 times greater than that after myocardial infarction. Forty percent will die within the first year after being hospitalized in intensive care with a COPD exacerbation. As previously noted, costs for COPD are about $50 billion a year, with about 70% spent on exacerbation costs. Disease management appears to be a tool that healthcare organizations can use to decrease the morbidity and mortality of the disease.

There are things that patients with COPD can do to help reduce exacerbations. They can stop smoking, get flu vaccinations, and consider using the medications reviewed earlier. In addition to treatment and pharmacology, education and exercise rehabilitation are important steps patients can take to improve quality of life for patients with COPD. 9

Gundersen Health System’s chronic disease management program has been in place since 2003. The program began with 2 disease states—diabetes and congestive heart failure—and the list has now grown to 9 chronic medical conditions, including COPD. Disease management has proven to be beneficial for managing chronic illness because it demonstrates both the strengths and weaknesses of care, allowing clinicians to focus on areas of improvement.

Providers can access Gundersen Health System’s new COPD registry to see which of their patients have COPD diagnoses. Any time a patient has a visit associated with a COPD diagnosis, they will be placed in the registry of their primary care provider or their pulmonary specialist. Disease management provides access to COPD treatment guidelines, which are evidence based and compiled by Gundersen Health System.

With this new program, providers have tools in EPIC and on Gladiator to track their performance on key measures for their COPD patients, to educate patients on their condition, and to use the guidelines.

Four COPD treatment quality measures will be tracked in 2015. The first is spirometry, which is required to make an accurate diagnosis of COPD. The second is tobacco use status. Providers should do everything within their power to help patients quit smoking. The third is vaccination against Streptococcus pneumoniae. Patients must be vaccinated at least once, and as the new 13-valent pneumococcal conjugate vaccine is incorporated into the guidelines, additional vaccinations may be required. And the fourth measure is annual vaccination against influenza. These chronic disease management tools are similar to those for asthma—in fact, they are easier.

Providers can find information pertinent to disease management on Gundersen’s Intranet, Gladiator. The first step is to go to the section called Top Clinical Resources on Gladiator. Then click on the fourth item down, Disease Mgmt, which will take users to the Disease Management homepage. This page lists all of the diseases that Gundersen Health System tracks. Providers can click on the guidelines, patient education materials, and other resources needed to care for their patients with COPD.

A number of disease management tools are available to providers in the patient record. A list of all the patient’s disease state registries can be found in the upper right corner. By clicking Disease Management, disease states that are listed by folder are added to the left-side toolbar. In these folders are the relevant measures and when they were last completed. An order button will appear for incomplete measures. A severity score is listed, although severity will not be measured in 2015. In 2016, severity will be measured; therefore, providers are encouraged to order spirometry so tracking can begin. If a patient is entered into a disease registry by mistake, go under the maintenence tab under Disease Management and click on add/remove form. Fill in the necessary information and enter the reason for the change. Your request will be sent to the registrar to make sure the criteria are met to make the change.

DISEASE MANAGEMENT EDUCATION

Education is an extremely important part of disease management—not only for providers, but also for nursing staff and patients. Standardized education material has been created for COPD. For patients, disease self-management is crucial because they can take many steps to help manage their own disease.

CONCLUSION

Many tools are built into EPIC to aid in the management of COPD and other chronic illnesses. For instance, providers can look at their patient registries for any disease state and compare their quality measures with those of other providers with similar practices. There are also tools within the patient encounter that allow providers stay up to date on the measurements required.

When providers are given measurements for COPD, or any other chronic illness, it is important to act on them. They can do an intervention and at a later date, perhaps a month, reassess how the patient is doing. Measurement guides providers as they intervene in an effort to improve their patients’ condition.

Gundersen’s disease management program currently includes the following diseases: diabetes, heart failure, asthma, hypertension, coronary artery disease, depression, chronic kidney disease, and chronic pain. In January 2015, COPD was added to the list. Ours is a disease management program even more ambitious and aggressive than the national norm.

Chronic obstructive pulmonary disease is a common diagnosis associated with a tremendous cost in both dollars and lives. Gundersen Health System is trying to reduce the number of patients on external oxygen therapy and the number of COPD exacerbations that require hospitalizations.

BIBLIOGRAPHY


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The author has completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

One of my clinical ethics teachers described the clinical ethicist role in treatment decision-making thusly: we intentionally slow things down when they’re going too fast, and intentionally speed things up when they’re going too slow. In essence, clinical ethicists tend to be a special kind of gatekeeper. We are often the catalysts that cause a transition in how people view or act in relation to patient care. At the moment of our involvement it is common that decisions about patient care are slowed down to gather information toward ensuring an ethically sound decision. Then, as needed information becomes clearer and specific decisions are or are not ethically supportable. As such, we are the ethicists help speed up the decision-making process to prevent further untimely delays in patient care, even if the decision is to withhold or withdraw treatment.

This role is sometimes difficult to clarify to patients, their loved ones, providers, and sometimes even to ourselves as ethicists. Our role is advisory; we are not the ones responsible to write and execute medical orders. We guide people on whether certain actions or decisions are or are not ethically supportable. As such, we are the energy—but not the will or the strength—that gives power to a decision. It is perhaps obvious, therefore, that the clinical ethicist role requires being responsible to uphold a good and ethically sound process when we are asked to assist with resolving clinical ethics dilemmas.

One of the important features of a sound process is information gathering. Good information gathering—having thorough discussions with relevant parties, examining medical records and other relevant documents—requires time. The more time an ethicist has to gather and analyze pertinent information, the better the chances that all relevant information becomes known; the more information about a case becomes known, the better the ethicist is able to support recommendations related to the case, as well as minimize the possibility of making mistakes in the ethicist’s analysis, which can happen when decisions are made based on inaccurate or incomplete information. In short: time is the ethicist’s ally.

However, time is not always the patient’s friend. The longer an illness or injury affects one’s body, the more damage or suffering possibly occurs to that person. Likewise, the more time an ethicist takes to gather and analyze information, the greater the possibility that harm or suffering can befall the patient at the heart of a consult.

In urgent or emergent cases, the more quickly treatment decisions can be made, the better it is for helping to maximize favorable patient outcomes. In urgent or emergent cases, time is not a luxury but a burden. And when there is a question about what to do in an urgent or emergent case and an ethicist is called on to help guide decision-making, we must be cognizant that our ally—time—is truly the patient’s enemy. This tension between the ethicist’s need for time to make sound ethical recommendations and the patient’s need to speed up the decision-making process can put the ethicist in an uncomfortable position of having to make recommendations in non-optimal conditions, intensifying the overall phenomenological experience of the ethics consult.

While on general medicine teaching rounds my pager beeps at me. No message was sent, just a phone number. People in a rush—those who need quick responses—typically don’t write much when they send a page. I immediately think this is either a wrong number—perhaps intended for medical doctor urgently needed to enter an order—or this is intended for me and it is an emergency. It was the latter.

“Hi Tom.”

“Hi. What can I do for you?”

“I’m in the operating room and we’re in the middle of a hernia repair.”

I immediately think (but don’t say), “Wait, you’re in the OR in the middle of an operation with an unconscious patient and you’re taking a ‘time-out’ to call me…this can’t be good.”

“and we found a tumor on the patient’s testicle. We need to remove it, but the only way to excise the tumor is to remove the...
whole testicle. Should we remove it now, or should we finish the hernia repair and make a plan to surgically remove it later? We’ve got people here ready to take the tumor for testing if we remove it.”

Although he does not say it, I begin to imagine a room full of people all standing around this man’s body waiting for an answer, looking at the clock on the wall, and saying to themselves, “Hurry up, Harter. We’ve got to move on this; we’ve got other sick patients we need to operate on today.” This feeling is metaphorically tantamount to sky diving, in which my dear friend, time, shoves me out of the plane door before I’m mentally ready to jump and have had the opportunity to make sure my parachute is correctly fastened.

What makes this question interesting is the “now” factor. Philosophical discussions about the concept of now date back as far as, if not farther than, Aristotle. I studied Aristotle’s conception of time and the now in graduate school. Now, for Aristotle, is highly theoretical and ambiguous: Now can refer to the temporal present—that is, this moment as it exists right now. But Now can also refer to a durationless, unmeasurable point or position of time—for example, the time is now to act.²

In this case, now is being referred to as an instant, as the present moment that I am being asked to answer the question. By framing the question to say “what should we do now,” any luxury of delaying a reply is stripped away because the expectation is that I provide an answer right then. The hernia repair has been paused so the surgeon can talk to me, but the surgery cannot be halted indefinitely; a decision to act must be made. The surgeon is looking to me to remove the barrier that stopped the surgery and allow the group of people caring for the patient to complete their work on him, whether this means fixing the hernia sans removing the testicle, or removing the testicle as part of the hernia repair. To delay an answer would be an abdication of my professional responsibilities to my colleagues, this patient, and possibly other patients affected by the treatment team being delayed in making a decision about removing the testicle.

At the heart of the surgeon’s question is the concept of informed consent, which is both an ethical and legal requirement that must be met in order for health providers to treat patients. It is considered unethical and illegal for health providers to treat patients when patients or their surrogate decision-makers have not exclusively given their permission to treat (a surrogate decision-maker is someone who is legally authorized to make treatment decisions for a patient if the patient is unable to make those decisions for him or herself. A surrogate can be a legal guardian (judicially appointed), someone with a health care power of attorney (appointed by the patient during a time when the patient was mentally capable), or, in some states, the next of kin. Informed consent, however, is more than simply giving permission to treat. To meet the basic ethical and legal standards of informed consent, the treatment decision-maker must: be mentally capable of making and able to articulate a decision; be free and willing to make a decision (eg, the decision cannot be coerced); and demonstrate understanding of the relevant clinical information of the decision at-hand.³

Although the patient gave the surgeon permission to do the hernia repair, he did not give explicit permission to remove his testicle in the event of an incidental finding. Most surgical informed consent conversations and documents signed by patients include a caveat that grants health providers the authority to treat beyond the scope of the immediate issue, should an incidental finding occur. However, it is not clear that this additional treatment authority applies in cases in when the patient is otherwise stable and the additional intervention is not emergent. In this case, removal of the testicle is needed, but removal is not emergent and otherwise has no impact on the potential success of the hernia repair.

At the time the surgeon called, the patient could not provide informed consent. Being under the effect of anesthesia precludes the patient from being interactive. However, even if the patient were awakened in the OR and asked about the removal of his testicle, the effects of the anesthesia would still likely prevent the patient from being able to make a fully informed decision because it is unclear whether the patient would be mentally capable at that time to understand and process the information regarding the tumor and its removal. Furthermore, to awaken a patient in the middle of a surgical procedure, knowing that the patient’s immediate mental capabilities are compromised due to anesthesia, exposes the patient to the experience of pain and potential suffering without the benefit of ascertaining an informed treatment decision. And because the surgical wound from the hernia repair is still open, awakening the patient can also compromise informed decision-making because it is unclear whether a decision to move forward is truly voluntary or coerced by the experience of pain.

A decision is needed, and the gold standard for deciding what to do—that is, asking the patient directly—cannot be met. So what is the next step?

“Is there someone who brought the patient to the operation, and is that person the patient’s appointed healthcare agent?”

“His mother brought him to the surgery. But, he doesn’t have any documents authorizing a surrogate decision-maker.”

“Ok. Well, his mother cannot consent to the tumor removal, but perhaps she can give some insight into the patient’s wishes.”

“Alright. Anything else?”

“Do you know if the patient is sexually active, and will removal of the testicle impair his sexual functioning and ability to father children?”

“From what I know about the patient, he lives with his mother and is unlikely to be sexually active. But even if he were, he would still have his other testicle and still be able to father children in the future.”

It might not be obvious to some why I am asking about the patient’s sexual functioning. At this point in
In the case, we have a situation in which the patient is facing either the removal of his testicle now, or being subjected to another surgery in the future. All things being equal, the ethical preference is to avoid subjecting the patient to a second future surgery. All surgeries, no matter how minimal, carry some risk of pain and suffering, infection, or some other unforeseen consequence. Still, even though it is medically sound to remove the tumor now, it is possible that, if given the opportunity, the patient might refuse the removal of his testicle. Why? The most likely answer is not aesthetic, but a matter of function. But, even if I am wrong about this assumption and this man's hypothetical refusal to have his testicle removed is aesthetic over function, an aesthetic repair of the scrotum is possible, whereas the loss of sexual functioning can have a long-term, and perhaps irreparable, impact on this man's future life plans.

My concern over the impact of the testicle removal is based on the ethical concept of the right to an open future. While the concept is most often applied in the realms of pediatrics and genetics, the concept applies in this case because it refers to the idea that free persons should have the right to make their own choices based on their own values, including decisions about procreation. Had the surgeon replied that removing this man's testicle would potentially harm his sexual functioning or endanger his possible future parental choices, I likely would have recommended, despite the risk of a second surgery, that the surgeon complete the hernia repair without removing the testicle, regardless of the patient's mother's input.

By clarifying for me that the removal of the testicle would not have the sort of negative impact I am concerned about, the ethical support remains with not subjecting this patient to a future surgery.

“Ok. Here's how I think you should move forward. Since you're telling me that the tumor has to be removed, I would talk with the patient's mother. If she doesn't know the patient's wishes, or indicates that he wouldn't want his testicle removed, I think you should finish the hernia repair without removing the testicle and plan to remove the tumor at a future date. However, if his mother indicates that the patient would not want a future surgery and would, to the best of her knowledge, accept removing the testicle now, I think you should go ahead and remove the testicle. With no apparent long-term negative consequences to removal of the tumor, there's greater potential harm to the patient in waiting to have the tumor removed than in removing the tumor now.”

“Ok. I'll do that. Thank you.”

“You're welcome. Call me back if anything significant comes up that changes the context of the case.”

“Will do. Bye.”

Ethical dilemmas, by definition, have neither clearly right nor clearly wrong answers. Ethicists look for where the greatest support lies in making their assessments and recommendations with the understanding that others, including the patient, may disagree with those assessments and recommendations. The possibility of such disagreements highlights why it is imperative to follow a sound decision-making process: it is easier to justify one's assessments and recommendations when one can clearly demonstrate the thought process for others. Does making such decisions come with risk? Of course, but so does every decision when practicing the art of medicine.

My conversation with the surgeon lasted approximately 60 seconds. In those 60 seconds, a decision was made—that I guided—that could change the course of this man's life forever. This fact, along with the role that time plays in decision-making, is not lost to me. While it may seem like a burden to some, helping guide people through such difficult challenges where even time is a trap, to me is the greatest privilege of being able to call myself a clinical ethicist.

**REFERENCES**

GUNDERSEN GOT HIM BACK IN THE PILOT’S SEAT

‘Open heart surgery? My nature was to look for a better way.’

When a Twin Cities surgeon told Don he needed open heart surgery, Don searched for a better option. What he found was minimally invasive heart bypass surgery at Gundersen Health System in La Crosse, Wis. Surgery through a small 3" incision means no open chest, less pain and a faster recovery. Don, who is a pilot, is flying again and reports, “I now have more energy and ideas than I know what to do with.”

If your nature is also to look for better options, learn more at gundersenhealth.org/don or call (800) 362-9567, ext. 52335.
Visitors to the third floor of the La Crosse Gundersen Clinic and Hospital might recall walking past an imposing set of large black and white photographs. The subjects of those portraits are my uncles (Drs Sigurd, Gunnar, and Thorolf Gundersen) and my father (Dr Alf Gundersen), sons of Gundersen Clinic’s founder, Dr. Adolf Gundersen. The portraits were moved in 2015 and are now located on the first floor of the new hospital building in what is to be called the Gundersen Hallway.

In the late 1960s my wife Carol became aware of the exceptional photographic portraiture done by Yousuf Karsh, an immigrant Armenian artist living in Canada. An admirer of his work, she suggested that the senior Gundersen brothers have their portraits done by Mr. Karsh. Arrangements were made, and in the spring of 1970, Karsh and his assistant, along with a considerable collection of trunks and boxes full of photographic equipment, arrived in La Crosse, Wisconsin.

Karsh took great care to get to know his subjects so he could better capture their inner personalities, so he spent several days in La Crosse. Perhaps because Thorolf Gundersen was considerably younger than his brothers, who at that time were approaching retirement, he was not included in that first sitting. That oversight was corrected some time later when Thorolf traveled to the Karsh studio in Canada.

During Mr. Karsh’s visit, members of my extended family and I had the pleasure of entertaining him. Of course we were apprehensive because in the course of his work, he had travelled the world—met kings, queens, heads of state, artists, movie stars, and the greatest minds of his time—but he was a gracious guest with impeccable manners.

Yousuf Karsh (1908-2002) was born and raised in Armenia, but in 1925 he was sent to Quebec, Canada, to live with an uncle in order to escape the Armenian Genocide. He learned his profession from his uncle and, later, from a well-known photographic artist in Boston, Massachusetts. He then returned to Canada to begin his legendary career as a photographic portrait artist.

Karsh’s magnificent work first captured the attention of Mackenzie King, then Prime Minister of Canada, in the early 1930s. From that point forward, Karsh—soon known as Karsh of Ottawa—used his interpersonal skills, political connections, and unerring eye to capture on film many of the world’s most famous people.

In his long career, Karsh had more than 15,000 portrait sittings. His most famous portrait is that of Winston Churchill, taken in 1941 and reproduced on the cover of Life magazine in 1945. Among the thousands to gaze into his lens were Albert Einstein, Dwight Eisenhower, Pablo Picasso, Princess Grace of Monaco, Sophia Loren, Jonas Salk, Ernest Hemingway, Muhammad Ali, Colonel Sanders, Queen Elizabeth II, Frank Lloyd Wright, the Marx Brothers, and, of course, the Gundersen brothers.

REFERENCES


**Background.** Previous literature is varied with regard to rates of bowel obstruction after laparoscopic Roux-en-Y gastric bypass (LRYGB). Internal herniation through mesenteric defects is a common cause of bowel obstructions. There are advantages and disadvantages to routing the Roux limb via a retrocolic/retrogastric (RC/RG) versus an antecolic/antegastric (AC/AG) position.

**Objective.** To review the literature comparing obstruction rates in RYGB using the antecolic versus retrocolic approach.

**Setting.** Integrated multispecialty community teaching hospital.

**Methods.** A literature search for articles published from 1994–2013 was completed. Articles were included if they reported an n>25, Roux limb route, obstruction rate by route, and follow-up duration. Statistical analysis included χ² test by patient number.

