THE UNIVERSITY OF VERMONT
COLLEGE OF MEDICINE
DEPARTMENT OF SURGERY

FORTY-THIRD ANNUAL

SURGERY SENIOR MAJOR SCIENTIFIC PROGRAM
THURSDAY – MAY 2, 2013
AUSTIN AUDITORIUM, Shep 488, MCHV CAMPUS

8:00AM
Followed by Poster Presentation
Hoehl Gallery, HSRF Bldg., at 12:30pm

FROM THE OBJECTIVES OF THE SENIOR MAJOR PROGRAM IN SURGERY:
"To provide the student with the opportunity, through a library search or quality improvement project, a patient chart review and/or laboratory investigation, to complete a scholarly project, assemble and prepare the data in the form of a scientific article acceptable for publication in a professional journal and to present this research at a scientific seminar."
The abstracts included in this booklet have been prepared by the Surgery Senior Major students of the Class of 2013. The papers will be presented at a seminar on Thursday, May 2, 2013 in Austin Auditorium, MCHV Campus. This will be followed by a Poster Presentation in the Hoehl Gallery at 12:30pm in the Health Science Research Facility. We urge you to attend these presentations and lend your support to their efforts. The presentations will be judged by a committee and awards for outstanding scientific projects will be announced at a reception and luncheon that afternoon in honor of the Surgery Senior Majors.

8:00AM  INTRODUCTION – TED JAMES, M.D.  
Seminar Coordinator, Director, Surgery Senior Major Project

8:05AM  Role of TRPV3 Channels in the Urinary Bladder, Nkem Aziken

8:20AM  Patient Perceptions of Customized Quantitative Informed Consent for Coronary Artery Bypass Grafting, Griffin Boll

8:35AM  Glycerol Triacetate (GTA) Enhances Chemotherapeutic Efficacy on Glioblastoma Stem-Like Cells (GSCS), Matthew Davies

8:50AM  Femoral Intercondylar Notch Geometry and Anterior Cruciate Ligament Size in Association with Risk of ACL Injury: A Multivariate Model, Darryl C. Whitney

9:05AM  Risk Factors for Surgical Site Infection Following Orthopedic Spinal Fusion, Lindsay Kleeman

9:20am-9:35am  INTERMISSION (Fifteen Minute Intermission)

9:35AM  Cutaneous Non-Contact Infrared Temperature Measurements as an Assessment of Circulation, Haddon Pantel

9:50AM  Variability in Re-Excision and Mastectomy Rates for Breast Cancer Based on Margin Status Reporting for Women Undergoing Initial Breast Conserving Treatment, Sarah Persing
10:05AM  Does Epidural Use Cause More Postoperative Complications Following Pancreatic Surgery? Cristine Velazco


10:35AM  A Retrospective Chart Review of the Impact Surgeon Experience has on Choice Between Hartmann Procedure and Primary Anastomosis for Acute Complicated Diverticulitis, Mohammad Jafferji
ABSTRACT

Role of TRPV3 Channels in the Urinary Bladder
Nkem Aziken, Travis Mann-Gow, Peter Zvara, M.D., Ph.D.

Introduction: Alterations in sensory signaling in association with overactive bladder (OAB) and chronic pelvic pain syndrome are not completely understood. Transient receptor potential (TRP) cation channels play a role in several organs and systems through sensory transduction. One of these channels, TRPV3, has been documented to be present in the urinary bladder. These TRPV3 channels have been shown to be stimulated and partially desensitized by carvacrol, a naturally occurring component of oregano. However, carvacrol affects several other pathways, including TRPA1 cation channels. Therefore, a novel TRPV3-specific antagonist HC-05 (Hydra, Cambridge, MA) was used in the present experiments. To the best of our knowledge, this study is the first to evaluate the role of TRPV3 in bladder function and sensory signaling.

Methods: Experiments were conducted using Balb-c mice. Myograph recordings were used to assess urinary bladder smooth muscle (detrusor) contractility. Electrical field stimulation (EFS) was used to induce contractions. Dose dependent (50 µM – 300 µM) carvacrol-induced changes of smooth muscle contractions were analyzed. Awake cystometry was conducted to record the effect of TRPV3-selective drug on bladder function. For bladder filling and intravesical pressure recordings, an intravesical polyethylene tube was implanted into the bladder. In addition, sensory bladder activity recordings were simultaneously performed using an electrode implanted onto post-ganglionic bladder nerves. Nerve activity was recorded during bladder filling with 0.9% NaCl as a baseline, and then during mild sensory stimulation with intravesical infusion of 0.25% acetic acid (AA). To evaluate the role of TRPV3 ion channels on bladder function and sensory signaling, a mixture of 0.25% AA and TRPV3 antagonist was infused intravesically.

