P1

Hypoalbuminemia Is Associated with Increase in Postoperative Complication and Mortality Rates in Hand Surgery

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PURPOSE: Hypoalbuminemia has been used clinically as a preoperative risk factor for different surgical complications. To our knowledge, no study has looked at the impact of low albumin on hand surgery outcomes. We conducted a retrospective analysis to identify the influence of hypoalbuminemia on complications in hand surgery.

METHODS: The National Surgical Quality Improvement Program database was queried using CPT codes to identify 16,429 patients undergoing hand surgery from 2005 until 2012. A total of 14.16% underwent inpatient (n = 2326) and 85.84% outpatient (n = 14,103) surgical procedure. Hypoalbuminemia was defined as preoperative serum albumin <3.5 g/dL. Previously described outcomes of overall complication rates and mortality were assessed. Univariate analysis and multivariate regression analysis accounting for demographic factors, comorbidities, and operative details were conducted.

RESULTS: Median age was 50 years, and body mass index was 27.1 kg/m². A total of 51.7% of patients were females. A total of 21.4% of patients were American Society of Anesthesiologists class 3 or higher. A total of 2.60% (n = 427) patients were identified as hypoalbuminemic. On univariate analysis, overall complication rates increased from 1.7% to 17.6% (P < 0.01) and mortality increased from 0.09% to 6.32% (P < 0.01). On multivariate analysis, overall complication rate was independently predicted by hypoalbuminemia (adjusted odds ratio: 1.79, P = 0.016); mortality rate was also independently predicted by hypoalbuminemia (adjusted odds ratio: 6.39, P < 0.01).

CONCLUSION: Hypoalbuminemia, detected preoperatively, significantly predicts complications and mortality after hand surgery. Independent predictive potential of albumin level on complication rates and, especially, mortality suggest that serum albumin level can be a valuable marker of increased risk and potentially identify high-risk surgical candidates.

P2

Breast Reconstruction Surgery Readmission Rates Are Higher in Patients with Both Anemia and Hypoalbuminemia

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PURPOSE: Anemia is relatively prevalent among women, and to our knowledge, it has not been linked to complications after breast reconstruction surgery. In this study, we examine the impact of anemia, hypoalbuminemia, and the compounded impact of both factors on readmission rates in patients after surgical breast reconstruction.

METHODS: The National Surgical Quality Improvement Program database was queried using CPT codes to identify 5870 female patients undergoing breast reconstruction surgery in 2011 and 2012. Anemia was defined as preoperative serum hematocrit <36% for women. Hypoalbuminemia was defined as preoperative serum albumin <3.5 g/dL. We selected the previously described outcome parameters of hospital readmission and reoperation after surgery to investigate. We used both univariate analysis and multivariate regression analysis, which accounted for demographic factors, comorbidities, and operative details that were performed.

RESULTS: Our data set included 78 hypoalbuminemic patients, 1129 anemic patients, and 39 patients with both conditions simultaneously. On univariate analysis, hypoalbuminemia alone was not found to be associated with significantly higher readmission or reoperation rates. Anemia alone also did not significantly correlate with increase in readmission and reoperation rates. However, patients with both conditions showed increased readmission rates from 4.86% to 12.82% (P = 0.041) but did not show significantly higher reoperation rates. On multivariate analysis, the cooccurrence of hypoalbuminemia and anemia was an independent predictor of readmission rates (adjusted odds ratio: 3.79, P = 0.011).

CONCLUSION: Combined impact of anemia and hypoalbuminemia is associated with hospital readmissions after reconstructive breast surgery. Considering the confounding effect of both factors can help identify the otherwise overlooked high-risk patients.
P3
Outcome Analysis of Metacarpal and Phalangeal Fixation Techniques at Bellevue Hospital

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PURPOSE: Phalangeal fractures represent a significant portion of upper extremity injuries but are not well studied as a single entity. The purpose of this study is to define our approach at a level 1 trauma center and determine whether plating or lag screws (rigid fixation) for fractures of the phalanges or metacarpals have superior functional outcomes compared with Kirschner wire fixation.

METHODS: The cases of all hand fractures managed surgically at Bellevue Hospital during 2012 and 2013 were reviewed. Demographics, type of fixation, length of operation, period of immobilization, range of motion, time to return to work, and complications including reoperation were noted, and comparisons were assessed for significance using \( t \) tests (\( P < 0.05 \) considered significant).