**Results.** The initial search identified 241 articles; 8 met inclusion criteria. There were 4805 patients in the AC/AG group, and 2238 in the RC/RG group. Follow-up ranged from 0 to 68 months. A linear stapled technique was reported in 4231 (88%) patients in the AC/AG group and 1541 (69%) of RC/RG group. Hand-sewn closure of mesenteric defects was reported in 2152 (45%) patients in the AC/AG group and 1012 (45%) patients in the RC/RG group. Bowel obstructions occurred in 68 (1.4%) patients in the AC/AG group and 117 (5.2%) patients in the RC/RG group (P<.001). Internal hernias were reported in 65 (1.3%) patients in the AC/AG group and 52 (2.3%) patients in the RC/RG group (P<.001). Two mortalities were reported in the AC/AG group.

**Conclusions.** Increased rates of bowel obstruction and internal hernia were observed in the RC/RG group compared with the AC/AG group. A prospective, randomized trial would be necessary to definitively determine the impact of Roux limb position and routine closure of mesenteric defects on bowel obstruction rates after gastric bypass.


**Background:** In 2007, the National Cancer Institute developed the Bethesda System for Reporting Thyroid Cytopathology. This allowed for consistent communication between health care providers and researchers and estimated malignant potential for each category. Gundersen Health System (GHS) adopted the Bethesda System of cytopathologic reporting in November 2010. Although the Bethesda system allowed for additional clarity for reporting and recommendations, there are still indeterminate categories for lesions with atypia of undetermined significance and suspicious lesions, where the risk of malignancy ranges from 5–15% and 15–30%, respectively. Patients with category 3 and 4 lesions on fine needle aspiration (FNA) would be offered surgery for further evaluation of the nodule. In 2012, GHS started using the Veracyte Afirma cytopathology with or without gene expression classifier as an adjunct to physical examination, ultrasound, and cytology results to help with risk discussions with patients. We sought to examine the impact that Veracyte testing has had on management recommendations for patients with Bethesda 3 and 4 lesions.

**Methods:** After IRB approval was obtained, a retrospective review of all patients who underwent thyroid FNA from January 2011 to May 2014 with Bethesda 3 and 4 category lesions was completed. The proportion of patients who underwent surgery with Veracyte testing vs. those without testing was analyzed using chi-square test.

**Results:** A total of 99 patients underwent FNA; 41 patients had category 3 lesions and 58 patients had category 4 lesions. Twenty of 41 patients with Bethesda 3 lesions had Veracyte testing and 24 of 58 patients with Bethesda 4 lesions had Veracyte testing. Of the patients who underwent Veracyte testing (n=44), 23 went on to have surgery (52%); of those who did not undergo testing (n= 55), 39 went on to have surgery (71%) (P=0.06).

**Conclusions:** Hemithyroidectomy is recommended for patients with Bethesda category 3 and 4 indeterminate lesions. The proportion of patients who underwent surgery decreased with the use of Veracyte testing.


The most appropriate operative treatment of acute midsubstance Achilles tendon ruptures is controversial. One approach uses a mini-open, device-assisted suture system (Achillon® System™, Integra LifeSciences Corp, Plainsboro, NJ) that has been generally available since 2002. To date, the incidence of complications with this system has not yet been evaluated. Therefore, we conducted a systematic review of electronic databases and relevant peer-reviewed sources as outlined by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines for the preparation of systematic reviews. Studies that reported acute (injury to surgery interval ≤10 days) midsubstance Achilles tendon ruptures repaired with the Achillon® mini-open suture system, provided a detailed description of all complications encountered, and a mean follow-up period of 12 months or more and 15 repairs or more were included. A total of 33 studies were identified, of which 8 (24%) met our inclusion criteria involving 253 repairs. Four studies were prospective and involved 169 repairs. The weighted mean age for the entire cohort was 39.5 (range 22 to 82) years, and the weighted mean follow-up period was 19.2 (range 5 to 44) months. The incidence of complications was 8.3% (21 of 253) and included 8 (3.2%) repeat ruptures, 5 (2%) incision problems, 3 (1.2%) sural nerve injuries, 3 (1.2%) suture reactions or irritations, and 2 (0.8%) infections. Our systematic review revealed that this mini-open, device-assisted suture system provides a safe and reproducible technique to repair acute midsubstance Achilles tendon ruptures with an acceptable incidence of complications.


INTRODUCTION. More than 600,000 hysterectomies are performed each year in the United States, and more than one third of American women have undergone a hysterectomy by the age of 60 years. Many studies have associated laparoscopic and vaginal hysterectomies with lower perioperative morbidity than abdominal hysterectomies, but abdominal remains the most common approach, likely because of the steep learning curve associated with minimally invasive techniques. To facilitate laparoscopy and allow more ergonomic and precise movements by the surgeon, the U.S. Food and Drug Administration approved the da Vinci robot surgical system in 2005. Robotic assisted laparoscopic hysterectomy has since gained popularity, but it remains controversial. The purpose of this study was to compare operative time, estimated blood loss (EBL), cost, and postoperative outcomes of the 4 surgical approaches to hysterectomy.

METHODS. Following Institutional Review Board approval of the study, women undergoing hysterectomy between May 2012 through May 2013 who provided written informed consent were prospectively enrolled. Women whose primary indication for operation was malignancy were excluded. Using a facility-created algorithm to determine the best surgical approach for her condition, patients were assigned to 1 of 4 groups: abdominal, laparoscopic, vaginal, or robotic. The abdominal group was subsequently eliminated due to low enrollment. The following measures were collected through electronic health record review: demographic and medical history; operative time; EBL; patient charges; presence of nausea, vomiting, and pain at points throughout the hospital stay; type of pain medication administered; and complications within 30 days of surgery.

RESULTS. A total of 105 patients were enrolled in 3 groups: 43 vaginal, 33 laparoscopic, and 29 robotic. The groups were similar by body mass index and history of abdominal surgeries, although the robotic group had a significantly higher number of caesarian deliveries than the other groups (P<.001). There was also a trend toward more comorbidities in the robotic group.

Mean uterine weight varied significantly, from 315.8 g in the robotic group to 176.3 g and 134.0 g in the laparoscopic and vaginal groups, respectively (P<.001). Seven patients in the robotic group had uterine weights greater than 500 g. These outlying cases were excluded from several analyses, as noted below.

Mean operative time was significantly shorter in the robotic group (99.0 min) than in the laparoscopic (129.5 min) and vaginal (120.4 min) groups (P<.001). Notably, when the 7 patients with uteri heavier than 500 g were excluded, mean robotic operative time decreased to 99.0 minutes, which was comparable to that of the vaginal group, with the laparoscopic operative time being significantly longer (P<.001).
No significant differences were found in time to discharge, presence of nausea and vomiting, or postoperative pain levels. Trend level and differences in the amounts and types of pain medications given postoperatively were found but were likely due to physician preference. Neither postoperative complications nor cost differed significantly by group.

**DISCUSSION.** The results of this study indicate that time to discharge, nausea and vomiting, postoperative pain, cost, and postoperative complications do not differ significantly among women who undergo robotic, laparoscopic, or vaginal hysterectomies. Further, when outlying cases of large uteri are excluded from analysis, EBL is significantly lower in the robotic group \((P<.001)\) and operative time is significantly longer in the laparoscopic group \((P<.001)\). These results challenge those of other studies that report longer operative times, comparable recovery, and higher cost with the robotically assisted approach. The differences in those studies might be explained by limited surgeon experience with the robotic system, with the steep learning curve hindering positive results.

Since 2007, a team of 3 physicians at Gundersen Health System have performed over 700 robotically assisted hysterectomies. With such extensive experience, these physicians have overcome the steep learning curve of the robotic system. At the time of robot implementation, efforts increased to review individual cases to determine whether they were candidates for minimally invasive surgery. In contrast to the national trend in which the robotic approach is replacing other minimally invasive approaches, at Gundersen it is replacing abdominal hysterectomies, with the percentage of abdominal hysterectomies having declined from 45% to 13%. Forty-four percent of all hysterectomies are now performed robotically.

**CONCLUSION.** Experienced surgeons can perform robotic, laparoscopic, and vaginal hysterectomies with the same degree of success in terms of EBL, operative time, and postoperative pain and complications. Further, it was shown that with large uteri excluded, robotic operative times were lower than laparoscopic operative times and comparable to those of vaginal procedures. Average patient charges among these 3 surgical approaches were not significantly different.


**PURPOSE.** Over 33% of all women in the United States undergo a hysterectomy by the age of 60 years, making this one of the most common operations in America. Although hysterectomies performed using minimally invasive techniques have been associated with fewer complications and faster postoperative recovery, the abdominal approach remains the most prevalent nationwide.

In 2005, a new minimally invasive technique using the da Vinci Surgical System (Intuitive Surgical, Mountain View, CA) designed to improve the surgeon's ergonomics and enhance the precision of the instrument movements was approved by the U.S. Food and Drug Administration. Although some studies of robotically assisted laparoscopic hysterectomies indicate better surgical outcomes, this technique has been met with skepticism regarding its cost and efficacy.

This study coincided with the Gundersen Health System Department of Gynecology’s adoption of individual case reviews for each hysterectomy patient to determine candidacy for minimally invasive surgery. Through these case reviews and implementation of the robotic program in 2007, our rate of abdominal hysterectomies has declined from 45% to 13%. Robotic surgeries now account for 44% of all hysterectomies performed in our medical center. This trend is not mimicked nationwide, where robotic hysterectomies have been shown to replace other minimally invasive techniques rather than replacing abdominal hysterectomies.

The purpose of this prospective study was to compare the postoperative outcomes and recoveries of patients undergoing hysterectomy by route: abdominal, laparoscopic, robotic, and vaginal.

**METHODS.** Following Institutional Review Board approval of the study, women undergoing hysterectomy between May 2012 through May 2013 who provided written informed consent were prospectively enrolled. Women whose primary indication for operation was malignancy were excluded. Route of hysterectomy was determined based upon review of each patient’s health and medical history. Due to lack of enrollment, the abdominal route was eliminated from analysis. Survey results from the 36-Item Short Form Health Survey (SF-36) and data about exercise and work obtained by questionnaire were collected preoperatively (baseline), and at 6 to 8 weeks and 12 weeks postoperatively. Due to the low rate of survey and questionnaire completion at 12 weeks, the groups’ baseline scores were compared with 6- to 8-week postoperative scores.

**RESULTS.** This study included 105 cases: 43 in the vaginal group, 33 in the laparoscopic, and 29 in the robotic. The groups were similar by body mass index and history of abdominal surgeries, although robotic group patients
had a higher rate of past cesarean deliveries and a higher uterine weight ($P<.001$ and $P<.001$, respectively). There was also a trend toward more comorbidities in the robotic group.

Of the 105 patients who completed the baseline SF-36 survey, 88 also completed the 6- to 8-week postoperative survey. Patients in the robotic group had significantly lower mean bodily pain domain scores at baseline (63.53, compared with 78.84 and 69.92 for those in the vaginal and laparoscopic groups, respectively; $P=.047$). Mean scores in the robotic group also trended lower in the role limitations physical domain due to physical health domain (61.21, compared with 83.54 and 71.21 in the vaginal and laparoscopic groups, respectively; $P=.091$) and in the general health perceptions domain (68.79, compared with 76.19 and 76.97 in the vaginal and laparoscopic groups, respectively; $P=.057$).

Patients in the robotic group had significantly larger increases from baseline in the physical functioning domain scores than patients in the vaginal group (11.72 points higher, $P=.033$). Conversely, the robotic group had significantly smaller increases from baseline in their emotional well-being scores (9.26 points lower, $P=.016$). The percentage of women who reported in the postoperative survey that they had returned to work was not significantly different by group ($P=.54$).

These results mirror the outcomes from our concurrent study in this same population, indicating that patients with more challenging conditions can undergo minimally invasive surgery via the robotic route with outcomes similar to those of vaginal and laparoscopic patients.

**CONCLUSION.** This study demonstrates that patients undergoing robotic, laparoscopic, and vaginal hysterectomies have similar results in terms of postoperative recovery, even though the patients in our robotic group tended to have lower preoperative health scores. Therefore, robotic hysterectomy offers a viable minimally invasive option, even in complicated cases.


**Introduction:** Extra-cutaneous melanomas account for 4–5 per cent of all malignant melanomas. Of these primary gastric mucosal melanomas are extremely rare and the exact incidence is unknown. There are very few cases reported in the literature.

**Case:** We present a case of 75 y/o gentleman who presented with acute epigastric pain and long standing diarrhea. The cause of diarrhea was not determined despite adequate lab evaluation and colonoscopy. An upper GI endoscopy done for epigastric pain, revealed a Schatzki ring in the esophagus, sliding hiatal hernia, esophagitis and a stricture in the 2nd portion of the duodenum with an ulcer adjacent to it. Stricture was dilated and the ulcer was cauterized. CT scan of abdomen/pelvis revealed gastric wall thickening and a cystic lesion in the greater curvature of stomach. EUS followed by a biopsy revealed this to be a melanoma. A thorough oral, skin and eye exam along with anoscopy did not reveal any suspicious primary lesions. PET/CT was negative for any other lesions. He underwent partial gastrectomy and pathological exam of the surgical specimen confirmed this to be a malignant melanoma which measured 2.5cm with subserosal extension.

**Discussion:** Primary gastric mucosal melanomas are rare and only a few case reports exist. The exact incidence of the disease is not known and based on the literature review the median survival rate is around 5 months. Vague presenting symptoms lead to delay in detection and poses a challenge for early diagnosis and treatment. Surgical resection remains the mainstay of treatment and the role of chemo-radiation and immunotherapy remains obscure. Our patient underwent surgical resection, and did not have any evidence of metastatic disease. He is doing well after 6 month follow up and is on close surveillance.


**Background:** Endoscopic retrograde cholangiopancreatography (ERCP) is a common procedure performed worldwide. It is generally regarded as a safe procedure with a 4% overall complication risk; however, it carries a small but significant risk of perforation, ranging from 0.1%–1% in the literature. Once thought to require immediate surgical intervention, a select group of patients can be managed successfully without operative intervention. However, there has yet to be a consensus in the current literature on patient factors that can be used as markers for successful non-operative management. Furthermore, there has yet to be any published data at a community-based center. The objective of this study was to evaluate the management of ERCP perforations at a single community medical center.

**Methods:** A retrospective review of the medical records of all patients who underwent ERCP from January 1, 2004 through June 30, 2014 was completed. Study variables included indications for ERCP, ERCP procedures,
diverticula or altered anatomy (i.e. Billroth, gastric bypass), mode of diagnosis, location of perforation, and clinical presentation at time of known perforation. Outcomes included failure of non-operative management, ICU length of stay (LOS), and death.

**Results:** We identified 19 patients who underwent ERCP with documented perforation out of 1486 patient who underwent ERCP (0.9%). All ERCPs were performed by an attending gastroenterologist. Among the patients with an ERCP perforation, 10 were female (53%) and the mean age was 50.1 years. ERCPs were performed for choledocholithiasis (47%), choledocholithiasis with cholangitis (16%), jaundice with peri-pancreatic mass (11%), and other (26%). ERCP procedures included sphincterotomy (32%) or sphincterotomy with stent placement (26%), with or without concurrent balloon sweep (32%). Duodenal diverticula were present in 2 (11%) and altered anatomy was present in 5 (26%). Perforation was diagnosed via the following imaging modalities: ERCP 11%, X-ray (37%), CT (84%), and upper GI (16%). Seventy-nine percent of patients had a surgical consult. Seventeen of the 19 patients were treated non-operatively with 3 (16%) undergoing percutaneous drain placement. One patient failed non-operative treatment requiring surgery. All 3 patients that underwent surgery had laparotomy. All patients with perforation were treated with antibiotics. Peritonitis and sepsis were absent in all patients at time of perforation diagnosis. Three patients required ICU stay with median post-ERCP LOS of 5 days. Two patients had 30 day mortality.

**Conclusions:** Perforations remain a rare, but serious, complication of ERCPs. Non-operative management is highly successful in the carefully chosen patient without signs of sepsis or peritonitis. Early recognition of perforation with initiation of antibiotics is key. Our community-based practice patterns match or exceed those previously published for successful non-operative management of ERCP perforations.


**Background:** Gastric lipoma represents a rare mesenchymal tumor that accounts for about three percent of benign gastric tumors. Five percent of gastrointestinal tract lipomas occur in the stomach. They usually are found incidentally, but may present with bleeding, dyspepsia, or intussusception. Endoscopic methods of resection exist. Surgical options include enucleation, subtotal gastrectomy with Billroth I or II reconstruction, or subtotal gastrectomy with Roux-en-Y reconstruction.

**Case Summary:** This is a 68-year-old female who presented to the general surgery clinic with a history of gastrointestinal bleeding. Previous workup revealed a large antral mass with mucosal erosion leading to bleeding. The mass was consistent with a lipoma. Her past medical history was significant for diabetes and hypertension. Her body mass index (BMI) was 40 kg/m2. Based on her BMI and comorbidities, we elected to perform a subtotal gastrectomy with Roux-en-Y reconstruction after a short period of nutritional education. She did well postoperatively. The procedure and technique are discussed in the video.

**Conclusion:** Subtotal gastrectomy with Roux-en-Y reconstruction is an excellent option for resection of benign gastric masses in obese patients with obesity-related comorbidities that would secondarily benefit from Roux-en-Y reconstruction.


**Background:** Bleeding complications after bariatric surgical procedures can result in significant morbidity and mortality.

**Methods:** A retrospective review of our institution’s prospective bariatric surgery registry was completed to identify patients who underwent laparoscopic Roux-en-Y gastric bypass (LRYGB) or laparoscopic sleeve gastrectomy (LSG) from September 2001 through June 2014. Patients were included if they received a blood transfusion, were taken back to the operating room, or were readmitted for a bleeding complication within 30 days of surgery.

**Results:** Overall, 1532 patients underwent either LRYGB or LSG during the study period. Twenty-nine patients (2%) had a bleeding complication. All of the bleeding complications occurred after LRYGB; however, one patient underwent a concurrent Nissen fundoplication takedown. Twenty patients (62%) with bleeding complications required a transfusion, and 8 (28%) were taken back to the operating room for re-exploration during their index hospitalization. Seven patients were readmitted for bleeding complications at a median of 9 days (range 2–15) postoperative. Location of bleeds included the gastrojejunostomy (n=4), jejuno-jejunostomy (n=2), port sites (n=2), and staple line (n=5). The site of bleeding could not be determined in 2 patients. Thirteen (45%) patients were transfused for acute blood loss anemia. Of note, in February 2004, we revised our anticoagulant from enoxaparin to heparin. This change resulted in decreased rates of bleeding complications, from 6% (14/239) to 1% (14/1293).
There were no 30-day postoperative mortalities.