Results: In the myograph experiments, carvacrol suppressed the electrical field stimulation (EFS)-induced contractions in a dose-dependent manner. A concentration of 300 µM carvacrol solution completely suppressed the EFS-induced contractions. In the mouse model of acid-evoked bladder hyperactivity, the TRPV3 antagonist caused a decrease in intravesical pressure during bladder filling, increase in intermicturition interval and suppression of bladder sensory signaling.

Conclusion: These studies demonstrate that carvacrol suppresses EFS-induced detrusor contractility in a dose-dependent manner to the point of complete blockade at 300 µM. The mode of action is mediated at least through TRPV3, but other mechanisms cannot be ruled out. The effects of a TRPV3-specific antagonist were less pronounced, yet reproducible. This compound reduced acid-evoked bladder overactivity. Further studies aimed at identifying the exact functional role of TRPV3 cation channels in the urinary bladder are necessary.
ABSTRACT

Patient Perceptions of Customized Quantitative Informed Consent for Coronary Artery Bypass Grafting
Griffin Boll, MS-IV\textsuperscript{1}, Bruce Leavitt, MD\textsuperscript{1}
\textsuperscript{1}University of Vermont College of Medicine

Introduction:
Although individualized risk information can be added to traditional informed consent forms, this practice is not standard, potentially compromising preoperative patient education. It is the purpose of this study to evaluate patient perceptions of an informed consent that utilizes Northern New England Cardiovascular Disease Study Group (NNECDSG) data to integrate customized quantitative (individualized) risk estimates for coronary artery bypass grafting (CABG) in lay terms.

Methods:
Patients that completed standard informed consent for CABG subsequently reviewed their individualized informed consent and completed a brief survey evaluating their perceptions of the two forms.

Results:
Of 30 consented patients that were seen pre-operatively, 22 (73\%) elected to participate in the study. Of the participants, 12 (55\%) believed that the individualized form made it easier to understand personal risks of surgery, 9 (41\%) believed they were equivalent in doing so, and 1 (4\%) believed the traditional consent made it easier. Feelings towards surgery were unchanged for 15 (68\%) patients, while the remaining 7 (32\%) felt more comfortable after reviewing the individualized form. 13 (59\%) preferred the individualized form, while the remaining 9 (41\%) had no preference between the two.

Conclusions:
Although limited by small enrollment numbers and lack of a control group, this study’s survey results suggest that the individualized informed consent may make it easier for patients to understand individual risks of surgery and is generally preferred by patients over the traditional informed consent form without negatively affecting their feelings toward surgery.
ABSTRACT

GLYCEROL TRIACETATE (GTA) ENHANCES CHEMOTHERAPEUTIC EFFICACY ON GLIOBLASTOMA STEM-LIKE CELLS (GSCS)

Complete List of Authors:
Matthew Davies, University of Vermont College of Medicine
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Purpose: Despite advances in therapy, survival rates for glioblastoma (GBM), the most common primary brain tumor, remain poor with less than 5% survival at five years following initial diagnosis. The mesenchymal subtype of GBM portends the worst prognosis. N-acetyl aspartate (NAA), the primary storage form of acetate in the brain and aspartoacylase (ASPA), the enzyme that catalyzes NAA are decreased in glioma; thus, leading to acetate deficiency. This study sought to test the effect of the FDA approved food additive glycerol triacetate (GTA) for acetate supplementation on glioma stem-like cells (GSCs) in vitro and in vivo.

Methods: The growth effects of GTA on six GSC lines (3 proneural and 3 mesenchymal) was analyzed by propidium iodide flow cytometry and unbiased cytometry. Western blot analysis was performed to determine whether GTA altered expression of ASPA, acetyl coA synthesizing enzymes AceCS1 or AceCS2, or the marker of astrocytic differentiation glial fibrillary acidic protein (GFAP). The effect of GTA, both alone and in conjunction with temozolomide (TMZ) chemotherapy, on orthotopically grafted GSCs was assessed.

Results: GTA reduced GSC growth primarily by inducing cytostatic G0 growth arrest. GTA reduced growth of mesenchymal GSCs to a greater extent than proneural GSCs. This GTA-mediated growth arrest was not associated with altered expression of ASPA, AceCS1 or AceCS2. In vivo, GTA alone increased survival relative to vehicle alone and GTA enhanced TMZ chemotherapeutic efficacy relative to TMZ alone.

Conclusions: GTA decreases the growth rate of GSCs derived from the more treatment resistant mesenchymal GBM subtype. GTA (alone and with TMZ) increased the survival of GBM 12 grafted mice.
ABSTRACT

Risk Factors for Surgical Site infection Following Orthopedic Spinal Fusion

Student Investigator: Lindsay Kleeman, MS IV, University of Vermont College of Medicine

Mentor: W. Kemper Alston, MD, MPH, University of Vermont College of Medicine
Department of Medicine
Suzanne Elizabeth Ames, MD, University of Vermont College of Medicine
Department of Orthopaedics & Rehabilitation

Introduction: Development of a surgical site infection (SSI) is one of the most common and devastating complications following spinal fusion. Several risk factors have been identified as being associated with an increased risk of infection such as nasal colonization with *Staphylococcus aureus* and a high Surgery Invasiveness Index score. The role of these factors in predicting the risk of infection has not been investigated in a patient population composed of only posterior spine fusions (PSF).