RESULTS: One hundred ninety-three fractures (158 patients) were treated and followed up for an average of 113 days. Rigid fixation was used for 17 (19%) of 91 metacarpal fractures and 5 (5%) of 102 phalangeal fractures. Operative times were significantly shorter (59 vs 135 minutes and 84 vs 149 minutes) and period of immobilization was longer (37 vs 15 days and 34 vs 18 days) when K wires were used for metacarpal and phalangeal fractures, respectively (\( P > 0.05 \)). Total active motion and return to work were similar regardless of type of intervention in both fracture types. No patients treated with rigid fixation required reoperation.

CONCLUSION: To our best knowledge, this is the first review to study phalangeal fractures concurrently but also separately from metacarpal fractures. Despite shorter periods of immobilization, rigid fixation does not lead to improved TAM or time to return to work.

P4
Repurposing Jak/STAT Signaling Inhibition to Enhance Costimulation Blockade and Promote Transplant Acceptance

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PURPOSE: Transplant tolerance induction through conventional costimulation blockade (CoB) remains an elusive goal. Recent evidence suggests that inflammatory cytokines contribute to the activation of alloreactive T cells in a costimulation-independent manner. We then aimed to delineate the possible synergism between CD28 blockade and inhibition of cytokine signaling via Jak/STAT pathway.

METHODS: Murine T-cell activation and T-regulatory (Treg) cell activity were assessed through a CFSE proliferation and suppression assay, respectively. Stimulation in an inflamed environment was simulated through addition of supernatant (MATSup) from maturing dendritic cells (DCs). Inflammatory cytokines signaling inhibition was exerted with the Jak3/1 inhibitor tofacitinib (Tofa). Differential expression of DC maturation markers was analyzed by flow cytometry. In vivo synergism between Tofa and CTLA4-Ig was tested in a BALB/c-to-B6 heart graft model.

RESULTS: MATSup counteracted the antiproliferative effect of CTLA4-Ig on CD4/CD8 T cells. Notably, Tofa addition was able to completely restore CTLA4-Ig inhibition in the presence of MATSup. Tofa also reduced DC maturation in response to LPS but did not interfere with Treg suppression of CD4/CD8 T cells. In our heart transplant model showed that a short course of Tofa synergized with CTLA4-Ig in promoting long-term graft survival, associated to lower T helper 1 cell production and an increase in graft infiltrating Treg. This improvement was even stronger in mice receiving hearts kept ischemic for 4 hours before transplantation.

CONCLUSIONS: Our results clearly indicate that inflammatory cytokines counteracts the efficacy of CoB. However, their redundant activity can be neutralized by repurposing Tofa. Our transplant survival data suggest that combining transient Jak inhibition with CoB is a promising strategy for promotion of transplant acceptance.
P5
Analysis of Motor Hand Recovery in a Nonhuman Primate after Median Nerve Repair as a Preclinical Model System for Conduit Implantation

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PURPOSE: Surgical repair of peripheral nerve transection can result in nerve regeneration and functional recovery. However, the clinical outcome in nerve defect injuries is disappointing, and research continues to develop nerve conduits for optimal enhancement of axonal regeneration. Model systems to evaluate nerve conduit implantation in a preclinical model are limited. Here, we describe the sequence of functional recovery of fine hand movements in combination with electrophysiological recordings after repair of a critical size median nerve defect.

METHODS: In the nonhuman primate, a 2.0-cm defect injury of the median nerve was induced and reconstructed by nerve conduit implantation or autologous nerve transplantation. Postoperatively, animals were tested monthly for fine motor dexterity. Noninvasive electrophysiological studies were carried out to determine conduction velocity.

RESULTS: Immediately after injury and nerve reconstruction, significant loss of fine hand movements was observed. With regard to conduit implantation, no adverse effects were observed. The sequence of functional recovery after conduit implantation was characterized in comparison with autologous nerve transplantation, and comparable results were observed in both experimental groups. With increasing regeneration of the median nerve, recovery of fine motor dexterity of the hand could be observed. Twelve months after median nerve repair, the behavioral outcome and muscle innervation indicated almost complete functional restoration.

CONCLUSION: The establishment of a nerve defect injury model and subsequent repair in a nonhuman primate combined with detailed analysis of functional recovery could serve as an important preclinical model system for conduit implantation studies providing data on the safety and efficacy.