**Conclusions:** Bleeding complications after bariatric surgical procedures can occur from several sources within the abdomen. Treatment may include observation, reoperation, or transfusion and bleeding complications remain a source of significant morbidity following minimally invasive bariatric surgery. The optimal drug, dose, duration, and timing of chemoprophylaxis have yet to be determined.


**Introduction:** Enteral nutrition is important in the surgical patient, particularly those with cancer. One option for enteral access in patients unable to take oral nutrition is a jejunostomy, which may be placed laparoscopically, open, or percutaneously. This video demonstrates a novel laparoscopic technique for placing a feeding jejunostomy in a patient undergoing neoadjuvant therapy for distal esophageal adenocarcinoma.

**Case summary:** A 53-year-old male presented with distal esophageal adenocarcinoma and significant dysphagia. He planned to undergo neoadjuvant chemoradiation. The patient was taken to the operating room for laparoscopic feeding jejunostomy placement for enteral nutrition and to preserve the gastric conduit. Four sutures were placed in the jejunum approximately thirty centimeters from the ligament of Treitz and brought through the skin using a suture passer. A percutaneous pigtail catheter typically used by interventional radiology to perform abscess drainage is then used to access the small bowel using Seldinger technique. The jejunum was then fully secured to the abdominal wall by tying the external sutures. No postoperative complications occurred and he underwent successful esophagectomy following neoadjuvant therapy.

**Conclusion:** Enteral nutritional access is especially important in patients undergoing surgery for cancer. This video demonstrates successful placement of a feeding jejunostomy using a minimally invasive/interventional hybrid technique.


15. Cogbill TH. **General surgery residency training - past, present, and future (William Holden invited lecture).** Presented at Metrohealth Medical Center/Case Western University, Cleveland, Ohio, 2014.


24. Cogbill TH. **Rural general surgery - workforce, training, and practice issues (oral presentation).** Presented at the University of Wisconsin School of Medicine & Public Health Grand Rounds, Madison, WI, 2014.

**Background:** As healthcare cost containment becomes increasingly important, standardization of surgical supply costs for certain procedures, including laparoscopic appendectomy, has been proposed. The objective of this study was to determine whether increasing complexity of the case was directly associated with increasing surgical supply costs for laparoscopic appendectomy.

**Methods:** A retrospective review of the medical and billing records of all patients who underwent a laparoscopic appendectomy from January 2002-March 2013 was completed. Pathology and surgical supply costs were analyzed. Patients were stratified by pathology results into 4 groups: 1) no evidence of acute appendicitis, 2) acute/subacute appendicitis, 3) gangrenous appendicitis, and 4) perforated appendicitis. Statistical analysis included χ² test and ANOVA.

**Results:** There were 2154 patients included; 135 (6%) had no evidence of acute appendicitis, 1545 (72%) had acute/subacute appendicitis, 182 (8%) had gangrenous appendicitis, and 292 (14%) had perforated appendicitis. Mean age was 32.7, 32.1, 38.6, and 42.3 years for those without evidence of acute appendicitis, those with acute/subacute, gangrenous, and perforated appendicitis, respectively (P<0.001). There were a higher proportion of men in the gangrenous (58%) and perforated (59%) appendicitis groups vs. those with acute/subacute (55%) appendicitis and those without acute appendicitis (51%) (P<0.001). An American Society of Anesthesiologists' (ASA) class ≥3 was present in 6%, 13%, 20%, and 7% for those with no acute appendicitis, and those with acute/subacute, gangrenous, and perforated appendicitis, respectively (P<0.001). The mean total cost at the time of surgery was $1277.59±701.96, $1281.63±686.10, $1445.31±756.53, and $1287.92±691.33 for patients with no evidence of acute appendicitis, those with acute/subacute, gangrenous, and perforated appendicitis, respectively (P=0.027). Post-hoc analysis confirmed the greatest cost associated with gangrenous appendicitis vs. the other 3 groups. When stratified by surgeon, there was no difference in supply costs for laparoscopic appendectomies in patients with no acute appendicitis (P=0.263); however differences were observed for acute/subacute (P<0.001), gangrenous (P<0.001), and perforated appendicitis (P<0.001).

**Conclusions:** There was no progressive increase in surgical supply cost with increased complexity. Patients with gangrenous or perforated appendicitis tended to be older, male, and have a higher ASA class. There may be a role for institutional standardization of surgical supplies as a cost control measure; however, surgeon's equipment preference and patient factors also play a measurable role in determining the final supply cost.

**CME Questions:**
1. The greatest cost for our institution was seen in patients with which of the following?
   a. Acute/subacute appendicitis.
   b. Gangrenous appendicitis.*
   c. Perforated appendicitis.
   d. No acute appendicitis.
2. Which of the following was not found to be associated with significant difference in surgical supply cost between surgeons?
   a. Acute/subacute appendicitis.
   b. Gangrenous appendicitis.
   c. Perforated appendicitis.
   d. No acute appendicitis.*


**Background:** After the IOM report “From Cancer Patient to Cancer Survivor—Lost in Transition” was issued, there was a widespread call to develop Survivorship programs. Few studies have evaluated the effectiveness of these programs. Prior studies have focused on perceptions of, or preferences for, certain models of survivorship care. Therefore, our goal was to retrospectively evaluate our effectiveness based on patient perception, quality of life (QOL) and compliance with NCCN guidelines for follow-up.

**Methods:** Eligible patients completed all of their breast cancer treatment at GHS. Surveys were sent out to evaluate patient knowledge and QOL. Chart review was conducted to assess NCCN compliance. Survivorship clinic attendees and non-attendees were matched for age and disease stage for comparison purposes of the outcomes (QOL, NCCN compliance, overall effectiveness) using descriptive statistics analysis. Chi-squares and t-tests/ANOVA statistical tests were used for categorical and continuous data significance respectively.
Results: We found survivorship clinic patients (n=65) tended to perceive their concerns, in various categories, to be more adequately addressed than non-attendees (n=52), with significant differences in the areas of practical concerns and questions regarding late-term side effects. Categories in which there were no significant differences tended to be highly rated in both groups. There was also a significant difference in compliance with two NCCN guidelines for those attending survivorship. Additionally, women attending the survivorship appointment utilized supportive resources more than those who did not attend.

Conclusions: Survivorship clinic attendees felt certain concerns were better addressed, were more compliant with NCCN recommended follow-up, and used supportive services more often than non-attendees. Statistically significant differences in other categories may be found in a larger sample size. These measures can be used to help us improve our survivorship services and for other institutions to measure quality and effectiveness of their programs.


PURPOSE. Midfoot arthrodesis often requires bone grafting; options include autograft or allograft/synthetic products. The distal medial tibia (DMT) represents a source of autograft that is locally available, easily accessible and safe. The quantity of cancellous bone routinely available from the DMT remains unknown. Therefore, we explored if the DMT provides sufficient autograft for extended midfoot arthrodesis.

METHODOLOGY and HYPOTHESIS. We performed a retrospective review of all patients undergoing cancellous autograft DMT harvest for extended midfoot arthrodesis by the senior authors. The technique involved identification of the DMT metaphyseal/diaphyseal junction through topography. Using a trephine, the medial cortex was breached and cancellous bone graft was harvested by curettage until sufficient volume was obtained (Figure 1), but the exact volume was not recorded. For the purpose of this study, the volume of graft harvested was estimated on post-operative plain film using the height (r1) and width (r2) on the anterior-posterior view and depth (r3) from the lateral view (Figure 2) using the prolate ellipsoid formula (volume= 4/3πr1r2r3).

Figure 1: Intra-operative anterior-posterior image intensification views demonstrating curettage of cancellous bone marrow of the distal tibia (A-C). Extent of intra-operative curettage (D).

Figure 2: Volumetric radiographic estimations. Anterior-posterior view with height and width (A); Lateral view with height and depth (B).
RESULTS. Eight women and two men (mean age: 58.4-years; right: 7, left: 3) were included. The calculated mean volume of graft harvested was 11 ± 3.4 cm³. No additional bone graft was required to complete the extended midfoot arthrodesis and there were no complications.

ANALYSIS and DISCUSSION. As our data demonstrates cancellous autograft DMT harvest provided sufficient volume for extended midfoot arthrodesis in every instance. Therefore, the DMT should routinely be considered for these procedures. The novel volumetric radiographic estimation is yet to be validated, but warrants further prospective investigation to determine if this can accurately predict the available volume of graft pre-operatively.


Introduction: Azathioprine (AZA) induced hypersensitivity affecting gastrointestinal tract is very rare. There is only one reported case with AZA induced colitis to our knowledge. We present a case of severe enteritis from AZA mimicking the flare of inflammatory bowel disease.

Case Presentation: 52 YO male with 9-month history of ulcerative colitis (UC), on mesalamine, presented with severe diarrhea. He was evaluated in ER 12 days prior to his hospitalization for diarrhea. His stool test was positive for C. difficile. He was treated initially with metronidazole followed by oral vancomycin as he did not respond to metronidazole. Due to refractory symptoms colonoscopy was done which showed severe pancolitis. CT enterography revealed colitis with no small bowel involvement. He was diagnosed with UC flare triggered by C. difficile colitis. Steroid was started and patient was placed on AZA in conjunction with Adalimumab. His symptoms improved temporarily. After 10 days his diarrhea came back. He was readmitted with severe diarrhea and dehydration. He was afebrile. Labs revealed leukocytosis (19,000), normal inflammatory markers (ESR, CRP) and negative work up for infectious etiologies (C. difficile, HSV, CMV, HIV). Colonoscopy showed improvement in previously seen pancolitis. Small bowel capsule endoscopy (SBCE) was performed for diarrhea refractory to the treatment and with the concern of Crohn's disease, revealed severe erosive enteritis confirmed with biopsy. His adalimumab was switched over to infliximab with no benefit. Given the low possibility of UC flare in the light of improving colitis and negative infectious work up, concern of AZA induced enteritis was raised. AZA had been stopped. We continued infliximab and oral steroids. He has had dramatic improvement in his diarrheal symptoms with gradual reduction in his stool frequency. Follow up SBCE 14 days after discontinuation of AZA was normal.

Discussion: Adverse reactions to AZA can be classified as dose related toxic reactions (myelosuppression and hepatotoxicity) and dose independent hypersensitivity reactions. Hypersensitivity reactions are rare and it is not often easy to distinguish them from infections or disease recurrence. Fever, skin rash, arthralgia, sepsis-like syndrome, pancreatitis, interstitial nephritis, and pneumonitis are commonly reported hypersensitivity reactions. Immunopathology of hypersensitivity reactions is still unclear. For our patient, we consider enteritis was hypersensitivity reaction to AZA use, since it occurred early and no infectious etiologies were found. Furthermore, Enteritis resolved completely with discontinuation of AZA.


Background: The appropriateness of EGD has become an important issue as the use of EGD becomes more widespread. Aim of our study was to determine the adherence to American Society of Gastrointestinal Endoscopy (ASGE) indication guidelines and diagnostic yield of EGD in a gastroenterology practice within an integrated health care system.

Methods: A random sample of all EGDs completed in 2013 were retrospectively reviewed for demographics, hospitalization status, indication, findings (relevant to indication or not), and urgency. Appropriate indication was determined by adherence to ASGE guidelines. Appropriateness and diagnostic yield were calculated separately within these categories. The diagnostic yields between appropriate and inappropriate EGDs were compared using the chi-square test.

Results: 451 EGDs were included. The patients’ mean age was 57.3 years (71.2% greater than 50 years,) more Female (56.4%), more Outpatient (86.4%), and more elective (83.4%). Indications were appropriate in 377 cases (83.6%). Inappropriate indications were more likely if the patient was Female, 68.9% vs. 54.1% (p=0.019) or <50 years old, 62.1% vs. 22.2% (p=0.001). Relevant findings were more likely if indication was appropriate, 57.8% vs. 17.5% (p=0.001). Of the exams with appropriate indications, the relevant yields by diagnosis were as follows: Refractory gastroesophageal reflux disease (GERD) 38.2%, Abdominal Symptoms 42.5%, Portal Hypertension

**Purpose.** One of the causes of central metatarsalgia is an abnormal metatarsal length arabola. In most circumstances, limited shortening is required with myriad osteotomies and fixation existing. However, when significant central metatarsal shortening is required, fewer options are available. We present a long-term follow-up of a novel approach that utilizes intramedullary fixation for the treatment of central metatarsal deformities that require significant shortening.

**Case Study.** A list of all surgical interventions performed by our section from January 2001 to August 2013 was evaluated for potential inclusion. Of the 8,456 cases performed during this period, 21 patients underwent shortening osteotomy ≥4-mm stabilized with an intramedullary Steinman pin. Minimum follow-up of six months was required. Patients were allowed immediate protected weightbearing. Radiologic pre and postoperative measurements included the “Maestro line” for evaluation of global metatarsal cascade and a standardized longitudinal central metatarsal length to determine the measured amount of metatarsal shortening.

**Results.** Fourteen women and seven men (mean age: 54-years; metatarsals: 33) were included. Mean shortening was 7.7-mm (range: 4 to 16-mm) and an appropriate radiographic metatarsal cascade was restored in all patients. The mean follow-up was 60.6-months (range: 7 to 121-months). One medically co-morbid patient required external bone growth stimulation to achieve union. Six (29%) patients required continued orthotic management for limited residual forefoot symptomatology.

**Analysis and Discussion.** This procedure provides a sound alternative to other metatarsal osteotomies as it affords a predictable means for significant shortening of a central metatarsal, allows for reconfiguration of the central metatarsal cascade and is extra-articular thereby preserving joint integrity and metatarsal morphology.

**References**


**Background:** Miscarriage denotes a non-voluntary ending of a pregnancy prior to 20 weeks gestation. Between 10% and 25% of confirmed pregnancies end in miscarriage, with 87% of miscarriages occurring in the first 10 weeks. Although significant literature exists regarding women's experience of miscarriage, how women facing an inevitable miscarriage choose a treatment option has yet to be explored. This study extends understanding of women's experience of miscarriage by examining their approach to decisions about care options (expectant management, surgical management, or medication) when they are faced with inevitable miscarriage.

**Significance:** The treatment decision is a difficult one, and the consequences extend well beyond short-term treatment. Women need nurses who will help them through this process, and understand their trepidations in choosing the best treatment. Nurses can use the results of this study to give compassionate, attentive, and appropriate nursing care to women who find themselves in the difficult position of having a miscarriage.

**Purpose/objective:** To explore a woman's experience of early pregnancy loss when she is diagnosed with an inevitable miscarriage through understanding her description of symptoms and treatment decisions.

75%, Iron Deficiency Anemia 59%, Dysphagia 75%, Barrett's screening 2%, vomiting 57.1%, and Upper gastrointestinal (GI) bleeding 82.6%. Relevant findings were more likely if the patient was Male, 54.6% vs. 48% (p=0.017); Inpatient, 77% vs. 47% (p<0.001); and age >50, 52.6% vs. 47.7% (p=0.003).

**Conclusion:** This study demonstrated good adherence to ASGE guidelines for EGD indications within this practice. Higher yields of relevant findings were obtained in patients who were male, inpatients, and older than 50 years. It confirms that most of the guideline recommended indications predict the identification of relevant lesions on EGD in fairly high percentages. EGDs for surveillance of malignancy in Barrett's esophagus had lowest diagnostic yield.
Methods/project: This qualitative study consisted of transcribed data from a recorded telephone interview lasting from 30–45 minutes. Researchers used a semi-structured interview guide. Nurses recruited the participants from an obstetrics/gynecology outpatient clinic at a Midwestern medical center. A purposive sample of women who experienced a miscarriage at or before 14 weeks of pregnancy, needed to make a treatment decision (medical, surgical, expectant management), were at least 18 years old, and spoke English were recruited. Dimensional analysis, a method generic to grounded theory, but appropriate for existing data, was used to analyze transcripts. Women were asked to “Tell me about your miscarriage” with follow-up questions such as “How did you decide what to do next?” or “What went into knowing what to do next?” Using line-by-line analysis, the research team identified dimensions and related conditions.

Results: Participants ranged in age from 23–40, with a mean age of 31. All were married. Fifteen women decided on surgical intervention, 1 chose medical, and 7 chose expectant management. The women described two central dimensions: being sure they were miscarrying and being sure they chose the right treatment option. Making decisions about treatment were compelling due to potential for pregnancy viability. Conditions for “being sure” included relationship with their health care provider (physician or nurse midwife), severity or extent of symptoms (bleeding and cramping, absence or change in pregnancy symptoms), medical technology, personal intuition, and input and advice from others (e.g., friend who had miscarried).

Clinical Implications: Women wanted to know what to watch for (e.g., how to determine how much bleeding is too much) when they learned their miscarriage was inevitable. They were also traumatized by miscarrying in the toilet and either retrieving or flushing the products of conception. Findings support the critical role of nurses in health care of women with early pregnancy loss. Understanding symptoms, helping women know what to expect, the importance of confirmed non-viability of pregnancy, and the need for support from the woman’s health care team are key to evidence-based and relationship-based nursing care.


Background: This is a video presentation of a 69-year-old morbidly obese female who presented to the emergency department with a 2–3 day history of pain that started in her chest and migrated to her abdomen. On presentation, she was hypotensive and tachycardic with mental status changes. Her abdominal exam was concerning for peritonitis. Her pre-surgical evaluation included a CT scan of the abdomen and pelvis that revealed a large paraesophageal hernia with significant amount of free air in the hernia sac. The presumptive diagnosis was a strangulated paraesophageal hernia with gastric perforation.

Methods: The use of laparoscopy and intraoperative endoscopy were used to explore the abdominal cavity and treat the underlying disease process.

Results: She underwent a diagnostic laparoscopy with reduction of the paraesophageal hernia. The stomach was found to be viable without perforation. On intraoperative upper endoscopy she was found to have a perforated posterior duodenal ulcer and underwent proximal duodenectomy with antrectomy, truncal vagotomy, and Billroth II reconstruction performed laparoscopically. The type III hiatal hernia was reduced with dissection of the hernia sac, crural repair, and gastropexy. The patient had an uneventful recovery with transfer to a skilled care facility on postoperative day #7.