Methods: Patients who underwent a posterior spinal fusion by an orthopaedic surgeon at Fletcher Allen Health Care between June 2010 and December 2011 were assessed for development of a SSI and various other risk factors, including *S. aureus* screening and decolonization status. A SSI score was calculated for each patient using a previously reported scoring system. A deep surgical site infection was defined as signs and symptoms consistent with an infection along with positive cultures from deep tissue of the surgical site.

Results: A total of 387 patients underwent a posterior spinal fusion by an orthopaedic surgeon excluding neurosurgery cases and anterior cervical disk fusions (ACDFs). A deep SSI occurred in 38 of the patients (9.8%) with 22 (58%) of those infections caused by *S. aureus*. Of the 220 patients screened preoperatively for *S. aureus* colonization, 52 out of 220 patients screened positive for MSSA and 12 out of 239 patients screened positive for MRSA. Following self-administered decolonization with mupirocin, 39% of patients remained colonized with MSSA and 50% remained colonized with MRSA. The total deep infection rate in patients colonized with MSSA was 9.6% and was 8.3% in patients colonized with MRSA. Univariate analysis found that age, BMI, high glucose values, average glucose values, diabetes, coronary artery disease, hypertension and duration of surgery were associated with development of an SSI. In a logistic regression model, only duration of surgery and high glucose levels independent of diabetes mellitus status remained significantly associated with increased risk of infection but further studies are needed to better understand the role of glucose levels in the peri-operative period.

Discussion: Screening and decolonization commonly identified nasal carriers of *Staphylococcus aureus* but self-administered decolonization was not successful in eliminating colonization or in reducing infection rates from *S. aureus*. The SSI score did not predict an increased risk of infection in a population that excluded ACDF cases. Operative duration and high glucose levels independent of diabetes mellitus status remained significantly associated with increased risk of infection but further studies are needed to better understand the role of glucose levels in the peri-operative period.
ABSTRACT

Cutaneous Non-Contact Infrared Temperature Measurements as an Assessment of Circulation

Authors: Haddon Pantel, Jeffrey McLaren

Advisor: Robert Nesbit

Introduction: Changes in skin temperature may represent underlying tissue pathology, such as compromised vascular supply. The aim of this study was to evaluate the ability of handheld non-contact infrared (IR) thermometer to objectively measure changes in cutaneous temperature after complete occlusion of blood flow to tissue.

Hypothesis: Occlusion of the brachial artery can be measured as a decrease in skin temperature of the hand, measured with non-contact IR thermometer.

Methods: 30 healthy subjects underwent brachial artery occlusion with a pneumatic tourniquet for 5 minutes. Measurements of skin temperature at standardized locations on the hand were made before tourniquet application, and at 1 minute intervals during artery occlusion. Identical measurements were simultaneously performed on the contralateral extremity as a control.

Results: Subjects had a mean age of 26.5 years, 70% were male, and had a mean Fitzpatrick skin scale of 2.9. Before brachial artery occlusion there were no differences measured in starting temperature between the occluded and control extremity at the palm (30.49C, 30.93C, p>0.05) and the digit (28.13C, 28.19C, p>0.05). After 5 minutes of occlusion the measured temperature of the test extremity had significantly decreased when compared to the control at the palm (-1.37C, -0.2C, p<0.05) and the digit (-1.5C, -0.2C, p<0.05).

Conclusions: A significant change in temperature between the occluded and control extremity was measured with non-contact IR thermometry. These data demonstrates the ability of this technology to measure temperature changes in tissue with occluded arterial supply. The use of non-contact IR thermometers may provide early evidence of decreased circulation with accurate temperature measurements.
ABSTRACT
Variability in re-excision rates of breast cancer based on margin status reporting for women with breast cancer undergoing breast conserving treatment

Author: Sarah Persing
Adviser: Ted James, MD

INTRODUCTION:
Surgical margin status following breast-conserving surgery (BCS) is widely considered to be one of the strongest predictors for local recurrence, as well as an important factor guiding the decision to re-excise additional tissue. Previous research has shown that there is variability in compliance with margin status reporting according to guidelines established by the College of American Pathologists (CAP). The objective of this study was to determine whether compliance with guidelines affects re-excision rates for women undergoing BCS.