P6
Quantifying Normal Facial Form and Baseline Facial Asymmetry in the Pediatric Population

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PURPOSE: Restoring facial symmetry is an important objective in the treatment of many craniofacial conditions. Normal form has been measured using anthropometry, cephalometry, and conventional photography. In this study, we define normal facial form and baseline facial asymmetry using stereophotogrammetric images.

METHODS: Stereophotogrammetric images (3dMD, Atlanta, Ga.) of normal healthy children (n = 534) with no known cranial and facial abnormalities were recruited at well-child visits after IRB approval. The children ages ranged from 0 to 16 years. A symmetric 3D template was registered and scaled to each individual scan using 25 manually placed landmarks. The template was deformed to each subject’s 3D scan using a thin-plate split algorithm and iterative closest point matching. Age-based normal facial models were derived. Average facial asymmetry was calculated, with statistical characteristics of the population provided.

RESULTS: The mean asymmetry were equal between younger children (<10 years) and older children (>10 years), 1.2 ± 0.6% and 1.2 ± 0.6%, respectively. In addition, similar asymmetry values were observed in African American and white children, 1.0% ± 0.5% and 1.2% ± 0.7%, respectively.

CONCLUSION: Understanding of the “normal” form and distribution of asymmetry in the normal condition is an important foundation in considering diagnosis and subsequent interventions in craniofacial conditions, which involve the face. In this study, we present a method to quantify facial normal form and baseline asymmetry in a large pediatric sample.
P7  
**Gene Expression Markers of Wound Healing and Oxidative Stress in Keloid**

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**PURPOSE:** Keloid is a dermal injury resulting from an abnormal healing process. The molecular mechanisms that lead to the formation of keloid and hypertrophic scars are poorly understood. The aim of the study was to evaluate gene expression of 84 mediators of wound healing and oxidative stress by means of polymerase chain reaction array.

**METHODS:** It was evaluated that 12 patients with keloids and 12 control patients underwent aesthetic surgery. The skin fragments of both groups were used for total RNA extraction and subsequent analysis by quantitative polymerase chain reaction array in triplicate.

**RESULTS:** For wound healing, 46 genes (55%) were differentially expressed: 25 (54%) hyperregulated and 21 (46%) hyporegulated. The genes that showed greater differential were (in times): *FGF10* (19), *TNF* (18), and *MMP1* (15). For oxidative stress, 33 genes (39%) were differentially expressed: 24 (73%) hyperregulated and 9 (27%) hyporegulated. The genes that showed greater differential were (in times): *NOS2* (25), *LPO* (19), *PTGS2* (13), *SPINK1* (10), and *MBL2* (15).

**CONCLUSION:** The healing process expressed predominantly high levels of *FGF10* or *KGF-2* that is expressed by fibroblasts and is a potent mitogenic inducing proliferation and migration of keratinocytes and secretion of metalloproteinases; and they were hyperexpressed in this study. Matrix metalloproteinase-1 plays a central role in the pathogenesis of abnormal collagen. *LPO, NOS2, SPINK1, and PTGS2,* respectively, produced changes that lead to increased production of free radicals, increased synthesis of collagen, cell proliferation, and the proliferation of extracellular matrix by keloid. Thus, the overexpression of these genes in this study corroborates with previous studies. This study was supported by FAPESP 2013/10905-0.

P8  
**Decreased Colony-Forming Capacity in Mesenchymal Stem Cells Derived from Irradiated Human Skin**

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**PURPOSE:** Radiotherapy results in increased complications during postoncologic reconstructive surgery. Skin-derived mesenchymal stem cells (SMSCs) are critically involved in skin homeostasis, but little is known about the in situ effect of irradiation on these cells. This study aimed to characterize functional alterations in SMSCs derived from irradiated and normal human skin.

**METHODS:** Four pairs of irradiated and normal human skin samples were harvested from patients. SMSCs were isolated from these samples and cultured according to standard protocol. SMSC function was assessed using a colony-forming unit assay. Gene expression was evaluated using RNA-Seq and confirmed with quantitative polymerase chain reaction.

**RESULTS:** SMSCs from irradiated skin had a 5.6-fold decrease in colony formation capacity (*P* < 0.05). Analysis of RNA-Seq data was restricted to genes with reads per kilobase of transcript per million mapped reads greater than 0.3. Eleven genes were differentially expressed in irradiated SMSCs (*P* < 0.05). Three candidate genes—*DACT1, FMN1,* and *IL32*—were selected on the basis of their involvement in skin function or pathology, and the directionality of their differential expression was confirmed with quantitative polymerase chain reaction.