Conclusion: At times, unexpected findings are encountered intraoperatively. With increasing skill levels in laparoscopic surgery, many disease processes can be treated with minimally invasive techniques while maintaining good patient outcomes.

CME Questions:
1. What intraoperative method was used to identify the location of perforation?
   a. Methylene blue dye leak test
   b. Upper GI contrast study under fluoroscopy
   c. Upper endoscopy with bubble test*
   d. CT enterography
2. What method was used for intestinal reconstruction after specimen resection?
   a. Billroth I (gastroduodenostomy)
   b. Billroth II (gastrojejunostomy)*
   c. Roux-en-Y anastomosis
   d. Pyloric exclusion with diversion


36. Harter TD. La Crosse advance directive study evaluating the effectiveness of next steps planning (LADS III) (oral presentation). Presented at Cleveland Clinic Bioethics Research Day, Cleveland, Ohio, October 10, 2014.


Background: In a quest to develop as a Caritas organization, Gundersen Health System (GHS) became a Watson Caring Science Affiliate in 2012. GHS's goal is to learn more about the theory and science of Human Caring as an interdisciplinary approach to caring-healing healthcare. As an affiliate organization, GHS is participating in the International Watson Caring Comparative Database (IWCCD) which supports clinical research which measures caring and staff-patient-system outcomes.

Significance: GHS will be able to appraise their caring practices and use the results to improve performance. Relationships between patient perceptions of GHS’s caring practices and aggregate quality data on specific patient care units will be evaluated. Results will help to generate further research questions and potentially advise health policy.

Purpose/objective: The purpose of this international study is to apply the Caritas Patient Assessment Score (CPAS) in the acute care setting to build a national comparative database. The database will include CPAS scores and quarterly aggregate quality data to test for relationships between patients’ perceptions of feeling cared for (CPAS) and nationally identified outcome indicators.
**Methods/project:** IWCCD is a multicenter, prospective, longitudinal study. Five hospital units at GHS are participating in the study. Inclusion criteria for this study include: >18 years of age, on unit for >24 hours, alert and oriented, and speak English. A list of randomized patients, who are eligible to participate in the study, are approached and verbal consent obtained. The survey is comprised of ten demographic questions and five caring questions. GHS is the pilot organization for collecting data at the bedside via an electronic method utilizing an iPad rather than paper and pencil. At the end of the survey the patient is given the opportunity to share their story and provide comments.

**Results:** Good results have been obtained from four quarters of data. The overall GHS caring scores on a seven point Likert scale have ranged from 6.43 to 6.61. The individual question scores range from 6.02 to 6.65. These results are mid-study and more data is being collected. Raw data will be analyzed to answer several research questions specific to GHS.

**Clinical implications:** Communicating the study results and raising awareness of staff should increase caring scores and a resultant positive change in national quality indicators is anticipated. Providing a caring theoretical foundation to deliver caring healthcare will advance professional nursing practice and research.

41. Hulett S. **Comparing patient handoff structures to explore communication error risk.** Presented at Nursing Research on the Green, Viterbo University, La Crosse, Wisconsin, April 24, 2014.

**Background:** Patient handoff is a frequent, yet inconsistent nursing practice. The variations in communication processes during handoff are significant because of the implications on patient safety.

**Significance:** Electronic health records offer handoff reports but they can be restrictive and the information included may not support nurses’ needs. Incomplete information can lead to adverse events and technological solutions could improve communication (Staggers, Clark, Blaz, & Kapsandov, 2011).

**Purpose/objective:** The purpose of this review was to determine if standardized patient handoff structures reduce communication error risk for hospitalized patients when compared to varied patient handoff structures.

**Methods/project:** literature review.

**Results:** Communication errors related handoff structure variation were found on medical surgical, intensive care, and psychiatric units. Bradley and Mott (2012) found decreased medication and fall incident events. Reilly, Marcotte, Berns, and Shea (2013) found errors including omission of antibiotic needs, missing dialysis prescription information, and lost follow-up appointments in their study.

**Clinical implications:** Standardized handoff tools and processes should be implemented. Handoff reports must be designed in ways that match nurses’ workflows, provide valuable information quickly, and allow nurses to organize data in a meaningful way. New software and hardware, such as mobile devices, will likely change nurses’ utilization of technology for patient care. Further research should drive plans for efficient and effective computerization of handoff to decrease communication errors and improve patient safety (Staggers et al., 2011).


Gundersen Lutheran Medical Center utilizes EPIC electronic health record, Clinical Practice Model (CPM) content and various content providers for patient education. Organization and quick access to the appropriate content was essential with the added content and delivery method of the GetWellNetwork. Patient and family education guides were developed to organize the print and non-print materials in a standardized document. The patient and family education guides were also designed to drive staff to content selected by the subject matter experts, specifically to engage the patient with GetWellNetwork. The patient and family education guides create efficiency in education selection that encourages use of the GetWellNetwork. Based on CPM teaching titles and points, patient and family education guides offer suggestions for multiple resources and formats for patient education. The patient education team, nurse educators, and EPIC programmers developed and placed the patient and family education guides within the EPIC patient education activity for easy access. The patient and family education guide links directly to education handouts and lists specific video education. Order sets for EPIC were developed based on the content within the patient and family education guides. Staff is able to copy and paste complete titles and sources into the patient education documentation section of EPIC.

43. Jarman BT, O’Heron CT. **Five year experience with an international elective during general surgery residency.** Presented at the 100th Annual American College of Surgeons Clinical Congress, San Francisco, California, October 26–30, 2014.

**Introduction:** Clinical and cultural opportunities in underserved countries provide invaluable experiences for general surgery residents. We review our five year experience creating these rotations, the American Board of Surgery
Methods: Four surgery residents participated on the IE prior to 2012 and five have participated since that time with successful ABS and ACGME approval. Independent global organizations and an institutional program have been utilized to provide experiences in Nicaragua, the Dominican Republic, Ethiopia and Ecuador.

Results: Residents have participated in a variety of clinical settings and gained insight into global health issues, exposure to a broad spectrum of surgical pathology, and a strong operative experience. Operative case volumes average 22-80 and include a broad variety of the defined category operations required during residency. An institutional program which is focused on the development of sustainable relationships with underserved populations has provided our residents with valuable opportunities for cross-cultural exchange of knowledge and experience. Funding of the rotations has been accomplished and an institutional plan with a restricted donor fund is in place.

Conclusions: Participation on an IE provides invaluable cultural and operative experiences for general surgery residents. Challenges inherent in the development of the elective including adequate supervision and evaluation, resident safety, funding and attention to ABS and ACGME requirements have not been prohibitive. Sustainable institutional relationships provide advantages in planning and continuity of care.


Introduction: Aconite, derived from the root of the aconitum plant, is used throughout eastern Asia, including India and China, as an analgesic and an anti-inflammatory agent. Serious neuro- and cardiotoxic effects can occur if taken at a high dose. Aconite toxicity is common in Southeast Asia, but rare in the U.S.

Case: A 62-year-old Hmong man with no significant cardiac history came to the emergency department with chest pain, dizziness, and palpitations. Systolic blood pressure was 60-80 mmHg, and heart rate was 150-220 bpm. Cardiac rhythms were variable with runs of ventricular tachycardia (VT) and supraventricular tachycardia, couplets with right bundle branch block-like morphology, and left axis deviation suggestive of left posterior fascicular origin. Multiple cardioversions did not resolve his arrhythmias. Amiodarone load was given, also without improvement. Signs compatible with coronary ischemia and lactic acidosis prompted coronary angiography and ventriculography, which showed non obstructive coronary atherosclerosis with slow coronary flow and hyper dynamic left ventricular function with normal wall motion. The patient's wife told an interpreter that the patient had taken multiple doses of decoction made from aconitum roots for stomach upset before having cardiac symptoms. Literature review confirmed symptoms compatible with aconite toxicity. Over 24 hours the patient improved both hemodynamically and electrically. Supportive care was weaned successfully over 48 hours. Discharge ECG was identical to an ECG obtained 3 years prior when he presented with mild chest pains.

Mechanism of toxicity: Aconite interacts with the voltage-dependent sodium channel present on cell membranes of excitable tissues, including the myocardium, striated and smooth muscle, and neurons nerves, altering membrane depolarization and repolarization.

Management: mainly supportive. Vasopressor support and cardiopulmonary bypass have been used to maintain perfusion in refractory shock. Ventricular arrhythmias are often refractory to cardioversion and only minimally responsive to antiarrhythmic like sodium channel blocking agents

Conclusion: Aconite poisoning may be on the rise in the U.S. with a growing Asian population in which use of alternative medicine is high. Our case illustrates that herbal remedies may result in critical illness and highlights the need to recognize the signs and side effects of alternative remedies used in the locale. This case also highlights the importance of having interpreter services in emergency services to overcome language barriers, especially for locally prevalent languages.


**Background/Objective.** There is strong evidence of marked variability of re-excision rates after initial lumpectomy for breast cancer. Reasons for re-excision have not been well documented. Recent research suggests some re-excisions are performed unnecessarily due to differences in surgeon opinion regarding adequacy of margin width. We hypothesized the ASBrS MasterySM Program can identify variation in re-excision rates and reasons for re-excision to aid the development of performance improvement strategies to reduce secondary breast operations.

**Methods.** In the ASBrS MasterySM Program, surgeons can enter information on patient demographics, surgical procedures and quality measures with immediate peer performance comparison as a method of performance assessment and improvement. Data from January 1–November 5, 2013 were evaluated to determine re-excision lumpectomy rate (RELR). On June 1, 2013, a dropdown menu was added to the Mastery data collection tool to track reasons for re-excision. RELR was defined as the number of patients undergoing re-excision after lumpectomy divided by the number of patients having initial lumpectomy for cancer. Variation in re-excision rates by surgeon and patient characteristics was performed by chi square for univariate analysis.

**Results.** Three hundred twenty six surgeons reported on 6523 unique patients who had undergone initial lumpectomy for cancer, with 1438 patients (22.4%) undergoing one or more re-excisions. Two hundred thirteen surgeons reported at least 10 lumpectomies (range 10–163) during the queried period. For patients having re-excision by these surgeons, the number of re-excisions ranged from 1–4 (mean 1.1). Re-excision rates were higher in non-Caucasian (p=0.006) and Hispanic (p=0.008) patients, lower in surgeons who had been in practice longer (p<0.001), and were no different according to primary insurance type (p=0.15). Reasons for re-excision were documented in 1575 re-excision procedures and are detailed in the table below. The most common reasons were an ink positive margin (49.7%) or a margin < 1 mm (34.3%).

**Conclusion.** The ASBrS MasterySM Program provides a rapid, contemporary, and valuable source of data on specific reasons for re-excision lumpectomy. Variability of re-excision by surgeon and patient characteristics was identified. Most re-excisions are performed for margins that are positive or < 1 mm. This information corroborates surgeon survey data regarding reasons for re-excision and provides proof of concept the MasterySM Program can measure re-excisions in real time, providing a method for monitoring during future performance initiatives.

**Table. Reasons for Re-excision Lumpectomy Procedures**

<table>
<thead>
<tr>
<th>Reason</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ink positive margin</td>
<td>783</td>
<td>49.7%</td>
</tr>
<tr>
<td>Margin &lt; 1 mm</td>
<td>540</td>
<td>34.3%</td>
</tr>
<tr>
<td>Margin 1-2mm</td>
<td>114</td>
<td>7.2%</td>
</tr>
<tr>
<td>Post lumpectomy imaging demonstrated evidence of residual disease</td>
<td>38</td>
<td>2.4%</td>
</tr>
<tr>
<td>Prior surgery elsewhere, margin status uncertain</td>
<td>2</td>
<td>1.6%</td>
</tr>
<tr>
<td>Margin &gt;2mm but desire wider margin</td>
<td>16</td>
<td>1.0%</td>
</tr>
<tr>
<td>Tumor board recommended wider margins</td>
<td>6</td>
<td>0.4%</td>
</tr>
<tr>
<td>Fragmented specimen, margin status uncertain</td>
<td>3</td>
<td>0.2%</td>
</tr>
<tr>
<td>Radiation oncologist recommended wider margins</td>
<td>2</td>
<td>0.1%</td>
</tr>
<tr>
<td>Median total charge amount per patient, $</td>
<td>6521.05</td>
<td>6855.54</td>
</tr>
<tr>
<td>Other</td>
<td>48</td>
<td>3.1%</td>
</tr>
<tr>
<td>Total procedures</td>
<td>1575</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Background:** It is a well-known fact that the available organs for donation are far fewer in number than the patients who are in need of them. Organ donation raises ethics and policy questions related to the cost and extent of resources used toward procuring transplantable organs. It is therefore plausible to consider the financial burden of keeping patients alive while giving their families the option of donation. This cost includes not only equipment and services, but also limited resources such as blood products and pharmaceuticals, especially in a rural setting.

**Methods:** A retrospective review of our institution’s trauma registry for all patients who were admitted and ultimately underwent organ procurement from January 2001 through February 2013 was completed. Patients who were not eligible for donation were excluded. Statistical analysis included descriptive statistics and Wilcoxon Rank Sum test.

**Results:** Seventy-six patients met inclusion criteria. Mean age was 37.8 ± 18.1 years, and 76% were men. Median injury severity score was 26 (25-38), and 87% were blunt injuries. Twenty (26%) patients were taken to the operating room prior to meeting criteria for organ donation. Eleven (14%) patients experienced cardiac death and 65 (86%) patients experienced brain death. The mean time from meeting organ donation criteria to procurement was 14.3±11.9 hours. The most common organs donated included liver (55%), kidney (54%), pancreas (43%), heart/heart valve (36%), bone (33%), and eyes/cornea (32%). Mean hospital length of stay was 2.0 ± 2.8 days, and was similar for patients with cardiac vs. brain death (1.4 days vs. 2.1 days, respectively; P=0.224). Blood products were administered in 51 (68%) patients. Mean number of units of packed red cells given was 6.7±9.1. The median total cost of hospitalization was $21,167.60 ($13,050.82-$36,054.97). The highest median costs were associated with surgical procedures ($5,924.60; range $2,754.80-$14,696.58) and imaging studies ($5,614.70; range: 2,502.20-$9,729.10). The median cost of blood products was $1,460.35 ($884.00-$3,762.00).

**Conclusions:** Patients undergoing organ procurement after trauma have relatively short hospital stays and do not require excessive resources including blood products, imaging studies and surgical procedures. Care of the potential donor patient is not cost-prohibitive in our rural, community-based, hospital setting.


**Background:** Increase in prescription opioid use to control chronic non-cancer pain (CNCP) parallels the increase opioid use disorders in the United States. Health care providers face challenges in managing pain while decreasing the risk of patient’s misuse of opioid medications. To avoid opioid misuse, some providers avoid prescribing any opioids for CNCP, however, CNCP remains a significant cause of disability, thus, opioids are considered in some cases in a treatment plan. Opioids risk tools have been developed to ascertain the potential for opioid misuse and include: 1) Opioids Risk Tool (ORT), 2) Screener and Opioid Assessment for Patients with Pain –Revised (SOAPP-R), 3) Diagnosis, Intractability, Risk, and Efficacy (DIRE) and 4) Pain Medicine Questionnaire (PMQ).

**Significance:** Available evidence based research on these tools can help guide health providers to assess the potential for misuse of those at high risk, and consecutively those at low risk for aberrant behavior while using opioids for CNCP. Identifying high risk patients can lead to implementation of effective monitoring protocols and consideration of alternative methods and modalities for management CNCP. Understanding the potential for opioids misuse aberrant behaviors and other risk factors coupled with evidenced based tools can provide effective management of CNCP while reducing the potential risk of opioid misuse. Education and utilization of assessment tools for opioid use remain essential for health care professionals, patients and family is crucial for decreasing opioid use disorders.

**Purpose/objective:** Consequences of misuse of prescription opioids is common and affects all levels of health care professional, patient and the communities we live. This problem is increasing and it is essential that evidenced based practice knowledge is gained for ongoing assessment/education and further research can be done.

**Methods/project:** Evidenced based research on opioid prescription misuse, prevalence, problems across the United States and of four evidenced based practice tools are reviewed. Screening tools including SOAPP-R, ORT, DIRE and PMQ are reviewed with research showing positive and negative outcomes of validity/reliability and limitations of tools.

**Results:** Recommendations for Centers of Disease and literature meta-analysis include nurses and health care professionals use universal precautions, tools for screening and education for health care professionals, patients/families and community to address the growing problem of opioid misuse. Working together with federal and state regulations/police and multiple modalities for managing chronic non cancer pain to better understand the reasons for misuse and reduction of consequences including the rise of unintentional overdose of opioid prescription and deaths.
Clinical implications: To gain knowledge and ability to better assess/monitor and provide nursing interventions in relationship to prescription opioids for chronic non cancer pain. To continue to treat pain while addressing growing problem of opioid misuse. To understand evidenced base practice tools available and utilized in order to provide education. To discern different etiologies of misuse to better treat the underline problem.


Background/Objective: Utilization of a Comprehensive Unit-based Safety Program (CUSP) has been associated with increased patient safety, including decreased infectious complications, in the critical care and colorectal surgery literature. The purpose of this study was to examine the incidence of postoperative wound complications following BCS prior to implementing a CUSP for patients treated with BCS.

Methods: A prospectively maintained breast cancer registry at a community-based multidisciplinary breast center was queried to identify all patients diagnosed with breast cancer from 2010–2012. A retrospective review was performed to identify patients treated with BCS. Patients who had lumpectomy for benign pathology, had surgery elsewhere, were treated with mastectomy, or presented with metastatic disease were excluded. Univariate analysis was performed to identify the rates of wound complications, defined according to NSQIP criteria as superficial surgical site infection (SSI), deep abscess, seroma, hematoma, wound dehiscence and lymphedema. Wilcoxon sum rank test and Chi Square (Fisher) were performed to identify independent risk factors for wound complications. Qualitative chart review, literature review, and provider opinion were used to identify potential CUSP interventions.