METHODS:
The Vermont Breast Cancer Surveillance System (VBCSS) tracks mammography-related services provided to women treated for breast cancer at hospitals in Vermont since 1994. Available data in the VBCSS also includes patient demographics and pathology information. Data from pathology reports representing years 1998 to 2006 for patients who were diagnosed with invasive carcinoma and ductal carcinoma in situ (DCIS) and subsequently underwent BCS were retrospectively analyzed. Surgical margin status was recorded for the initial breast-conserving procedure and for any subsequent excisions. Reports were sorted based on compliance (i.e., “maximally compliant,” “minimally compliant,” and “non-compliant”) with CAP guidelines. The level of compliance with margin reporting was then compared with the frequency of re-excision using Pearson χ² tests of independence.

RESULTS:
We have 2,016 subjects with pathology reports coded for compliance. A total of 593 reports were reviewed to date. Of these reports, 382 were re-excisions. In maximally compliant reports, 35.3% of the reports were re-excisions; in minimally compliant reports, 42.6% were re-excisions; and in non-compliant reports, 75.4% were re-excisions (Chi square trend test, p<0.001) for all three cohorts.

CONCLUSIONS:
Compliance with standardized CAP guidelines for the reporting of surgical margin status in BCS has been shown to vary. This preliminary data suggests that the decision to re-excise may be affected by the level of compliance with these guidelines. Reports that were maximally compliant with guideline standards had significantly lower re-excision rates than reports that were non-compliant. This study provides evidence to support the need for better compliance with standardized guidelines as it may affect surgical decision-making.
ABSTRACT

Does Epidural Use Cause More Postoperative Complications Following Pancreatic Surgery?

Authors: Cristine S. Velazco, MS, Turner Osler, MD, and James C. Hebert, MD

Introduction: Epidural use is an effective method of pain control following pancreatic surgery. However, patients managed with epidural anesthesia and analgesia tend to have higher IV fluid requirements and complications. The purpose of this study is to determine if epidural pain management is associated with greater rates of postoperative complications or greater fluid requirements.

Methods: A retrospective chart review of patient admissions following elective pancreatic surgery between 2008 and March 2012 was completed. Complications and fluid requirements were recorded and analyzed between patients receiving epidural vs. those receiving IV or PO pain control. All data manipulation and statistical calculations were performed using Stata/MP (V12.1).

Results: There were 51 patients who received epidural pain management and 12 patients who received IV or PO pain control. The epidural group received significantly more fluid intraoperatively as well as during the first 24 hours of admission (p<0.0334 and 0.0417, respectively). While the number of complications between the groups was not statistically significant, there were clear trends showing more complications in the epidural group.

Conclusions: Epidural use increases IV fluid requirements significantly. Supporting other studies, there was a distinct trend for increased rates of complications in the epidural group; however, in our study no other outcomes were significant likely due to the small sample size. Because the trend of increased complications in the epidural group is so worrisome, we have changed our clinical practice with judicious attention to fluid management in patients undergoing pancreatic surgery.
ABSTRACT

Femoral Intercondylar Notch Geometry and Anterior Cruciate Ligament Size in Association with Risk of ACL Injury: A Multivariate Model

Author: Darryl C. Whitney
Advisor: Bruce Beynnon, PhD

Introduction: Injuries to the anterior cruciate ligament (ACL) of the knee are common and debilitating. The geometric properties of the femoral intercondylar notch and the ACL have been implicated as intrinsic risk factors for ACL injury. Prior research investigating notch stenosis has produced equivocal results with several studies suggesting a smaller notch is associated with an increased risk of ACL tears and others showing no significant association. Notch width at the anterior-inferior outlet has been consistently shown to be a significant risk factor for ACL injury. There is also limited evidence that factors such as a small ACL, and the presence of a bony ridge prominence at the anteromedial aspect of the notch wall is associated with an increased risk of suffering ACL tear.

Methods: Bilateral knee MRI scans were obtained on 88 case-control pairs (27 male, 61 female) matched for age (within 1 year), sex, and participation on the same sports team. Cases had suffered a grade III first-time, non-contact ACL tear, as diagnosed and confirmed arthroscopically by an orthopedic surgeon. All images were obtained using the Phillips Achieva 3.0T MRI (Fletcher Allen Healthcare, Burlington, VT) with subjects positioned supine. The notch width was measured at the anterior-inferior notch outlet (NW-O). The thickness of the bony ridge was measured as a maximal distance from a line best fit to the medial border of the notch. The notch and ACL volumes were calculated by the sum of the outlined areas multiplied by the slice thickness. Using the case uninjured limb and the corresponding control limb, conditional logistic regression was performed to assess the effects of the continuous variables of notch width, ACL volume, and bony ridge thickness, as well as their interactions, on the risk of ACL injury in the study population.