**CONCLUSION:** SMSCs from irradiated skin have significant defects in colony formation in vitro that are associated with a distinct pattern of altered gene expression. The investigation of these differentially expressed genes may aid in the development of targeted therapies to improve skin healing after radiotherapy.
P9
Quantifying Lymph Nodes during Lymph Node Transplantation: The Role of Intraoperative Ultrasound

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PURPOSE: Quantifying lymph nodes in lymph node transplant (LNT) has been performed utilizing preoperative percutaneous ultrasound. We hypothesize that intraoperative ultrasound (IOU) during LNT would provide a superior method to quantify lymph nodes in our flaps.

METHODS: A prospectively collected database of patients undergoing LNT from September 2014 to August 2015 was reviewed. Our radiologists performed IOU after flap harvest and before pedicle ligation to quantify the number of lymph nodes in our flaps.

RESULTS: Eleven patients with an average age of 59 years and a mean body mass index of 34 kg/m² underwent LNT for chronic lymphedema during the study period. The patients’ lymphedema was staged Campisi 1 (n = 1), 2 (n = 4), 3 (n = 4), and 4 (n = 2). Ten patients underwent transfer of a superficial circumflex iliac artery flap to the upper extremity, and 1 patient underwent a transverse cervical artery flap to the lower extremity. The average number of lymph nodes transferred per IOU was 5.8 nodes (range, 2–6 nodes) for the superficial circumflex iliac artery flap and 4.0 for the transverse cervical artery flap.

CONCLUSION: The number of lymph nodes identified utilizing IOU during LNT is significantly higher than those reported by percutaneous ultrasound. Higher resolution with IOU accounts for the increased accuracy of this technique. As there are no data correlating the number of lymph nodes transferred and outcomes after LNT, developing a precise method of quantification is important.

P10
Dynamic Functioning of Latissimus Dorsi Muscle Flap Neosphincters Compared to Native Anal Sphincters in the Rat

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PURPOSE: Patients with fecal incontinence from oncologic resection, trauma, extensive sphincter defect, or infection require surgery to maintain health and hygiene. Pedicled flaps are a reconstruction mainstay. This study compares dynamic functions of anal sphincters constructed using neurovascular pedicled latissimus dorsi muscle (LDM) free flaps with those of native anal sphincters.

METHODS: Neosphincters (NeoS) were constructed off 1 shoulder of athymic rats. Native sphincters (n = 16) were controls. Experimental surgeries all began with elevation of the LDM and eventual formation into a NeoS with a lumen. Groups were as follows: (a) LDM only (NeoS, n = 7), acellular dermal matrix (ADM) lining the neosphincter lumen (NeoS-ADM, n = 4), and ADM prelaminated during tissue culture with human oral mucoepithelial cells (NeoS-Mucosa, n = 10). Recovery was 14 days when manometric pressures were measured.

RESULTS: All NeoS were well vascularized and healthy. Resting pressures after accommodation for manometer balloon inflation were all similar: 110, 100, 127, and 130 mm Hg for native sphincters, NeoS, NeoS-ADM, and NeoS-Mucosa groups, respectively. Maximal evoked pressures also were very similar. The mucoepithelial layer increased in thickness while in vivo.

CONCLUSIONS: Viable NeoS with a human mucoepithelial lining provided pressures similar to the native anal sphincter in the rat.
**P11**
The Versatility of Profunda Femoris Artery Perforator Flap for Reconstruction

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**PURPOSE:** The profunda femoris artery perforator (PAP) flap was recently introduced and gains popularity as an alternative method of autologous breast reconstruction with favorable outcomes. The purpose of this article is to demonstrate that PAP flap can be used reliably for reconstruction of any soft tissue defects and breast reconstruction.

**METHODS:** A total of 55 free PAP flaps and 16 pedicle PAP flaps were transferred in 63 patients. Each case was reviewed to verify whether a PAP flap was performed by identifying defect location, flap size, flap design, and postoperative complications.