Results: 286 patients were included, with a median age of 64.5 years. 19% (N=54) presented with DCIS and 81% (N=232) with invasive cancer. 24% (N=69) underwent lumpectomy alone while 76% (N=217) underwent lumpectomy with surgical axillary staging. Wound complication rates are presented in table 1. Tissue excision volume greater than 250cm³ (p=0.049) was a risk factor for wound complications, but oncoplastic closure was not. Additionally, pathologic stage II/III (p=0.045) was associated with more wound complications, but axillary surgery with BCS was not. Finally, reoperation (p=0.012) was significantly associated with increased postoperative wound complications. After review of results, a standardized protocol for perioperative care was developed and agreed upon by all surgical care providers, to include: preoperative instructions (including skin care), perioperative antimicrobial therapy, preoperative skin preparation and draping, and postoperative instructions.

Table 1. Wound complication rates

<table>
<thead>
<tr>
<th>Complication</th>
<th>N</th>
<th>Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSI</td>
<td>17</td>
<td>5.94</td>
</tr>
<tr>
<td>Deep Abscess</td>
<td>5</td>
<td>1.75</td>
</tr>
<tr>
<td>Seroma</td>
<td>17</td>
<td>5.94</td>
</tr>
<tr>
<td>Hematoma</td>
<td>13</td>
<td>4.55</td>
</tr>
<tr>
<td>Wound dehiscence</td>
<td>7</td>
<td>2.45</td>
</tr>
<tr>
<td>Lymphedema</td>
<td>18</td>
<td>6.29</td>
</tr>
<tr>
<td>Any</td>
<td>58</td>
<td>20.28</td>
</tr>
<tr>
<td>2 or more</td>
<td>15</td>
<td>5.24</td>
</tr>
<tr>
<td>Radiation oncologist recommended wider margins</td>
<td>2</td>
<td>0.1%</td>
</tr>
<tr>
<td>Median total charge amount per patient, $</td>
<td>6521.05</td>
<td>6855.54</td>
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<tr>
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<td>48</td>
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<tr>
<td>Total procedures</td>
<td>1575</td>
<td>100%</td>
</tr>
</tbody>
</table>

Conclusions: An institutional wound complication rate following BCS was established at a multidisciplinary breast center. A CUSP was developed to standardize the perioperative care among patients and care providers. These wound complication data provide a baseline, allowing future assessment of the effectiveness of a CUSP to reduce BCS complications.

Background/Objective: There has been a recent emphasis placed on the importance of the surgeon’s ethical and legal obligations to provide complete, accurate, and patient participatory informed consent regarding operative risk. The ACS NSQIP® has developed a universal risk estimation tool to facilitate this process. The purpose of this study was to analyze the applicability of the NSQIP® risk calculator to patients undergoing breast conserving surgery (BCS) for breast cancer at our institution.

Methods: A prospectively maintained breast cancer registry at a community-based multidisciplinary breast center was queried to identify all patients diagnosed with breast cancer from 2010-2012. A retrospective review was performed to identify patients treated with BCS. Patients with benign or metastatic disease were excluded, as were those who had surgery elsewhere or had mastectomy. The risk calculator was applied to each patient to generate an individual risk profile. The performance of the universal risk calculator model was then evaluated using two metrics: the c-statistic and the Brier score.

Results: There were 287 patients with a median age of 65 years. 54 (19%) had DCIS and 230 (81%) had invasive cancer. 69 (24%) underwent lumpectomy alone while 218 (76%) underwent lumpectomy with surgical axillary staging. Comparison of predicted and actual outcomes are presented in table 1. Of the 40 patients who returned to the OR, 29 were for positive margins, 8 were for upgrade in diagnosis, and 3 were for surgical wound complications.

Table 1. Comparison of NSQIP risk calculator estimates to actual outcomes in 287 patients undergoing BCS

<table>
<thead>
<tr>
<th>Complication</th>
<th>Actual Outcomes % (N)</th>
<th>NSQIP Predicted Outcomes %</th>
<th>Brier score</th>
<th>c-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious complication</td>
<td>15.0 (43)</td>
<td>5.0</td>
<td>0.138</td>
<td>0.549</td>
</tr>
<tr>
<td>Any Complication</td>
<td>16.7 (48)</td>
<td>6.6</td>
<td>0.150</td>
<td>0.541</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>0.3 (1)</td>
<td>0.0</td>
<td>0.003</td>
<td>0.956</td>
</tr>
<tr>
<td>Cardiac Complication</td>
<td>0.0 (0)</td>
<td>0.0</td>
<td>&lt;0.001</td>
<td>NC</td>
</tr>
<tr>
<td>Surgical Site Infection</td>
<td>2.4 (7)</td>
<td>1.1</td>
<td>0.024</td>
<td>0.601</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td>0.3 (1)</td>
<td>0.2</td>
<td>0.003</td>
<td>0.524</td>
</tr>
<tr>
<td>Venous Thromboembolism</td>
<td>0.0 (0)</td>
<td>0.1</td>
<td>&lt;0.001</td>
<td>NC</td>
</tr>
<tr>
<td>Renal Failure</td>
<td>0.0 (0)</td>
<td>0.0</td>
<td>&lt;0.001</td>
<td>NC</td>
</tr>
<tr>
<td>Return to OR</td>
<td>13.9 (40)</td>
<td>4.9</td>
<td>0.128</td>
<td>0.529</td>
</tr>
<tr>
<td>Death</td>
<td>0.0 (0)</td>
<td>0.0</td>
<td>&lt;0.001</td>
<td>NC</td>
</tr>
</tbody>
</table>

Conclusions: The model performed adequately for all complications except Return to OR, Any Complication, and Serious Complication. A return to the OR after BCS for positive margins or an upgraded diagnosis of invasive cancer is the standard of care in breast cancer treatment, and accounted for the majority of instances in this study. When controlling for Return to OR for oncologic purposes, the model performs adequately in predicting the rate of Any Complication or Serious Complication. The deviation from predicted Return to OR rates must be addressed when utilizing the NSQIP® risk calculator model during preoperative risk discussion with patients undergoing BCS at our institution.


Background: PET scan was approved by the US Medicare for diagnosis and staging of NHL in July 2001. We studied the DLBCL stage distribution and overall survival (OS) before and after introduction of PET scan.

Methods: We identified DLBCL patients diagnosed in 1998 to 2011 from the NCDB. We obtained data pertaining to stage and OS. We grouped patients into 2 cohorts: pre (1998-2001) and post (2002-2005) PET approval. To minimize bias in improvement of OS due to new treatments, year 2005 cut-off was chosen as rituximab was approved by the US Food and Drug Administration for treatment of B-cell NHL in 2006.

Results: There were 202,294 patients with DLBCL. Of these, 30.5% had extra-nodal disease presentation. The stage distribution over time is shown in table 1. Overall, early stage disease (I/II) remained relatively stable over time (35.1% in 1998 to 38.3% in 2011). Advanced stage disease (III/IV) increased from 30.7% to 51.8%. In contrast, patients with unknown stage decreased from 34.2% to 9.4%. We observed similar stage migration in both nodal...
and extra-nodal DLBCL subgroups. The median OS was significantly better (all P values < 0.001) in the post-PET approval era for all stages: combined (64.5 vs. 38.4 months), I/II (not reached (NR)[mean 103.8 months]) vs. (NR [mean 75.3 months]), III/IV (28.2 vs. 13.0 months), and unknown (57.2 vs. 39.9 months).

Conclusions: Since the approval of PET scan for NHL diagnosis and staging in 2001, there has been a substantial change in the stage distribution among DLBCL patients. This is predominantly due to a migration from unknown stage into advanced stage disease. The OS has improved across all stages but most marked among patients with advanced stage disease. The latter may be in part due to stage migration.


Purpose. Open repair of Achilles tendon rupture is commonly performed. Delayed incision healing is a known complication of open repair and can lead to deep infection.1 Development of a postoperative Achilles tendon infection may result in a massive functional defect and has limited reconstructive options.2

Case Study. We present a 43-year old man who underwent primary open end-to-end repair of a ruptured Achilles tendon. Postoperatively, he developed delayed incision healing that led to deep infection.1 Development of a postoperative Achilles tendon infection may result in a massive functional defect and has limited reconstructive options.2

Results. Tenuous scarring with intermittent fissuring at the STSG application site was initially problematic, but remains quiescent. Following a course of physical therapy, his function remains comparable to the contralateral limb at 13-months post-reconstruction.

Analysis and Discussion. Limited options exist when managing catastrophic failure of an infected Achilles tendon rupture repair. We successfully employed a combined flexor hallucis longus and peroneus brevis tendon transfer to restore form and function following complete loss of the Achilles tendon. Optimal reconstruction regardless of approach requires adequate resting tension. Local tendon transfers can be helpful when used in phase and without creating untoward weakness.

References


Background: More than 15 million units of blood are transfused annually in the U.S. Guidelines have been established to minimize the occurrence of transfusion-related adverse events; however, transfusion continues to be associated with increased mortality. The age of blood products transfused and its impact on mortality is not well understood. During storage, complex biochemical/biomechanical alterations modify the properties of red blood cells. Few studies have analysed the age of blood transfused, and the reports are highly varied with regards to the definition of “old” blood and the typical duration of blood storage. The objective of this study was to evaluate the effect of the age of blood transfused on mortality.

Methods: A retrospective review of our institution’s trauma registry and blood bank database for all patients who were admitted from January 1, 2001 through May 31, 2012 as a trauma activation and received >1 unit of packed red blood cells (PRBC) within the first 24 hours was completed. Patients were grouped by the age of the majority of the blood transfused into <10 days, 10-20 days, and >20 days. Statistical analysis included χ² and Fisher exact tests and multivariate logistic regression.

Results: There were 270 patients included; 7 (3%) received PRBC <10 days old, 120 (44%) received PRBC 10-20 days old, and 143 (53%) received PRBC >20 days old. Median ISS was 29, 27, and 26 in those who received PRBC <10 days, 10-20 days, and >20 days old, respectively (P=0.519). Median length of stay was 12, 9, and 9 days in those who received PRBC <10 days, 10-20 days, and >20 days old, respectively (P=0.853). The mechanism of injury was predominantly blunt (86%, 90%, and 87% in those who received PRBC <10 days, 10-20 days, and >20 days old, respectively).
>20 days, respectively; \( P=0.699 \)). The number of units transfused was similar among the 3 groups (\( P=0.248 \)). Thirty-day mortality rates were 29%, 29% and 34% in those who received PRBC <10 days, 10-20 days, and >20 days old (\( P=0.672 \)). When adjusting for other factors, multivariate logistic regression models indicated that ISS was a predictor of mortality in the PRBC 10-20 days (OR 1.237), and PRBC >20 days (OR 1.041) groups. Among patients who received PRBC >20 days old, hospital length of stay (OR 0.947) and transfusion of 3-5 units (vs. \( \leq 2; \) OR 0.069) were also predictive of mortality.

**Conclusions:** There was no statistically significant difference observed in the mortality rates based on the age of blood transfused, however, the highest mortality rate was observed in those who received PRBC >20 days old. In patients who received older blood transfusions, ISS, length of stay, and number of units transfused was predictive of 30-day mortality. Future randomized controlled trials are needed to clarify any correlation between mortality and the age of PRBC transfused.

**CME Questions:**
1. The maximum FDA approved shelf life for PRBCs is:
   a. 21 days
   b. 35 days
   c. 42 days*
   d. 56 days
2. Stored PRBCs are low in 2.3 DPG which will lead to which of the following?
   a. No change in oxygen dissociation curve.
   b. Shift of the oxygen dissociation curve to the left.*
   c. Shift of the oxygen dissociation curve to the right
   d. Variable effect on oxygen dissociation curve.


**Introduction:** The presence of gas in the wall of the small or large intestine is referred to as pneumatosis intestinalis (PI). There are multiple theories as to the pathogenesis of this condition. Several diseases are associated including: intraabdominal catastrophes, infections, and immunologic disturbances. When associated with bowel necrosis, PI may have high mortality rates.

**Case:** This patient is a 62-year-old female with a diagnosis of ovarian cancer involving the left ovary, uterus, colon and mesentery. Initial surgical management included bilateral salpingooophorectomy, hysterectomy and subtotal colectomy. One month post-op, she was treated with IV paclitaxel, IP paclitaxel and IP cisplatin. Nausea and vomiting prophylaxis included dexamethasone. Two months following the induction of chemotherapy, the patient developed diarrhea and belching at home and was later found unresponsive by her husband. The patient was transported to the ED. She was minimally responsive, hypotensive, tachycardic and hypothermic at 34.1 C. Physical exam was significant for dry oral mucosa, clear lungs, non-tender abdomen and no focal neurologic deficits. Initial investigations included a negative CT-head and chest x-ray revealing an air filled esophagus and dilated stomach. Labs revealed an anion gap of 24, WBC-24 and lactate-9.9. The patient passed bloody stool in the ED and was admitted to critical care with a consult to gastroenterology. Abdominal x-ray revealed marked dilation of the stomach. EGD was performed with the findings of esophagitis, severe gastritis and duodenal ulceration suggestive of mucositis and inflammation. A CT-abdomen was recommended, revealing pneumatosis involving the stomach, duodenum and most of the small bowel consistent with bowel necrosis. In the ICU, the patient quickly improved with conservative management. Her acute GI bleed resolved and lactate normalized within 24 hours. She received a 7 day course of piperacillin-tazobactam and was discharged home on hospital day 10.

**Discussion:** Pneumatosis intestinalis and gastric pneumatosis are rare but documented complications of immunological disturbances secondary to steroids or chemotherapy. Corticosteroids are the most common drugs associated with PI. There has been one case reported of PI during paclitaxel treatment and one case reported involving cisplatin in combination with irinotecan. Although the exact pathogenesis of this case may never be known, it adds to the collective data of documented causes of PI and side effects of these specific chemotherapeutic agents.


**Background:** Constipation led to delays in discharge, complications, re-admissions, decreased satisfaction, and increased costs. Bowel issues in the top three diagnoses of 7 day readmissions on Cardiopulmonary and Medical Oncology units from March–May 2012. Inconsistencies were found in assessments, documentation of ‘Stool
Output rows, discussions about bowel status, and tools utilized. Keenan, Yakel, Lopez, Tschannen, and Ford (2013) also found variation in nurse documentation and communication, the absence of a centralized care overview, and infrequency of interdisciplinary communication.

**Significance:** The lack of awareness and thorough communication about patients’ assessments can lead to safety issues. Technological solutions could improve variations in communication processes during handoff (Staggers, Clark, Blaz, & Kapsandov, 2011).

**Purpose/objective:** To improve awareness of and communication of bowel assessments to reduce constipation and the associated harm.

**Methods/project:** Quality Improvement Project A3 Problem Solving Tools.

**Results:** Documentation of bowel status increased. Discussions of bowel status at SBAR Handoff increased. January 2013–May 2013: no 48 hour nursing home readmissions were due to constipation January 2013–February 2013: no patients readmitted with constipation April 2013: EPIC SBAR Handoff report use 54% (variation in use as well).

**Clinical implications:** Identify and correct barriers to utilizing standardized tools such as SBAR Handoff Report in a consistent manner. Design electronic medical record flowsheets and reports that provide valuable, streamlined information for other concepts. Promote constipation prevention interventions. Consider clinical decision support strategies to help manage normal bowel patterns in hospitalized patients.


**Background:** Readmissions can be preventable. They are often caused by a failure of the provider to educate the patient on proper care instructions, information on their disease process, and lack of follow-up visits. This can further “cause patients’ failure to adhere to medical treatment and diet regimen, inability to perform self-care behavior, including monitoring symptoms of deterioration and failure to take action in order to prevent further deterioration” (Stromberg, 2005, p. 363). Education provided by nurses has shown increased medication and diet adherence. Education on specific self-care measures can increase likelihood of adherence as well. Stromberg, A. (2005). The crucial role of patient education in heart failure. European Journal of Heart Failure, 7(3): 363-369. doi: 10.1016/j.ejheart.2005.01.002

**Significance:** Hospital readmissions have a financial impact on health care organizations.

**Purpose/objective:** The premise of the High Risk Transition Practicum is to improve transition of care for high risk patients by a partnership of Clinical Nurse Leaders (CNL), Care Coordinators (CC) and Winona State University Nursing Students in providing care for the patients in the Community.

**Methods/project:** The CNL sets up the relationship with the student in the final days of the hospitalization, the student will meet face to face with the client prior to discharge, establish a plan of care and education with the CC, then meet with the patient in the community setting. This flow of care will be determined in collaboration with the CC. During the visit the student will electronically connect with the CC. The follow-up interactions will be structure in a specified format which will include data collection, reinforcement of the discharge plan, and use of teach-back for disease management education. The student will follow the patient in the community for 3 weeks in this manner. This process will be repeated until the students have seen a total of 5–6 patients.

**Results:** The most significant outcome is the reduction in readmissions to the hospital for this high risk patient population.

**Clinical implications:** In addition, the Winona State University Nursing Students are developing their community-oriented nursing roles of Educator, Advocate, Collaborator, Planner, Health Status Monitor, Data collector/evaluator, Assuror of health care and Community Care Agent.


**Background:** Preoperative antibiotic prophylaxis is an important adjunct in the prevention of surgical site infections (SSI) and infectious morbidity and mortality. At our institution, prior to September 2010, preoperative antibiotics were selected by the attending surgeon. Since that time, a pharmacy decision model (PDM) in which pharmacists review preoperative antibiotic selection and modify the order as needed was implemented. Appropriate antibiotic selection was based on an algorithm developed to account for patient risk factors for SSI. The PDM was initially applied to hernia repairs and then to colorectal procedures. Our objective was to evaluate the impact of
this transition.

**Methods:** After receiving IRB approval, a retrospective review of the medical records of patients who underwent hernia repairs and colorectal procedures between August 2009 to August 2010 (Pre-PDM) and November 2010 to December 2011 (Post-PDM) was completed. Variables included patient comorbidities, preoperative antibiotic selection, dose, and timing, operative data, and 30-day morbidity and mortality. Statistical analysis included chi-square and Wilcoxon Rank Sum Tests. A P value <0.05 was considered significant.