Results: Outlet notch width (OR=1.37, p=0.0039) and ACL volume (OR=1.18, p=0.0297) were significant independent predictors of ACL injury in the regression model, whereas ridge thickness (OR=1.20, p=0.3192) was not. Interaction terms between ACL volume/notch width and ACL volume/bony ridge thickness were not statistically significant.

Conclusions: The results of this study suggest that decreased notch width and decreased ACL volume are both associated with increased ACL injury risk. This is in agreement with the previous literature that has identified each of these as intrinsic risk factors with the use of univariate analysis. One advance made with the current study was application of multivariate analysis and this revealed that notch width and ACL volume are independently associated with the risk of suffering an ACL tear, while the thickness of the notch bony ridge prominence does not contribute to overall risk. In conclusion, a smaller ACL is more likely to tear, and a narrower notch outlet may perpetuate that risk.
ABSTRACT

A Retrospective Chart Review of the Impact Surgeon Experience has on Choice Between Hartmann Procedure and Primary Anastomosis for Acute Complicated Diverticulitis

Mohammad S. Jafferji, B.S.1 Neil Hyman, M.D., F.A.C.S.,1

1. Department of Surgery, University of Vermont College of Medicine, Burlington, VT

Introduction: Acute complicated diverticulitis is a serious disease with high morbidity and mortality often requiring emergent or urgent surgical management. The Hartmann Procedure (HP) has historically been the procedure of choice. However, resection with primary anastomosis (PA) has become an increasingly popular alternative because it is a one stage operation. Several recent studies have shown that resection with a PA leads to decreased peri-operative complications and mortality. It is unclear however how the experience and training of the surgeon impacts the operative decision between these two procedures and how this impacts patient outcomes. This study seeks to determine if there is a difference in choice of operation based on surgeon training and its impact on outcome parameters.

Methods: A retrospective chart review was conducted of all patients at FAHC from 1997-2012 with a diagnosis of acute sigmoid diverticulitis and underwent sigmoidectomy with either a HP or PA/PA-DI (with/without diverting ileostomy) after ED admission. 136 patients were included. Surgeon specific data was collected from the FAHC department of surgery database performing these operations. The primary outcome was comparing surgeon experience on choice of operation. The secondary outcome was patient factors including complications, ICU admission, LOS, operative length and stoma reversal.

Results: 88 (65%) operations were performed by general/other surgeons. 48 (35%) operations were performed by colorectal surgeons. General surgeons performed 56 (64%) HPs, 6 (7%) PAs, and 20 (23%) PA-DIs. Colorectal surgeons performed 18 (38%) HP, 14 (29%) PAs, 12 (25%) PA-DIs. General and other fellowship trained surgeons performed significantly more HPs compared to colorectal surgeons (64% vs. 38%, p = 0.012). Total overall complications and ICU admission were higher in the general group than the colorectal group (20.5%, 43.2%). Length of stay was longer for the PA and PA-DI in the general group (10.5, 14 vs. 5.5, 6.7 days). Stoma reversal rates was similar among both groups but the colorectal group had shorter reversal times (HP, 170 vs. 109 and PA-DI, 117 vs. 77 days).

Conclusions: General surgeons prefer an HP to a PA in the acute setting for diverticulitis when compared to colorectal surgeons. Reversal of stoma were similar but those performed by colorectal had shorter reversal times. Demographics were well distributed and severity of patient disease was not significantly different. Despite the increase in ICU admission and total complication rate in the general group, this study did not show a safety difference between the two groups among all three operations studied.
ABSTRACT

Determinants of Amputation Free Survival after Peripheral Vascular Intervention for Critical Limb Ischemia

Vierthaler, Luke¹, Goodney, Philip P.², Schanzer, Andres³, Patel, Virenda I.⁴, Cronenwett, Jack L.², Bertges, Daniel J.¹ Mentor

For the Vascular Study Group of New England

1. University of Vermont College of Medicine, Burlington, VT, United States
2. Dartmouth Hitchcock Medical Center, Lebanon, NH, United States
3. University of Massachusetts Medical Center, Worcester, MA, United States
4. Massachusetts Medical Center, Boston, MA, United States

Introduction: Our objective was to identify independent predictors of overall (OS) and amputation free survival (AFS) in patients undergoing peripheral vascular intervention (PVI) for critical limb ischemia (CLI).

Methods: We reviewed 1,253 patients who underwent 1,414 PVI for CLI within the Vascular Study Group of New England (VSGNE) from January 2010 to December 2011. A univariate screen of potential predictors of the primary (AFS) and secondary endpoints (OS) was performed to construct a Cox proportional hazards model of survival at one year.