**RESULTS:** Five patients underwent breast reconstruction using 7 flaps, and 48 patients underwent head and neck reconstruction using free PAP flap. The flap survival rate was 100%; however, there were minor complications including wound poor healing (1/55, 1.8%), flap partial necrosis (3/55, 5.5%), and pedicle vessels problems including artery or venous thrombosis (3/55, 5.5%). A total of 16 pedicle PAP flaps were transferred in 10 patients for vulvar reconstruction. All flaps were transferred successfully, with a 100% flap survival rate. There were minor complications including urinary tract infection (1/10, 10%), poor wound healing (7/16, 43.8%), wound infection (3/16, 18.8%), and hematoma (1/16, 6.3%).

**CONCLUSIONS:** The anatomy and number of perforators of PAP flap are reliable with adequate pedicle length. The donor site scar is well hidden with minimal morbidities, which makes this flap an excellent option for reconstruction of most soft tissue defects and breast reconstruction.

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**P12**
Comparison of Diabetic Peripheral Polyneuropathy Detection Rate in High-Sensitivity Quantitative Sensory Testing Devices against Symptom Score Scales: A Prospective Cross-Sectional Study

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**PURPOSE:** Current evidence indicates that early detection of diabetic peripheral polyneuropathy (DPP), followed by surgical microneurolysis of entrapped peripheral nerves, results in fewer foot ulcers and amputations. A definite diagnostic test for the early detection of DPP is lacking. We objectively compared detection rates for early stage DPP of the 2 available quantitative sensory testing devices against 5 established qualitative symptom scores.

**METHODS:** Ninety-four diabetes mellitus patients were referred by diabetologists for neuropathic-like complaints. Relevant traumatic pain history, positive psychiatric evaluation, venous pathology, and ABI index <0.7 were used as exclusion criteria. HbA1c levels were determined and recorded. Qualitative testing was performed by administering MD Anderson Brief Pain Inventory, Neuropathy Symptom Score, Douleur Neuropathique 4 Questionnaire, Leeds Assessment of Neuropathic Symptoms and Signs Pain Scale, Neuropathic Pain Scale, and Michigan Neuropathy Screening Instrument. Quantitative sensory testing was performed using the Computer Aided Sensory Evaluation (CASE-IV QST) Device and the Pressure-Specified Sensory Device (PSSD).

**RESULTS:** Sixty-eight patients, aged 47 to 83 years, were diagnosed with DPP. Mean HbA1c level was 7.25% (range, 5.27%–10.1%). Mean just noticeable difference was 18.98 (posterior tibial nerve) and 19.09 (anterior tibial nerve), and sensory amplitude ranged from 31.52 (dorsal foot) to 41.7 g/mm² (great toe pulp). Sensitivity of PSSD versus CASE-IV was 98% versus 91% and specificity was 14% versus 19%, respectively. Only 1 qualitative symptom score identified DPP consistently in the study group.

**CONCLUSION:** PSSD has a greater accuracy in detecting early stage DPP compared with CASE-IV. Both devices offer high sensitivity over traditional qualitative testing.
Increasing Indocyanine Green Fluorescence with Organic Solvents for Experimental Lymphangiography

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PURPOSE: Indocyanine green (ICG) is a widely used near-infrared fluorescent contrast agent used in vivo lymphangiography. However, the use of ICG is limited by its intensity and ability to visualize deep lymphatics. Previous reports have suggested that organic solvents can increase the fluorescent intensity of ICG. Therefore, the purpose of this study was to optimize the concentration of ICG and to determine whether amounts of ethanol added to the solvent can increase the fluorescent intensity of ICG and improve lymphatic visualization.

METHODS: We first determined the optimal concentration of ICG in deionized water using a spectrophotometer and monochromator to measure the fluorescent intensity of a dilution series of ICG. We then prepared a series of ICG solutions with various proportions of ethanol and analyzed them with a fluorescent microscope with an excitation wavelength of 770 nm and an emission wavelength of 800 nm—quantifying fluorescent intensity with MetaMorph software. We then performed lymphangiography in mouse hindlimbs using ICG solutions containing 25%, 10%, and 0% ethanol.

RESULTS: We found that the optimal concentration of ICG for fluorescent intensity was 0.05 mg/ml, which provided a 4-fold increase in fluorescent intensity over previously published concentrations. Increasing ethanol concentrations increased fluorescent intensity with 10% ethanol doubling fluorescent intensity and 25% ethanol tripling fluorescent intensity without apparent toxicity locally.

CONCLUSION: We determined the optimal concentration of ICG for near-infrared lymphatic imaging and provided a cost-effective way of markedly improving the quality of lymphangiography using the organic solvent ethanol. Future studies will analyze cytotoxicity and application to experimental and clinical lymphangiography.