**Results:** There were 472 patients in the Pre-PDM group, and 370 in the Post-PDM group. Age, sex, preoperative body mass index, and comorbidities (renal disease, type II diabetes, malignancy, tobacco use, antibiotic allergies and history of MRSA) were similar between the groups. Colorectal cases comprised 20.3% of the Pre-PDM group, and 27.0% of the Post-PDM group (P=0.023). Cases were performed laparoscopically in 29% and 37% of those in the Pre-PDM and Post-PDM groups, respectively (P<0.001). Mean length of stay among patients who underwent colorectal procedures was 5.5±3.2 and 5.8±3.2 days (P=0.331) in the Pre and Post-PDM groups, respectively. Mean length of stay for patients who underwent hernia repairs was 0.2±0.7 and 0.4±1.3 days in the Pre and Post-PDM groups, respectively (P=0.064). In the Post-PDM group, the surgeon’s preoperative antibiotic order was changed in 31% of the cases. Preoperative antibiotics were administered in 80% in the Pre-PDM group and 88% in the Post-PDM group (P<0.001). Cephalosporins were administered in 88% and 95% of those in the Pre and Post-PDM groups, respectively (P<0.001). In the Pre and Post-PDM groups, SSI rates were similar (5.3% vs. 4.9%; P=0.777) overall, and among colorectal procedures (13.5% vs. 14.0%, P=0.926) and hernia repairs (3.2% vs. 1.5%; P=0.168). Urinary tract infection (2.1% vs. 0.5%; P=0.055) and intra-abdominal infection (0.8% vs. 0.7%; P=0.871) rates were similar in the Pre and Post-PDM groups.

**Conclusions:** After implementation of the PDM, one third of the surgeon’s preoperative antibiotic orders were changed. Overall, more antibiotics were administered post-PDM. There was no difference in the rate of SSI after transitioning to a PDM for preoperative antibiotic selection.

**CME Questions:**
1. After transitioning to a process of having a pharmacist review and modify preoperative antibiotic orders, the rate of preoperative antibiotic administration…
   a. Decreased drastically.
   b. Did not change.
   c. Increased slightly.*
   d. Tripled.
2. What was the impact of having pharmacists’ review and modify preoperative antibiotic orders on surgical site infections (SSI)?
   a. SSI rates were similar before and after transitioning to pharmacist’s review.*
   b. SSI rates increased drastically.
   c. SSI rates decreased to 0% for both colorectal procedures and hernia repairs.
   d. SSI rates decreased for colorectal procedures and increased for hernia repairs.


**Background:** The National Institutes of Health have established criteria that patients must satisfy before undergoing bariatric surgery; however, many insurance companies have their own criteria in order to obtain approval. Previous research at our institution has demonstrated that the most common reason patients do not undergo surgery was insurance-related, and new-onset comorbidities increased over a 3 year follow-up among patients who were denied LRYGB compared to those who underwent surgery. Our objective was to evaluate all-cause hospital admissions and charges among patients who were denied laparoscopic Roux-en-Y gastric bypass (LRYGB) for insurance reasons compared to those who underwent LRYGB.

**Methods:** After IRB approval, our electronic medical record system was queried for all-cause hospital admissions among patients who attended an initial visit for bariatric surgery from January 2000–December 2012, but were denied by insurance, and those who underwent LRYGB from September 2001–December 2012. Statistical analysis included Wilcoxon Rank Sum test, and Fisher exact test.

**Results:** There were 1209 patients who underwent LRYGB and 228 patients who were denied. Mean follow-up was 4.4 and 5.8 years in the LRYGB and denials groups, respectively (P<0.001). There were 886 admissions in 402 patients in the LRYGB group, and 112 admissions in 58 patients in the denials group over the follow-up period.
There were no perioperative mortalities. Overall mortality was 2% in both the LRYGB and denials group.

**Conclusions:** Although more comorbidities were observed in the LRYGB group initially, there was no difference in the number of admissions or charges associated with admissions in the LRYGB vs. denials group. Patients who were denied surgery had increased medical admissions, while those who underwent LRYGB had increased behavioral health admissions.


**Background:** Gastroesophageal reflux disease (GERD) is a common problem affecting up to 40% of the population in the western world. Antireflux surgery is the gold standard for GERD that is refractory to medication. Obesity is a risk factor for GERD as well as for failure of fundoplication. Roux-en-Y gastric bypass is considered a safe and effective treatment for reflux in the severely obese and recent reports support the long-term effectiveness of obesity surgery for controlling reflux symptoms. We present a case of multiple failed attempts at fundoplication for control of severe reflux.

**Methods:** We present the case of a 72-year-old female with a body mass index of 31.5 kg/m² who underwent paraesophageal hernia repair and Nissen fundoplication in 2010. She experienced early recurrence of her symptoms and was found to have persistent reflux on upper gastrointestinal studies with disruption of the fundoplication.

**Results:** The patient was taken to the operating room for revisional antireflux surgery with a redo Nissen fundoplication in 2011. In 2013, her symptoms were poorly controlled and further work-up showed esophagitis with persistent reflux. She was taken back to the operating room for a prolonged lysis of adhesions with reduction of intrathoracic stomach into the abdomen. This straightened the angulation of the distal esophagus, which was thought to be contributing to her symptoms. Postoperatively, she had early improvement, but again developed severe, worsening regurgitation with vomiting. In April 2014, she then underwent a proximal gastrectomy with Roux-en-Y esophago-jejunostomy. The patient recovered uneventfully with no leak or obstruction detected on imaging. Her diet was advanced and she was discharged on postoperative day five.

**Conclusion:** Gastric bypass should be considered as first line treatment for refractory GERD in severely obese patients or as a revisional procedure in patients with failed Nissen fundoplications. Poor tissue integrity in revisional surgery may necessitate proximal gastrectomy with Roux-en-Y reconstruction.

64. Prissel MA, Roukis TS. **Registry data trends of total ankle replacement use (oral presentation).** Presented at the American College of Foot and Ankle Surgeons 72nd Annual Scientific Conference, Orlando, Florida, February 27–March 2, 2014.

Joint arthroplasty registry data are meaningful when evaluating the outcomes of total joint replacement, because they provide unbiased objective information regarding survivorship and incidence of use. Critical evaluation of the registry data information will benefit the surgeon, patient, and industry. However, the implementation and acceptance of registry data for total ankle replacement has lagged behind that of hip and knee implant arthroplasty. Currently, several countries have national joint arthroplasty registries, with only some procuring information for total ankle replacement. We performed an electronic search to identify publications and worldwide registry databanks with pertinent information specific to total ankle replacement to determine the type of prostheses used and usage trends over time. We identified worldwide registry data from 33 countries, with details pertinent to total ankle replacement identified in only 6 countries. The obtained information was arbitrarily stratified into 3 distinct periods: 2000 to 2006, 2007 to 2010, and 2011. Within these study periods, the data from 13 total ankle replacement systems involving 3,980 ankles were identified. The vast majority (97%) of the reported ankle replacements were 3-component, mobile-bearing, uncemented prostheses. Three usage trends were identified: initial robust embracement followed by abrupt disuse, minimal use, and initial embracement followed by sustained growth in implantation. Before the widespread acceptance of new total ankle replacements, the United States should scrutinize and learn from the international registry data and develop its own national joint registry that would include total ankle replacement. Caution against the adoption of newly released prostheses, especially those without readily available revision components, is recommended.

**References**


Purpose. One common etiology of total ankle replacement (TAR) failure is periprosthetic cyst formation from ultra-high molecular weight polyethylene (UHMWPE) wear debris leading to bone erosion, component loosening or subsidence.1-3 Once identified, periprosthetic cysts should be surveyed regularly for progression.4-7

Literature Review. Historically, impaction bone grafting has been proposed to manage contained defects, while ambiguity remains regarding management of massive periprosthetic osteolytic defects with cortical breach following TAR.4-8

Case Study. An 80-year old man 10-years status-post primary TAR responded to a surveillance program conducted by the senior author (TSR). Prior radiographs demonstrated early tibial periprosthetic cystic changes that progressed before he was lost to follow-up. Updated radiographs and CT demonstrated a massive periprosthetic osteolytic tibial defect breaching the anterior, medial and posterior cortices, as well as, progressive talar component subsidence.

Results. Revision TAR was performed by maintaining the stable original tibial component, while revising the UHMWPE insert and talar component. Periprosthetic tibial cysts were debrided and filled with geometric metal reinforced polymethylmethacrylate (PMMA) cement augmentation. Pathologic findings included an abundance of granular histiocytes consistent with a particulate-mediated inflammatory response due to UHMWPE wear debris. At 17-months follow-up he continues to do well with planned annual surveillance.

Analysis and Discussion. Early results utilizing this technique are promising for management of massive, progressive periprosthetic osteolytic cysts especially when cortical breach is present, thus limiting alternate options.6,7 Short- and long-term surveillance will provide additional insight to the efficacy of these techniques as further revision would be challenging.

References


Purpose. Management of septic arthritis is a surgical emergency requiring a protocol-driven approach including high-volume joint lavage, extensive debridement, deep culture procurement and prolonged sensitivity-driven parenteral antibiotics.1-6 With concomitant osteomyelitis, in addition to the above, a staged approach utilizing antibiotic loaded polymethylmethacrylate cement beads (AL-PMMA) and definitive management with joint arthrodesis is recommended.7

Literature Review. No standardized approach to the management of septic ankle arthritis exists.1-8

Case Study. A 66-year old uncontrolled diabetic woman was referred 11-days after initial presentation with a known right septic ankle. One year prior, she underwent trimalleolar ankle fracture ORIF performed elsewhere,
complicated by five-months of delayed incisional healing. Prior to referral, she underwent two ankle joint aspirations which yielded multi-drug resistant *Staphylococcus epidermidis*. Additionally, radiographs, CT scan, WBC-labeled bone scintigraphy and laboratory work-up demonstrated failed fixation, septic arthritis and osteomyelitis.

**Results.** We performed the protocol-driven approach, as stated in the purpose section, to treat the septic ankle and hardware removal with bone biopsy procurement that confirmed septic arthritis and acute osteomyelitis. Eight-weeks following the Index procedures, she underwent removal of AL-PMMA and arthroscopic ankle arthodesis utilizing external fixation that was removed 10-weeks later. Clinical surveillance with serial radiographs demonstrated successful arthrodesis. She ambulates with an AFO and remains infection-free on suppressive antibiotics 17-months postoperatively.

Analysis and Discussion. A positive outcome was achieved, despite treatment delays with known septic arthritis. Clinical acumen and appropriate use of diagnostic tests should be utilized to initiate prompt treatment for this surgical emergency. Protocol-driven staged treatment for septic ankle arthritis followed by arthroscopic arthodesis utilizing external fixation offers a viable limb-salvage approach.1

**References**


**Purpose:** Cerebral protection via deep hypothermic circulatory arrest has been the standard of care in aortic surgery. In recent years, moderate hypothermic circulatory arrest (MHCA), with selective antegrade (ACP) and retrograde (RCP) cerebral perfusion have proven to be safe and effective. We report our technique and experience with MHCA and ACP and RCP for repair of the thoracic aorta.

**Methods:** The medical records of all patients who underwent surgical repair of the ascending aorta with MHCA and ACP with or without RCP from September 2004 through July 2013 were retrospectively reviewed. Statistical analysis included Wilcoxon Rank Sum test. All patients were cooled to 25–28°C core bladder temperature. Antegrade cerebral perfusion was achieved by individual balloon-tipped 13F retrograde coronary sinus perfusion cannulas placed via the lumen of the graft and advanced directly into the orifice of the innominate and left common carotid arteries. Cerebral perfusion was started at 500–800 ml/min and adjusted to maintain a perfusion pressure of 40–60 mmHg. After the distal anastomosis is completed, ACP is stopped, cannulas removed, and RCP is given via the SVC cannula by shunting arterialized blood to the venous line and clamping the IVC cannula. Cardiopulmonary bypass is resumed slowly to fill and de-air the graft before cross-clamping. The patient is re-warmed during the proximal anastomosis.

**Results:** Eighty-five patients met inclusion criteria; the mean age was 64.9 years, and 65% were male. Comorbidities included hypertension (68%), type II diabetes mellitus (6%), coronary artery disease (31%), chronic kidney disease (9%), peripheral vascular disease (2%), and a history of stroke (4%). Current or history of tobacco abuse was present in 66%. Thirty-one percent of cases were emergent. One patient underwent complete arch reconstruction, and two patients underwent MHCA and ACP without RCP. Median MHCA, ACP and RCP times were 20 (11–62), 12 (7–45), and 3 (0–12) minutes, respectively. Median cross-clamp and cardiopulmonary bypass times were 93 (25–275) and 160 (83–365) minutes, respectively. Median ICU and postoperative length of stay was
2 (1–21) days and 6 (1–28) days, respectively. Two (2%) patients experienced a stroke. The 30-day mortality rate was 12%. Overall, there were no statistically significant associations between the duration of MHCA, ACP, RCP, and cross-clamp time and adverse outcomes (stroke or 30-day mortality). Emergent cases were associated with longer mean durations of ACP (21 vs. 13 minutes; P<0.001), RCP (5 vs. 3 minutes; P=0.012), cardiopulmonary bypass (198 vs. 161 minutes; P=0.017), and ventilator time (3 vs. 2 days; P=0.003) compared to elective cases; however, there was no difference in stroke or mortality rates.

Conclusions: The perfusion technique used at our institution among patients who underwent thoracic aortic surgery yielded encouraging low rates of postoperative neurologic events and acceptable mortality. Neither the duration of MHCA nor the extent of the operation had any significant impact on adverse outcomes.


73. Roukis TS. How to avoid multiple amputations on the same patient (oral presentation). American College of Foot and Ankle Surgeons Division 7 Michigan Conference; Troy, Michigan, November 15, 2014.


77. Roukis TS. How far should you stretch the indications for total ankle replacement? Total ankle replacement — the not so straightforward (oral presentation). Presented at the American College of Foot and Ankle Surgeons 72nd Annual Scientific Conference, Orlando, Florida, February 27–March 2, 2014.


79. Roukis TS. What do we know and what do we think we know? The evidence-based medicine on total ankle replacement: The ankle replacement — the bare essentials (oral presentation). Presented at the American College of Foot and Ankle Surgeons 72nd Annual Scientific Conference, Orlando, Florida, February 27–March 2, 2014.


PURPOSE. Computed tomography (CT) examinations of the lower extremities are widely used for musculoskeletal conditions as well as for CT angiography (CTA). Existing dose-length product (DLP) to effective dose (E) conversion coefficient tables do not include the lower extremities and hence do not allow calculating effective dose.
in this region. The purpose of this study was to provide DLP-to-E coefficients for fast and accurate effective dose calculation in order to comply with requirements regarding patient radiation dose recording.

**METHOD AND MATERIALS.** Dose simulations were performed on standard mathematical phantoms using a validated Monte Carlo calculation tool for the following exams: hip (femur), knee, ankle and CTA of the lower limbs. All simulations were performed for scanner geometry, spectra and filtration equivalent to those of a generic clinical CT scanner with tube voltage values from 80 to 140 kV in steps of 20 kV. Effective dose values were calculated as a weighted sum of organ doses with respect to the tissue-weighting factors published in ICRP 103. Values of the dose-length product (DLP) were calculated by multiplying measured CTDI values by the scan length of the corresponding lower extremity CT examinations. The DLP-to-E coefficients were determined as the quotient of E and DLP for a wide range of ages from newborn to adult and for both genders.

**RESULTS.** Our findings showed that DLP-to-E coefficients for lower extremity examinations differ markedly from the ones published for other body regions. The coefficients depended strongly on the phantom age and size. In the case of a newborn, for example, DLP-to-E values were 0.0612, 0.0046, 0.0014 and 0.047 for hip, knee, ankle and CTA respectively, while in case of adult these values were 0.0110, 0.0004, 0.0002 and 0.0062. Substantial difference of up to 20% between male and female coefficients was observed for CTA examination. Dependence on kV value was found to be negligible with a standard deviation of 5% on average.

**CONCLUSION.** DLP-to-E conversion coefficients were calculated specifically for lower extremity CT examinations and appear suitable for fast and reasonably accurate effective dose calculations.

**CLINICAL RELEVANCE/APPLICATION.** DLP-to-E conversion coefficients presented in this study allow estimation of effective dose for commonly used clinical musculoskeletal CT and CTA protocols.


**Background:** Cystic adventitial disease (CAD) is a rare condition that causes symptoms of vascular compression. Involvement of the arterial system is more common and can cause symptoms of claudication. Involvement of the venous system is extremely rare. We identified 36 cases reports in the worldwide literature of venous CAD. It is predominantly seen in young, healthy men with minimal cardiovascular risk factors and can cause extremity swelling and deep venous thrombosis (DVT). The etiology of the cellular degeneration has not been clearly defined. With such a rare condition, the standard of treatment of venous CAD remains controversial. Reported interventions consist of cyst aspiration, sclerosis of cyst wall, enucleating the cyst, and resection of the cyst with primary vein repair or interposition graft. Overall recurrence rate is 11.5%.

**Case Report:** We report the case of a 37-year-old male who presented to the emergency department with vague abdominal pain and underwent a contrast-enhanced CT scan that demonstrated a large cystic structure involving the left common femoral vein. Vein compression and DVT could not be excluded (Figure 1). Ultrasound confirmed a multi-cystic structure consistent with CAD and no DVT; however, there were decreased respiratory variations of the venous waveform and concern for venous compression. The patient was asymptomatic and initial management consisted of percutaneous cyst aspiration. Within 3 months the cyst recurred and we decided to proceed with surgical excision. Intra-operatively, there appeared to be a multi-loculated cystic structure that spanned 8 cm of the posterior aspect of the common femoral vein and contained the typical gelatinous fluid. The cystic structures were resected en-bloc as the vein wall was not involved and the vein was left intact (Figure 2). Histology of the excised specimen confirmed a cystic structure with layers of collagen separated by scanty elastic fibers consistent with CAD. The patient recovered without complications in the initial 6 months of follow-up.

**Conclusions:** Venous CAD is rare and surgical treatment is currently not well defined. Our patient had an incidental finding of venous CAD and initial treatment consisted of cyst aspiration. The patient required surgical resection after cyst recurrence. There is a lack of consensus in the literature on management of venous CAD. The diagnostic work-up, therapeutic options, and long-term outcomes are not well delineated and further research is needed to ascertain the most appropriate treatment algorithm.

86. Schaper AM, Anderson X, Steffes D. *Detection, treatment and referral of perinatal depression using defined algorithms for care.* Presented at Nursing Research on the Green, Viterbo University, La Crosse, Wisconsin, April 24, 2014.

**Background:** Perinatal Depression (PND) encompasses major and minor depressive episodes that occur during pregnancy and/or the postpartum period. PND is one of the leading causes of disability and death during the pregnancy and postpartum period. PND is associated with poor maternal health, poor maternal attachment, depression in partners and negative effects on child development.
Significance: There is limited information in the literature on universal screening for PND across the perinatal period. Collaboration among the Obstetric, Pediatric and Family Practice Departments at a Midwest Medical Center resulted in the development of an algorithm for screening, referral and treatment of women scoring high on the Edinburgh Postnatal Depression Scale (EPDS). The EPDS is administered at the new obstetrical visit, the preview visit, after delivery and at 2 weeks, 6 weeks and 4 months postpartum.