Results: All PVI were performed for CLI (rest pain 29%, tissue loss 71%). During each procedure, the number of arteries treated were 1 (49%), 2 (35%), 3 (12%) and >4 (5%). Target arterial segments and TASC classifications were aorto-iliac (27%; A 49%, B 25%, C 11%, D 15%), femoral-popliteal (48%; A 30%, B 33%, C 20%, D 17%) and infrapopliteal (25%; A 17%, B 15%, C 27%, D 41%). Technical success was high (92%) while complication rates were low [access site hematoma (5.0%) or occlusion (0.3%), distal embolization (2.4%)]. Mortality and major amputation rates were 2.8% and 2.2% at 30 days, respectively. Overall percutaneous or open reintervention rate was 8.0% at 1-year. The Kaplan-Meier estimate of one-year OS and AFS were 82% and 76%, respectively. Independent predictors of AFS included male sex (HR 1.58), age>80 (HR 1.38), dependent living status (HR 1.79), congestive heart failure (HR 1.55), dialysis dependence (HR 2.92) and tissue loss (HR 1.81); smoking was protective (HR 0.64).

Conclusion: Amputation free survival after PVI for CLI is associated with specific preoperative patient characteristics. This data may facilitate efforts to improve patient selection and, after further validation, enable risk-adjusted outcome reporting for CLI patients undergoing PVI.
POSTER PRESENTATIONS

Followed by Surgical Senior Major Awards Banquet

12:30PM

HOEHL GALLERY

HEALTH SCIENCE RESEARCH FACILITY
Scholarly Project: Assessment of Risk Factors for Naloxone Administration (Narcan) During the Acute Postoperative Period Following Orthopaedic Surgery: A Multidisciplinary Approach

Mohammed Almzayyen
Mentor: Elizabeth Ames, MD

ABSTRACT

Background
Pain management for postoperative orthopaedic patients remains a challenging issue as we try to achieve a balance between pain control and patient safety. Adverse reactions to opioid administration, such as respiratory depression, are common and usually are counteracted by naloxone (narcan), an opioid receptor antagonist. In this retrospective study, we investigated risk factors for naloxone administration in postoperative orthopaedic patients. The main goal of this study is to evaluate the three potential systems-based factors contributing to adverse events and subsequently naloxone administration: patient factors, anesthesia and medications and admission factors and compare such factors to the control group (no adverse events).

Methods
Data regarding patient factors, admission factors, and anesthesia and medications factors, were collected from medical records (chart and PRISM) for 80 postoperative naloxone administrations in one inpatient surgical unit from June 1, 2009 to May 30, 2011. The program RedCAP and Excel were used for the data collection. Names/MRN, and date and time associated with the naloxone administration were kept in a master list and each administration was given a unique identifier. No patients were contacted during the study. Three main domains were investigated:
1-Patient domain included age, gender, BMI, ASA score, prior narcotic use, laboratory values, and reported pain scores, vital signs before narcan administration etc.
2-Admission domain included admitting diagnosis, ICU admission, anesthesia pain consult etc.
3-Anesthesia and medications domains included morphine equivalents of opioids received postoperatively, the use of non-opioid analgesics, antiemetic medications etc.
Opioids dosages were converted to morphine equivalents. About 85 factors were investigated for each patient. Preliminary data analysis was obtained via query of the PYXIS database and acquired without patients identifiers.

Results
The analysis showed that only two factors were significantly associated with naloxone administration primarily admission to the ICU and the use of long acting opioids. About 54.17% (26/48) of patients who had adverse events were on long acting opioids compared to only 29.17% (42/144) of the control group with P value = 0.0017. Similarly, 54.17% (26/48) of patients with adverse events had received long-acting opioids within 24 hours of event compared to only 28.47% (41/144) of the control with P value = 0.0012.

The second clinically significant factor is any ICU admission during the hospitalization; about 29.17% (14/48) of patients with adverse events had an ICU admission compared to 6.25% (9/144) of the control with P value < 0.001. It’s important to note that ICU admission before any adverse events was higher in the naloxone group vs. the control 10.42% vs. 6.25% however it was clinically insignificant P value = 0.34.

All other factors were not clinically significant including number of comorbidities, ASA score, obesity, use of oxygen prior to admission etc.
POSTER PRESENTATION

TRANSLATION OF RoSS (ROBOTIC SURGICAL SIMULATOR) TRAINING INTO LAPAROSCOPIC SURGICAL SKILLS

Authors: Charles Ashley, Brian Nielson, Cate Nicholas, Elise Everett
Advisor: Elise Everett, MD

Introduction: Previous studies have demonstrated that laparoscopic surgical training improves robotic surgical proficiency in basic skills; however, no group has demonstrated the inverse to be true. As residency surgical curricula develop to include both modalities, the relationship between robotic and laparoscopic skills needs to be further explored.

Methods: 30 medical students with limited experience in laparoscopic and robotic surgery watched an introductory video and were led through a brief orientation to both the laparoscopic and RoSS training consoles. Participants were timed performing the Ball Drop task on both modalities, then were randomized to the laparoscopic or RoSS arm of the study where they were timed performing the Ball Drop task 10 times on that modality. Participants were then reassessed performing the Ball Drop on the opposite modality. Finally, participants completed a survey regarding prior exposure to surgery and other possible confounding factors.

Results: Participants did demonstrate a statistically significant decrease in time to completion of the Ball Drop through practicing on each individual modality. However, practicing the Ball Drop did not demonstrate a statistically significant decrease in time to completion of the Ball Drop on the opposite modality.

Conclusions: Our group did not find a correlation between practicing the Ball Drop on the laparoscopic simulator or the RoSS and improved time to completion on the opposite modality.
POSTER PRESENTATION
Emergency Department Opioid Prescribing Practices

Author: Mayo Fujii, MS-IV
Adviser: Charles MacLean, MD

Introduction: Prescription opioid misuse is a recognized problem in health care with increasing prevalence and societal impact. Accidental or deliberate prescription misuse and abuse generates significant health and financial costs and results in increased emergency department visits and substance abuse treatment, prolonged hospitalizations, and overdose-related hospitalization and death. Pain assessment and management in the emergency department is especially challenging given overall patient acuity and limited access to patient medical history. The purpose of this study was to compare current opioid prescribing patterns in the emergency department setting compared to other specialties and identify areas for potential improvement.

Methods: Retrospective analysis of one year of electronic medical record (EMR) opioid prescriptions written by primary care, specialty and emergency medicine (EM) prescribers. Measurements included patient demographics, prescriber roster size, prescribing patterns and prevalence of “red flags”.

Preliminary Results: Median patient age was 52 years; 59% were female. Median opioid patients per prescriber was 53 for primary care, 17 for specialists, and 108 for EM (p<0.001). Median morphine equivalents per prescription was highest for primary care (840 mg) and lowest for EM (100 mg). Half of the total opioid amount was prescribed in primary care, 48% in specialty care and 1% by EM. Prescribing in quantities divisible by seven occurred in 31% of prescriptions from primary care, 5% from specialists, and 3% from EM (p<0.001). Red flags included 4 or more prescribers (8% of patients), methadone use for pain (2%), and high dose opioids for non-cancer pain (3%).

Conclusions: Opioid prescription population reports from electronic medical record data are both feasible and have face validity in comparing opioid prescribing patterns across different settings. Over 11% of opioid patients have “red flags” suggesting potential for improvements in prescribing practices. Future steps include further characterizing EM prescriber attitudes and practices by survey to identify potential interventions.
POSTER PRESENTATION

Changes in Medical Student Lipids and Behaviors in Those With and Without Hyperlipidemia

Authors: Jeff McLaren, Haddon Pantel
Advisor: Paula Tracy

Introduction: Physicians’ personal health behaviors may impact their ability to counsel patients about lifestyle changes. Physician health deteriorates during residency training; however, little is known about health changes during undergraduate medical education. This study evaluated the effect of knowledge of elevated cholesterol levels on medical students’ subsequent health behaviors and lipid values.

Methods: The effect of knowledge of cholesterol levels on subsequent behavior and changes in serum lipids was assessed in 111 medical students graduating from the University of Vermont College of Medicine from 2010-2012. Total cholesterol, HDL, LDL, and triglycerides were measured in subject’s first and fourth years of school. At follow-up, a questionnaire was administered to determine the impact of knowledge of lipid values on subsequent behavior.

Results: At year one, 22 (20%) subjects had a hyperlipidemia (total cholesterol > 200mg/dl). At year 4 the subgroup with an initial hyperlipidemia had a mean decrease in total cholesterol (-27.4mg/dl), LDL (-11.9mg/dl), and triglycerides (-60.2mg/dl). In contrast the remaining 89 (80%) subjects with initially normal lipids had a significant increase in mean total cholesterol (16.4mg/dl) and LDL (10.4mg/dl) at year four. First-year hyperlipidemic subjects were more likely to alter their diet, increase exercise, and increase the frequency of lipid panels, compared to initially normal subjects.

Conclusions: Results suggest that medical students informed of elevated cholesterol can enact positive change behavior to reduce risk of cardiovascular disease. The potential benefits of cardiovascular risk screening in first-year students may reduce risk and improve health outcomes for students and their future patients.
Introduction: Individuals under 50 do not meet specific age criteria for colorectal cancer screening, the diagnosis may often be delayed, resulting in more advanced tumors and poorer outcomes. Delays may be caused by a low index of suspicion either by the patient or primary care physician, possibly believing that patient is “too young” to warrant investigation. There has been an increasing amount of CRC in young patients particularly with a rise in rectal adenocarcinoma. This retrospective study will compare the diagnosis of rectal adenocarcinoma to colon adenocarcinoma in patients under 50. The purpose is to examine diagnosis time periods, local customs to analyze diagnostic aggressiveness, and 5 year survival between the groups.