Purpose/objective: To provide a comprehensive description of documented predictive risk factors associated with PND in the population base for this geographic area and document health outcome indicators of screening, referral and treatment algorithms.

Methods/project: A retrospective chart review was conducted on 100 randomly selected women who scored high on the EPDS between 4/1/12 and 4/1/13. Data analysis include descriptive statistics and group comparisons using chi-square and t-tests.

Results: Multiple predictive risk factors were present in women who scored high on the EPDS. The vast majority of women screened high on the EPDS for the first time at either the new OB or the Preview visits. Approximately half of the women were formally treated with medication and/or counseling. Women with high depression symptoms were more likely to accept formal treatment. Rates of postpartum depression were very low with early identification in the pre-natal period. More than 80% of women had a low EPDS score at their last visit. However, return rates for the six weeks and 4 month postpartum visits were low.

Clinical implications: The electronic medical record needs to be refined to provide a comprehensive picture of women's past medical history, risk factors and strengths. Stressors in women's lives need to be addressed at the new obstetrical visit while also building social supports and wellness practices. New onset PND should be differentiated from ongoing depression at the new obstetrical visit to provide for best practices in caring for women with depression. The algorithms need to be enhanced to provide women with ongoing support with their primary care providers.


Purpose. Tibio-talo-calcaneal (TTC) arthrodesis is an accepted treatment for combined degenerative joint disease (DJD) of the hindfoot/ankle. The surgical technique has evolved significantly and recent advancements involve a posterior arthroscopic approach to joint preparation and insertion of a locked retrograde intramedullary nail (LRIN).\textsuperscript{1,4}

Literature Review. Limited available literature states that this approach affords a lower incidence of non-union, superior joint exposure and few incision healing complications compared to open approaches.\textsuperscript{1,2}

Case Study. We present a 65-year old woman who sustained a severely comminuted closed trimalleolar ankle fracture 20-years prior that ultimately required four surgeries and resulted in persistent pain with activity. She has diabetes mellitus with peripheral sensory neuropathy, peripheral vascular disease (PVD) status-post iliac stenting (ABI 0.7) and untreated osteoporosis. Plain film radiographs and bone scintigraphy demonstrated hindfoot/ankle DJD with distal-lateral tibial osteonecrosis. We proposed a TTC arthrodesis via a posterior arthroscopic approach

Figure 1: Contrast-enhanced CT.

Figure 2: Excised specimen.
with LRIN fixation and a mixture of synthetic bone graft, intramedullary reamings and autogenous tibial bone marrow aspirate to enhance primary union.

**Results.** Osseous preparation to bleeding subchondral substrate was achieved and LRIN inserted. Delayed incisional healing for five-months occurred; however, she healed and progressed to a stable, well-aligned arthrodesis with 13-months follow-up.

**Analysis and Discussion.** When treating high-risk patients with PVD and combined hindfoot/ankle DUD, open approaches may result in catastrophic complications. Alternatively, an arthroscopic approach allows for maximum preservation of bone mass and vascularity, and insertion of a LRIN provides sound fixation. Therefore, we believe this is a viable approach in select patients and should be considered by surgeons familiar with these techniques.

**References**


**PURPOSE.** Arthroscopic diagnosis and treatment of anterolateral ankle soft-tissue impingement is established, yields satisfactory results and is a procedure we perform with regularity at our facility. No study examining the incidence of complications specific to this procedure in isolation has been previously published. We sought to determine the overall incidence of complications regardless of specific etiology, in both the literature and the senior author's practice following arthroscopic treatment of isolated anterolateral soft-tissue impingement of the ankle joint.

**METHODOLOGY.** We performed a systematic review of electronic databases and relevant peer-reviewed sources including OvidSP/MEDLINE (http://ovidsp.tx.ovid.com) and a scientific search engine (http://scholar.google.com) between March and August 2013 with no restriction on date or language and used an inclusive text word query “anterolateral” AND “ankle” AND “impingement” OR “soft-tissue impingement” AND “arthroscopy” in which the all-uppercase words represent the Boolean operators used. Additionally, we manually searched common American, British and European orthopaedic and podiatric scientific literature for relevant articles. Only articles that employed a standard two-portal anterior arthroscopic approach for diagnosis and treatment of anterolateral ankle soft-tissue impingement with a minimum mean follow-up of 12-months were considered. We also performed an observational case series involving a retrospective review of prospectively collected data of 14 consecutive arthroscopic procedures for isolated treatment of anterolateral ankle soft-tissue impingement at our facility between December 2010 and March 2013 (Table 1).
Table 1. Study patient population data (n = 14 feet in 14 patients)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age (years)</th>
<th>Foot</th>
<th>Indications</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
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<td>R</td>
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<td>L</td>
<td>Chronic ankle synovitis</td>
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<td>F</td>
<td>28</td>
<td>L</td>
<td>Anterolateral ankle impingement; chronic ankle synovitis</td>
<td>None</td>
</tr>
<tr>
<td>M</td>
<td>36</td>
<td>R</td>
<td>Anterolateral ankle impingement; chronic ankle synovitis</td>
<td>None</td>
</tr>
<tr>
<td>M</td>
<td>43</td>
<td>R</td>
<td>Anterolateral ankle impingement; chronic ankle synovitis</td>
<td>None</td>
</tr>
<tr>
<td>F</td>
<td>53</td>
<td>R</td>
<td>Anterolateral ankle impingement; chronic ankle synovitis</td>
<td>None</td>
</tr>
<tr>
<td>F</td>
<td>42</td>
<td>L</td>
<td>Anterolateral ankle impingement; chronic ankle synovitis; history of prior osteochondral talar dome defect with microfracture</td>
<td>None</td>
</tr>
<tr>
<td>F</td>
<td>33</td>
<td>R</td>
<td>Anterolateral ankle impingement; chronic ankle synovitis</td>
<td>None</td>
</tr>
</tbody>
</table>

**LEGEND:** F, female; L, left; M, male; R, right

Each patient underwent arthroscopic synovectomy and extensive débridement using a standard two-portal anterior approach under general anesthesia without distraction and with infrequent use of a thigh tourniquet for hemostasis. All complications were documented as they occurred. Patients demonstrated varied specific intracapsular pathologies, including synovitis in all patients, both an impinging distal fascicle of the anterior-inferior tibiobular ligament (AITFL) and a meniscoid lesion in six patients, an isolated impinging distal fascicle of the AITFL in five patients, excessive hypertrophy of the synovium to the anterolateral aspect of the ankle in two patients and an isolated meniscoid lesion in one patient (Figure 1).

**Figure 1:**
RESULTS. Our systematic review search yielded a total of 52 references, with 15 (28.8%) being included (Table 2). There were 396 patients with 397 ankles, and a 2:1 ratio of men to women. The weighted mean age was 31.2-years and the weighted mean follow-up was 33.7 months. The overall incidence of complications was 4%, with the majority of reported complications being considered minor as they resolved either spontaneously or following conservative treatment by 12-months postoperative. Only three complications were considered major as they persisted beyond 12 months or required further treatment, and all were nerve-related.

Table 2. Study data included in systematic review

<table>
<thead>
<tr>
<th>Author (year) (level of evidence)</th>
<th>No. of Patients</th>
<th>No. of Ankles</th>
<th>Average Age in Years (range)</th>
<th>Average Follow-up in Months (range)</th>
<th>Total No. of Complications</th>
<th>Total No. of Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>McCarroll et al. (1987) (IV)²</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td>24 (12 – 36)</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Martin et al. (1989) (IV)⁸</td>
<td>16</td>
<td>16</td>
<td>28 (12 – 54)</td>
<td>30 (25 – 40)</td>
<td>0</td>
<td>3 (18.8%)</td>
</tr>
<tr>
<td>Bassett et al. (1990) (IV)⁶</td>
<td>2</td>
<td>2</td>
<td>28 (24 – 31)</td>
<td>15 (6 – 24)</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Ferkel et al. (1991) (IV)¹</td>
<td>31</td>
<td>31</td>
<td>34 (16 – 74)</td>
<td>34 (24 – 66)</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Thein et al. (1992) (IV)¹⁰</td>
<td>3</td>
<td>3</td>
<td>NA</td>
<td>34 (28 – 44)</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Meislin et al. (1993) (IV)¹³</td>
<td>29</td>
<td>29</td>
<td>37 (17 – 66)</td>
<td>25 (6 – 41)</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Liu et al. (1994) (IV)¹²</td>
<td>55</td>
<td>55</td>
<td>34 (20 – 67)</td>
<td>31 (12 – 54)</td>
<td>0</td>
<td>3 (5.5%)</td>
</tr>
<tr>
<td>Ogilvie-Harris et al. (1997) (IV)¹¹</td>
<td>17</td>
<td>17</td>
<td>29 (17 – 54)</td>
<td>33 (12 – 72)</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>DeBerardino et al. (1997) (IV)²</td>
<td>60</td>
<td>60</td>
<td>24 (13 – 45)</td>
<td>27 (6 – 64)</td>
<td>0</td>
<td>3 (5%)</td>
</tr>
<tr>
<td>Akseki et al. (1999) (IV)¹⁴</td>
<td>21</td>
<td>21</td>
<td>31 (11 – 68)</td>
<td>34 (24 – 48)</td>
<td>2</td>
<td>2 (9.5%)</td>
</tr>
<tr>
<td>Kim et al. (2000) (IV)¹⁵</td>
<td>52</td>
<td>52</td>
<td>31 (16 – 49)</td>
<td>30 (25 – 45)</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Urgüden et al. (2005) (IV)⁴</td>
<td>41</td>
<td>41</td>
<td>33 (15 – 63)</td>
<td>83.7 (21 – 152)</td>
<td>1</td>
<td>1 (0.2%)</td>
</tr>
<tr>
<td>Hassan (2007) (IV)¹⁶</td>
<td>23</td>
<td>23</td>
<td>27 (15 – 53)</td>
<td>25 (12 – 38)</td>
<td>0</td>
<td>3 (13%)</td>
</tr>
<tr>
<td>Kocz et al. (2009) (IV)¹⁷</td>
<td>22</td>
<td>22</td>
<td>34 (17 – 55)</td>
<td>12 (12)</td>
<td>0</td>
<td>1 (4.5%)</td>
</tr>
<tr>
<td>Moustafa El-Sayed (2010) (IV)³</td>
<td>20</td>
<td>20</td>
<td>36 (26 – 49)</td>
<td>21.3 (12 – 47)</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>396</td>
<td>397</td>
<td>31.2 (11 – 75)</td>
<td>33.7 (6 – 152)</td>
<td>3</td>
<td>16 (4%)</td>
</tr>
</tbody>
</table>

LEGEND: NA, not available; No., number

Our retrospective review yielded 14 of 76 anterior ankle arthroscopic procedures that were performed for isolated anterolateral ankle soft-tissue impingement with an almost 4:1 ratio of women to men. The mean age was 43-years and the mean follow-up was 25.1-months. We encountered only one complication which was minor and completely resolved by three weeks post-operative. There were no major complications in this case series. We found no significant difference between the data of the systematic review and our own, therefore we combined the data to yield a total of 411 procedures with an overall incidence of complications of 4.1%.

ANALYSIS and DISCUSSION. We found a 4.1% overall incidence of complications after arthroscopic treatment of isolated anterolateral ankle soft-tissue impingement using a standard anterior two-portal technique. This was categorically divided into major and minor complications, with a very low incidence of major complications (0.7%) and an acceptably low incidence of minor complications (3.4%). Meticulous approach to ankle arthroscopy is mandatory as complications are largely related to nerve injury. Based on our findings, this is a safe procedure when indicated. Additional investigations with patient outcome measures may be necessary to determine if this treatment improves patient function.
We are creating a new framework for professional nursing, based on the Theory of Human Caring, to empower and engage nursing staff to own their practice and provide multiple pathways for professional growth.

Methods/project: A multi-phased program was developed by nurses at the patient side and nurse leadership to create an innovative Nursing Professional Framework (NPF). Phase I included: a literature review, incorporation of Human Caring Theory, inclusion of the current Clinical Practice Model and Kanter’s Theory of Structural Empowerment, and a commitment to meet the multi-generational needs of practicing nurses. Workgroups were defined in Phase II to develop key components of the new NPF. Phase III encompassed staff education of the key components and pilot testing of the NPF with employee performance evaluations. Phase IV is being implemented in 2014 with additional education on the key components, development of individual nurse portfolios and inclusion of evaluation measures.
Results: The Caritas (Theory of Human Caring) are the center or core of the program. Four inter-related values, which drive nursing care include: Nursing Skills and Knowledge, Patient and Family-Centered Care, Healing Environment, and a Culture of Caring and Safety. Key Components of the NPF are: Practice and Pathways, Professional Enhancement, Innovation, Reflective Practice and Nursing Structure.

Clinical Implications: Lessons learned in creating and implementing a new NPF showcase are: the dedication of nurses to be innovative, the value of persistence and the time it takes to develop the structure of a new framework, the importance of creative community building, the benefits of involving other staff in multiple ways, and the challenges of keeping the NPF in the forefront of nursing activities.

92. Strong S. School based health clinic: increasing access to care for children in rural areas. Presented at Nursing Research on the Green, Viterbo University, La Crosse, Wisconsin, April 24, 2014.

Background: Access to health care is limited in many areas, particularly rural communities. Fewer U.S. physicians are choosing primary care as a profession, and satisfaction among primary care physicians has waned amid the growing demands of office-based practice. There is growing concern that current models of primary care will not be sustainable for meeting the broad health care needs of the American population, especially in the pediatric population. The purpose of this project is to develop and establish the first school based health clinic (SBHC) in a local community. School based health clinics have proven to be successful in delivering quality care to underserved children and adolescents in poverty stricken communities.

Significance: Collaboration for improving patient population outcomes and prevention and population health for improving the nation's health.

Purpose/objective: The intended goal of the SBHC is to increase access of care to underserved children by providing preventative and primary care to children enrolled in an underserved community.

Methods/project: There continues to be growing concern regarding access to health care for underserved pediatric population. Children spend 13 years of their life attending primary and secondary school. It has been determined that the healthier the child, the more they thrive academically. There is a growing need for more health care access. Single mothers and fathers, parents out of work, and lack of transportation are contributing elements and present significant barriers to access to health care. Communities have identified that access to health care in schools during elementary years, as this time is the foundation for lifelong benefits of growing, developing and thriving in a community. Care provided within SBHC have a positive impact on the physical and mental health of school-aged children, especially those with limited access to conventional health services. School based clinics have been especially effective in providing early intervention for at-risk children to prevent severe psychological problems later in life. Furthermore, school based clinics have demonstrated their effectiveness at lowering Medicaid costs and closing the gap on health disparities. IRB exemption was received for this project. A needs assessment was conducted in the local community in La Crosse, WI. The school identified as the location for the first school based health clinic was Hamilton Elementary School. This school was chosen based on its high poverty level and low economic status evidenced by 73 % of students at this school on free or reduced meals. According to the current school nurse at Hamilton, the immunization rate in the 2012 academic year is as follows. On day 15 of school, statistics showed that 45 students, out of 300, were not up to date, and 53 waivers were signed at the beginning of the school year. The primary expenses of the Hamilton school-based health clinic are materials, equipment, and staff time. To assist with costs a grant process was completed and presented by DNP student. Grant was approved through the Children's Miracle Hospital and assisted with the clinic costs. After DNP student had discussion with administration, at Gundersen Health system, it was approved that the remaining expenses were funded and ordered by the Pediatric Department located within Gundersen Health System. Other necessary supplies, such as culture swabs, gloves, needles, syringes, immunizations, etc. were also provided by the Pediatric Department. The local pediatric department also supported the cost of time for staff to operate the SBHC. This includes the time of the providers and nurses. Marketing was also included in the budget and represented a large portion of the work of the project. Advertisement for the school clinic, provided by the DNP student and school clinic staff, included: posters, flyers, informational PTO meetings, automated phone reminder, immunization update clinic held at the school, and attendance of community events. The DNP student submitted an application for the SBHC to be accepted into the Vaccine For Children (VFC) program. After a site visit the school clinic was approved as a VFC site. This program provides needed vaccines for children who are underinsured or non-insured at no cost from the state of Wisconsin.

Results: The school based health clinic opened on July 18, 2013. The first measurement and data collected was students accessing the clinic. To create a sustainable program, the school based health clinic must have a strong partnership between the providers of care, families enrolled in the school, the children, and the Hamilton school personnel. Other essential components to ensure sustainability include continued funding, identifying satisfaction
among the use of the clinic, continued promotion of the clinic and high quality care provided within the clinic. Marketing efforts continue to be carried out due to low numbers of students seen at the clinic. As sustainability and usage of the clinic is proven positive, evaluation of health outcomes can be measured. These outcomes could include less missed days of school, decreased emergency room visits, increased immunization rate, and streamlining the need for mental health access. The clinic has provided improved access of care along with improved access for immunizations. Continued monitoring is needed to support promotion of child health and to identify health disparities among children within this rural community. The long-term goal of this project is the development of more clinics in and around the community.

Clinical implications: 1) Develop a process to establish a relationship between primary care provider and school clinic 2) Provide a comprehensive range of services that meet the needs of the community 3) Develop a process to provide health programs and health resources for families in the school district 4) Develop process to provide access for students in other schools 5) Open school clinics in other rural communities.


Background: Newly graduated staff nurses represent a group at high risk for leaving their first employment due to conflict, incivility and experiences with disruptive behaviors in the workplace. As part of the Department of Nursing’s Nurse Residency program, newly graduated nurses received a modified Conflict Engagement (CE) program. The CE program is recommended by the American Nurses Association.

Significance: No published paper could be located describing conflict training for new nurses.

Purpose/objective: The specific aim of this evidence-based practice project was to evaluate changes in constructive and destructive conflict behaviors following implementation of the CE program.

Methods/project: The CE program was modified from an 8-hour workshop with time built in to practice constructive conflict skills to a 6-hour workshop with 1-hour skill-building practice sessions (Learning Circles) held monthly. Two nurses certified in delivery of the CE program were facilitators. The workshop occurred 3–4 months after the start of residency program. A pre-workshop questionnaire included basic demographics and the Conflict Dynamic Profile-Individual (CDPI) instrument. Learning Circles provided for the identification of real-life conflict situations. Role-play was used to practice new skills and test options for constructive conflict behaviors. The CDPI was repeated at the end of the Residency program. Debriefing meetings were held monthly by the facilitators to document lessons learned and develop improvement strategies.

Results: There were 39 participants with a median age of 25 years; 59% were baccalaureate prepared. Confidence in engaging in conflict with co-workers and physicians increased at one year. Nurse residents entered the program with high use the destructive strategies of Yielding, Hiding Emotions and Self-Criticizing in conflict situations. Constructive strategies used most often included Perspective Taking, Delay Responding and Adaptation. However, Creating Solutions, Expressing Emotions Reaching Out and Reflective Thinking were not typically used. At the end of the year, residents remained high in Perspective Taking and increased their use of Creating Solutions and Expressing Emotions. The importance of the Conflict Engagement program was prominently illustrated by a resident’s story of her use of constructive conflict engagement skills in convincing a physician to delay a patient’s hospital discharge, thereby preventing a readmission.

Clinical implications: New nurses do not reach out in conflict situations but are more likely to hide their emotions and yield to others during this time of transition from student to professional nurse. Conflict skill building is important for preceptors and nurse residents. Having a common language that describes conflict and conflict behaviors may help to reduce misunderstanding and misinterpretation of conflict issues. Incivility and generational conflict constrains the residents’ willingness to engage conflict. The Conflict Engagement program supports the residents in the practice and use of new skills in conflict situations.


Case history: Our patient is a 62 year male with Crohn’s disease who presented with fever, drenching night sweats and increased frequency of watery diarrhea. Patient also reported severe anorexia, cachexia and weight loss. This was his fifth hospital admission in past 30 days with similar symptoms. He has had multiple laparotomies in the past with a total of 128 cm’s of small bowel removed till date. Due to disease progression on initially methotrexate and later Adalimumab, he was recently started on a combination of 6 mercaptopurine (6 MP) and Certolizumab.
He underwent colonoscopy few days ago, which showed mild active disease at the anastomotic site with normal C- reactive protein on all admissions. Biopsy was negative for cytomegalovirus and inclusion body disease. His stool cultures had repeatedly come back negative for routine bacteria, ova and parasites including giardia and cryptosporidium. Other tests that had come back negative were serum HIV, Epstein - Barr virus, hepatitis panel, cryptococcal antigen and fungal assays. 6 MP levels were found normal as well and discontinuation of this drug did not improve his symptoms. His symptoms were persistent despite empirical treatment with steroids for Crohn’s flare and use of cholestyramine. Physical exam during this admission revealed left axillary adenopathy and a 2x2 cm erythematous skin lesion on his scalp. He was also found anemic with hemoglobin of 9 and lactate dehydrogenase was found mildly elevated at 400. Computed tomography (CT) scan of abdomen showed a left flank mass measuring 6 cm x 6 cm with mild splenomegaly and mesenteric adenopathy, latter was also noted on the magnetic resonance imaging (MRI), 2 years ago and was thought to be reactive at that point. Biopsy of the left flank mass showed an unusual combination of cell surface markers with presence of both T cell (CD 3) and plasma cell (CD 38, 138 and Mum 1) markers. This sample was also sent for second opinion at a quaternary center where findings were confirmed and was diagnosed as “aggressive plasmablastic lymphoma with aberrant expression of T cell markers”. Bone marrow and cerebrospinal fluid analysis came back negative for lymphoma. Biopsy of scalp lesion revealed squamous cell skin cancer. Patient opted for comfort care after carefully evaluating all his treatment options and expired peacefully within next 2–3 days.

Discussion: The activity of tumor necrosis factor alpha (TNF) against tumors in laboratory models and, potentially, in humans raises the possibility that TNFI might potentiate the clinical risk of malignancy. There are studies supporting increased incidence of cancers especially skin cancer and lymphoma in patients receiving TNFI, but their accuracy is questionable due to mixed patient population and frequent co-administration of immunomodulators like 6 MP and azathioprine which are also implicated in the causation of lymphoma. Thus, a more homogeneous sample consisting of patients with crohn’s disease treated solely with TNFI is needed to reach accurate results. Our patient’s unusual lymphoma with rare atypical characteristics and presence of a concomitant squamous cell skin cancer makes us strongly suspicious of TNFI playing a role in the pathogenesis of these cancers.


Background: Surgery maintains a central role in the local treatment of Stage 0–3 breast cancer. Resident involvement in operations has long been the primary method of surgeon training. Many recent changes, such as surgical Milestones, have been developed to provide a more objective assessment of resident performance; however, key measures regarding effectiveness of training include actual patient outcomes.

Methods: We performed a retrospective review of Stage 0–3 breast cancer patients undergoing surgery in a single center during a nine year period ending 1/1/2010. Patients undergoing neoadjuvant therapy or major flap reconstruction were excluded. Data regarding patient, tumor and treatment factors known to influence cancer outcomes were collected. Overall survival (OS), disease free survival (DFS), local regional recurrence (LRR), and ipsilateral breast tumor recurrence (IBTR) were calculated by Kaplan-Meier method with Log-Rank comparison. We then analyzed these outcomes based on whether or not a resident was involved in the surgery.

Results: We analyzed 1107 patients. Median age was 64 years (range 24-97). Median and longest follow-up were 5.5 and 12.5 years. Initial operation was breast conserving in 796 (72%) and mastectomy in 311 (28%). Forty two patients died from breast cancer (crude mortality 3.8%). LRR occurred in 34 patients (3%). Of the 1107 patients, 887 (80.1%) had resident participation. We identified no differences in OS (P 0.13), DFS (P 0.88), LRR (P 0.32) or IBTR (P 0.83) when comparing resident involvement in the index surgical case.

Conclusions: Resident involvement in breast cancer operations did not affect cancer outcomes in our institution. This information can be used to reassure patients when they have questions about the effectiveness of surgical resident participation.

96. Vaca RA. A shot through the heart. Presented at the American College of Physicians 2014 Wisconsin Chapter Annual Scientific Meeting, Wisconsin Dells, Wisconsin, September 5–6, 2014.

An estimated 60,000 people receive prosthetic heart valves every year in the United States. This life-saving intervention is associated with several life threatening complications including complicated infections.

A 72 year old Caucasian male with diabetes and a prosthetic aortic valve for aortic stenosis had increasing somnolence and weakness resulting in multiple falls over the previous several weeks. He was taking aspirin, warfarin and several anti-hypertensives. During this time, he had a slowly improving diarrhea illness and his diet was relatively minimal. Recently, he had been seen for chest pain determined to be rib fractures sustained from a fall. At presentation he
was febrile with significantly decreased mental status and non-fluent aphasia. Initial workup demonstrated a WBC of 15, troponin I of 18, creatinine of 2 and an INR of 3.6. A non-contrast head CT was performed and read as acute vs subacute ischemic stroke of the left temporal lobe. A transthoracic echocardiogram was obtained which was poor quality. Multiple blood cultures identified *Enterococcus faecalis*. IV antibiotic treatment was optimized for likely prosthetic valve endocarditis and a trancosophageal echocardiogram was scheduled. Prior to this, he began to have episodes of junctional tachycardia with a new bundle branch block. TEE confirmed prosthetic valve endocarditis and showed extension of the infection into the intervalvular fibrosa with a large mobile vegetation on the mitral annulus. Further medical stabilization was needed before surgical intervention was an option. However, soon after the extent of his infectious process was discovered, he developed right upper quadrant abdominal pain and distension. CT identified multiple splenic lesions representing septic emboli. Unfortunately, he died within 8 weeks of initial diagnosis.

Multivalvular endocarditis is rare and represents an estimated 15% of all cases of infectious endocarditis. The aortic and mitral valves are the most common sites among these. Multivalvular endocarditis has similar in-hospital mortality to single valve endocarditis but is associated with a significantly increased morbidity including heart failure, perivalvular abnormalities and need for surgery. Notably, neurologic complications significantly increase the perioperative risk for hemorrhagic conversion making acute management decisions increasingly difficult. This case underscores the importance of prompt diagnosis and high clinical suspicion when evaluating any patient with prosthetic heart valves and positive blood cultures.


**Background:** Perioperative blood transfusion in patients with colorectal cancer is associated with increased cost, morbidity, mortality and decreased survival. In 2009, a 3-part transfusion reduction initiative (TRI) was introduced which initially decreased perioperative transfusions in colorectal surgery. Our hypothesis is that this resulted in a culture change and perioperative transfusions in colorectal surgery have remained lower than the Pre-TRI period with no associated increase in complications or recurrence rates.

**Methods:** After institutional review board approval was obtained, the medical records of patients who underwent colon resection before (January 2006–October 2009) and after (November 2009–December 2013) the TRI were reviewed. The Post-TRI period was broken into early (November 2009–March 2011) and late (April 2011–December 2013). Variables included demographic data, transfusion rates, morbidity, mortality, and survival. Additionally, patients in the Pre-TRI and early Post-TRI groups were compared for cancer recurrence.

**Results:** A total of 484 patients were included, 267, *** and *** in the Pre-TRI, early Post-TRI and late Post-TRI groups, respectively. Transfusion rates decreased in the Post-TRI group (17% vs. 28%, *P* = 0.006). Transfusion rates increased slightly in the late Post-TRI group compared to the early Post-TRI group but this increase was not statistically significant (19% vs. 15%, *P* = 0.42). Of the 484 patients, those who received a transfusion had higher 30-day mortality (9% vs. 0.8%, *P* < 0.001), rates of abscess (9% vs. 2%, *P* = 0.001), pneumonia (5% vs. 0.3%), *P* = 0.001), UTI (7% vs. 3%, *P* = 0.041), other complications (35% vs. 14%, *P* = 0.0001) and poorer 3-year survival (P < 0.001), but similar 3-year recurrence rates (P = 0.12). Patients in the Pre-TRI group compared to those in the Post-TRI group had similar rates of 30-day mortality (3% vs. 2%, *P* = 0.30), abscess (4% vs. 3% *P* = 0.42), UTI (5% vs. 2%, *P* = 0.13) and other complications (21% vs. 16%, *P* = 0.21) with only pneumonia being significantly reduced in the Post-TRI era (3% vs. 0%, *P* = 0.02). Three-year survival and recurrence rates were similar in the Pre and Post-TRI eras.

**Conclusions:** Perioperative transfusions in colorectal cancer surgery decreased after the implementation of a TRI and have remained low with minimal re-education. Perioperative transfusions were associated with increased 30-day mortality, abscess formation, UTI, other complications and decreased survival. Implementation of a TRI was safe and effective and did not significantly change survival, 30-day mortality or complication rates other than decreasing the rate of pneumonia while avoiding the costs and risks associated with a transfusion.

98. Van Osdol AD, Jarman BT. Same as it ever was—only different: A successful ACGME innovative project to equip PGY I residents to take at-home call. Presented at APDS / 2014 Surgical Education Week, Chicago, Illinois, 2014.

**Purpose:** Duty hour and supervision requirements for PGY I general surgery residents were mandated in July 2011. Included in these mandates was the inability for PGY I residents to take “at-home” call owing to the 16 hour rule and the lack of direct supervision. For at-home call systems, this was significant and required an overhaul of the PGY I year to accommodate the requirements and optimize resident education. With this in mind, we propose
a competency-based system for advancement of PGY I residents to take at-home call with indirect and direct supervision readily available.

**Methods:** ACGME approval for an innovative project equipping PGY I residents to take at-home call was obtained. Formal education of PGY I residents over a 3 month span included the successful completion of the Fundamentals of Surgery Curriculum (FSC) and attendance during a 12 week curriculum which focused on medical knowledge, patient care, system-based practice and skills lab scenarios. Residents were responsible for day calls on their assigned team’s inpatients with direct supervision. Patient care logs (PCL) were maintained by the resident for patient encounters. The PGY I residents were evaluated with faculty and senior resident review of the PCLs, a written exam, mock nursing phone calls and oral proficiency exams which were focused on clinical scenarios listed by the ACGME which require direct supervision until proficiency is demonstrated. The decision to permit the resident to take at-home call was determined by the Clinical Competency Committee (CCC).

**Results:** Each of the three PGY I residents completed the FSC online program prior to July 15th, 2013. An average of 25 patient encounters was recorded by each resident during the first three months of residency. The residents completed the structured program and successfully passed the oral and written exams. The residents were deemed competent to take at-home call starting in October of their first year. The number and type of patients are monitored with specified limitations and ongoing maintenance. Review of PCLs serve as excellent points for teaching and feedback. A formal back-up system with senior resident and faculty availability by phone or physical presence is utilized.

**Conclusion:** We present an ACGME-approved innovative project which appears to have been successful in implementing at-home call for PGY I residents prior to their promotion to the PGY II year. This will enable the progressive development of PGY I residents and assists our CCC in the development of competency-based milestones for advancement. The impact of this project is significant for those residency programs where incorporation of at-home call is possible.


**Background:** Traumatic hip dislocations represent a rare, yet significant, injury in the trauma population. Early reduction is critical to preventing complications of hip dislocations, including femoral head osteonecrosis and early joint degeneration. This study sought to determine whether hip reductions should be performed in the emergency department (ED) or in the operating room (OR). Potential barriers to using the OR include staffing and resource availability, which can result in significant delays in therapy.

**Methods:** We retrospectively reviewed our institution’s trauma registry for patients with traumatic hip dislocations admitted from March 1997 through December 2013. Patients who underwent hip reduction in the OR were compared to those reduced in the ED. Statistical analysis included Fisher Exact test and Wilcoxon Rank Sum test.

**Results:** One hundred seven cases of traumatic hip dislocation were identified. Left hip dislocations occurred in 52%, right hip in 51%, and 3.7% were bilateral dislocations. Reductions were performed by orthopedic surgeons (87.9%), ED physicians (8.4%), and trauma surgeons (3.7%). Three patients (2 reduced in the ED and 1 in the OR) experienced recurrent dislocation.
Table.

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR</th>
<th>ED</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=70</td>
<td>n=37</td>
<td></td>
</tr>
<tr>
<td>Sex, n (%) male</td>
<td>54</td>
<td>24</td>
<td>0.180</td>
</tr>
<tr>
<td>Mean Age, years</td>
<td>38.2±18.1</td>
<td>36.4±17.9</td>
<td>0.645</td>
</tr>
<tr>
<td>Median ISS [inter-quartile range]</td>
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<td>14 [9-27]</td>
<td>0.021</td>
</tr>
<tr>
<td>Mean LOS, days</td>
<td>6.3±6.1</td>
<td>16.3±37.7</td>
<td>0.022</td>
</tr>
<tr>
<td>Mean ICU days</td>
<td>1.3±5.2</td>
<td>2.8±4.6</td>
<td>0.013</td>
</tr>
<tr>
<td>Associated fractures, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetabular fracture</td>
<td>37</td>
<td>17</td>
<td>0.546</td>
</tr>
<tr>
<td>Femoral head fracture</td>
<td>10</td>
<td>4</td>
<td>0.767</td>
</tr>
<tr>
<td>Complications, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traumatic arthritis</td>
<td>5</td>
<td>2</td>
<td>0.999</td>
</tr>
<tr>
<td>Avascular necrosis</td>
<td>3</td>
<td>0</td>
<td>0.550</td>
</tr>
<tr>
<td>Pain</td>
<td>10</td>
<td>5</td>
<td>0.999</td>
</tr>
<tr>
<td>Loss of range of motion</td>
<td>1</td>
<td>2</td>
<td>0.274</td>
</tr>
<tr>
<td>Nerve injury</td>
<td>5</td>
<td>4</td>
<td>0.716</td>
</tr>
</tbody>
</table>

Conclusions: In our series of traumatic hip dislocations, complication rates were lower than historically reported. Differences in complication rates between ER and OR reductions were not demonstrated. Those reduced in the ED had higher injury severity scores but no difference in complication rates. Reducing dislocated hips in the ED is a reasonable alternative to the OR in select patients requiring urgent reduction.


Background: Laparoscopic Roux-en-Y gastric bypass (LRYGB) is the current “gold standard” bariatric procedure in the U.S. Laparoscopic sleeve gastrectomy (LSG) has recently become a more commonly performed procedure for many reasons, including patients’ perception that LSG is associated with less complexity and invasiveness, and lower risk. Our objective was to review the literature to compare the leak rates as well as morbidity and mortality for LRYGB versus LSG.

Methods: A MEDLINE search was performed to identify LRYGB and LSG reports from 2002-2012. Publications with n ≥ 25 and postoperative leak rate reported were included. Statistical analysis included chi-square test according to patient number.

Results: Twenty-eight (10,906 patients) LRYGB and 34 (4,836 patients) LSG articles met inclusion criteria. The leak rates after LRYGB versus LSG were 1.9% (n=206) versus 2.3% (n=112), respectively (P=0.079). Mortality rates were 0.4% (27/7117) for LRYGB and 0.2% (7/3594) for LSG (P=0.110). Timing from surgery to leak ranged from 1–12 days for LRYGB versus 1-35 days for LSG. Mean excess weight loss at 1 year postoperative ranged from 50–79% for LRYGB (n=5) and 38-81% for LSG (n=16).
Conclusions: Both LRYGB and LSG are effective surgical options for weight loss. The leak rates, mortality rates, and excess weight loss after LRYGB and LSG were comparable. Patients should be advised of these similarities when considering LRYGB versus LSG. The appropriate procedure should be tailored based on a comprehensive multidisciplinary discussion between the patient and bariatric team weighing patient factors, comorbidities, patient and surgeon comfort level, surgeon experience, and the institution’s outcomes.

CME Questions:
1. Leak rates for laparoscopic sleeve gastrectomy (LSG) and laparoscopic Roux-en-Y gastric bypass (LRYGB) were:
   a. Significantly different with LSG 0.2% and LRYGB 5.6%.
   b. Similar with LSG 2.3% and LRYGB 1.9%.*
   c. The exact same at 5%.
   d. Significantly different with LSG 5.6% and LRYGB 0.2%.

2. One year excess weight loss was shown to be:
   a. Similar for both with LSG 38–81% and LRYGB 50–79%.*
   b. Significantly different with LSG 30–52% and LRYGB 79–90%.
   c. Significantly different with LSG 79–90% and LRYGB 30–52%.
   d. Similar for both with LSG 20–42% and LRYGB 21–45%.

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