Methods: Individuals under age 50 were examined from time period of 1997-2007 who were diagnosed with colon and rectal adenocarcinoma. Retrospective chart review was preformed examining age, sex, county at diagnosis, symptom presentation, insurance status, and 5 year survival. To assess delay the following time periods were analyzed: length of time from symptoms to presentation, time from presentation to referral, and length of time from referral to first treatment.

Results: 133 charts will be reviewed 79 (39 male, 40 female) with colon cancer and 54 (38 male, 16 female) with rectal cancer. The charts have not been reviewed as the IRB approval is pending. However, therefore there is preliminary data of these patients from the FAHC Cancer Network data. T-test will be performed comparing colon and rectal cancer to delay. Logistic regression will be utilized to examine if age, insurance status, county at diagnosis, or any of the delay time points have statistical significance in relation to diagnosis of CRC in younger patients. Recurrence and 5 year survival will be compared between the two groups.

Conclusions: This study provides evidence to compare the diagnosis of colon to rectal adenocarcinoma in young population. The small sample size, single institution, and lack of comparison to over 50 cohort limits the application of the data. Consideration should be given to a prospective study analyzing patterns of diagnosis of CRC in younger population to determine if there are delays in diagnosis.
Assessment of Primary Care Providers’ Current Clinical Practices in Determining a Woman’s Risk for Ovarian Cancer

Author: Amanda Schwartz
Advisor: Elise Everett, MD

Introduction: Ovarian cancer is the gynecologic cancer with the highest mortality rate, yet it is also a disease with known hereditary risk factors, and more recently, a better defined set of symptoms in early stage disease. Despite an increased effort to standardize history taking tools to identify women at risk for ovarian cancer, it is our hypothesis that few primary care practitioners are using these tools and that the capture rate of women at risk can be improved. The purpose of this study is to assess primary care practitioner knowledge of ovarian cancer risk factors, assess current usage of standardized tools, and assess the willingness of practitioners to adopt a clinical decision rules algorithm into their daily practice regarding the identification of women who are at increased risk for ovarian cancer.

Methods: A survey addressing knowledge of ovarian cancer risk factors and current practices used in the primary care setting to identify women at risk for this disease was emailed to primary care practitioners in Vermont. Email addresses were obtained through the Vermont Medical Society and FAHC directory.

Results: We received complete or partial responses from 78 participants. 41% of responders report never or rarely asking questions aimed at assessing the risk of a BRCA mutation. Less than 1% of responders use the Amsterdam II criteria or Revised Bethesda Guidelines to estimate the risk of a HNPCC mutation. 73% are unaware of an ovarian cancer symptom index. Over 90% of responders support the creation of a standardized patient questionnaire and EMR tool aimed at assessing ovarian cancer risk factors.

Conclusions: This study supports our hypothesis that primary care practitioners in Vermont are not regularly using available tools to capture women at increased risk of ovarian cancer based on history or symptoms. It also shows that there is support for the creation of a standardized patient history questionnaire and EMR risk assessment tool to aid in increasing the capture rate of these women.
POSTER PRESENTATION

ANASTOMOTIC LEAK: SURGEON ERROR VERSUS PATIENT DISEASE

Author: Katie Murray Shean
Advisor: Dr. Neil Hyman

Introduction: Post-operative leak is a feared consequence of any bowel surgery that involves anastomosis, and the fact remains that we seldom understand why a leak occurs in any individual case, despite numerous studies describing risk factors. Previous data from our institution has demonstrated variability in leak rate across surgeons performing similar surgeries, suggesting both patient disease and technical error are ultimately responsible.

Methods: A retrospective chart review of all anastomotic leaks from intestinal anastomoses (small and large bowel) from 2007 through 2011 (5 year period) was performed, and from which, a leak rate was calculated for each surgeon. The leak rates were subsequently compared to determine an expected rate, with attention to the presence of known risk factors to assure patients were comparable. Operative reports of surgeons above the expected rate were then examined for factors such as blood loss, operative times and any intraoperative complications (eg stapler dysfunction, positive leak test). This data was compared to results of a surgeon within the expected rate to see if the leaks were, in fact, a result of technical skill and not patient disease.

Results: IRB approval was completed on January 28, 2013, and therefore, the data has not yet been reviewed. The data is currently being compiled from the SATS database, from the Department of Surgery at FAHC. Charts will be reviewed from all leaks that have occurred over a 5 year period, and the leak rate for surgeons at FAHC will be calculated. Operative reports will be reviewed from any surgeon with a higher leak rate and criteria will be analyzed to determine if there are technical errors.

Conclusions: This study provides evidence that there is an expected leak rate among bowel anastomoses. It also shows that patient disease is not always responsible for a post-operative leak. By reviewing select criteria in operative reports, we will be able to determine if technical errors are a statistically significant source of bowel leaks.