Targeted and Sustained Delivery of a Focal Adhesion Kinase Inhibitor via Pullulan–Collagen Hydrogel Scaffolds for Scarless Wound Healing in a Mouse Excisional Wound Model

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PURPOSE: Skin fibrosis and contractures resulting from traumatic soft tissue injury can cause significant disfigurement and dysfunction to the injured patients. Unfortunately, current antiscarring therapies have proven inadequate in treating these conditions. Previous investigation has demonstrated that focal adhesion kinase (FAK) plays a critical mechanosensory role in hypertrophic scarring and offers a promising target for therapy. This study aims to provide a novel approach to scar reduction by performing sustained and targeted delivery of FAK-inhibitor (FAK-I) from pullulan–collagen hydrogel scaffolds.

METHODS: A novel molecular imprinting technique was used to encapsulate FAK-I into pullulan–collagen hydrogel. Effects of imprinted hydrogel on wound healing and scar formation were further investigated in a mouse excisional wound model.

RESULTS: Subcutaneous implantation of a small-molecule imprinted pullulan-collagen hydrogel to the mouse groin resulted in up to 21 days of sustained release, in contrast to 3 hours of fast release in the nonimprinted hydrogel/molecule mixture group. Furthermore, compared with the control group, wounds in FAK-I-imprinted hydrogel group (H+FAK-I) closed 3 days earlier with significantly reduced expression of fibrosis marker proteins (collagen and α-SMA) and enhanced mechanical properties.

CONCLUSIONS: It highlights a great potential of developing a novel and effective antiscarring approach by targeted and sustained delivery of antifibrosis drug(s) through manipulation of biomaterial-based drug delivery capabilities.
P15
Targeting the Hif-1α Pathway to Eliminate Trauma-Induced Muscle Fibrosis

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PURPOSE: Muscle fibrosis is a pathologic condition characterized by abnormal collagen deposition causing loss of muscle excursion. Fibrosis develops in settings of trauma such as muscle crush or laceration and in muscle flaps or transfers, which are prone to ischemic insult. Here, we study the role of hypoxia-inducible factor-1α (HIF-1α) as a mediator of muscle fibrosis to elucidate potential therapeutic targets.

METHODS: Mice with Cre-inducible expression of hyperactive BMP receptor (caACVR1) underwent Ad.cre/cardiotoxin injection to generate intramuscular trauma and fibrosis. Mice were treated daily with vehicle control or the HIF-1α inhibitors such as rapamycin (10 mg/kg) or PX-478 (100 mg/kg) for 15 days and killed. Fibrosis was quantified using picrosirius staining, and profibrotic mesenchymal cells were quantified using PDGFRα immunostaining.

RESULTS: Ad.cre/cardiotoxin injection caused reproducible intramuscular fibrosis on hematoxylin and eosin stain and picrosirius after 15 days (A). Mice treated with HIF-1α inhibitors consistently produced less fibrosis at 15 days postinjection based on picrosirius (B). Immunostaining showed fewer PDGFRα(+) cells at the site of injury in treated mice when compared with untreated controls (C). These cells expressed Col1, but did not express cartilage or bone markers consistent with their role in fibrosis.

DISCUSSION: Our results suggest that HIF-1α inhibition represents a viable therapeutic strategy to reduce or eliminate intramuscular fibrosis. These therapeutics are readily available and may improve long-term function of muscle at risk for fibrosis.

P16
Assessing the Predictive Accuracy of the ACS NSQIP Surgical Risk Calculator in Open Ventral Hernia Repair

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PURPOSE: Preoperative surgical risk assessment is critical for clinical decision making. The American College of Surgeon’s (ACS) risk calculator estimates risk for outcomes based on individual risk profiles. Recent studies have reported inaccuracies among certain populations. This study assesses the predictive accuracy of the ACS Risk Calculator in patients undergoing open ventral hernia repair (VHR).

METHODS: A review of patients undergoing open VHR between July 1, 2007, and July 1, 2014, by a single surgeon was performed. Risk factors and outcomes were collected as defined by NSQIP. Thirty-day outcomes included serious complication, venous thromboembolism (VTE), medical morbidity, surgical site infection (SSI), unplanned reoperation, mortality, and length of stay. Patient profiles were entered into the ACS Risk Calculator and outcome-specific risk predictions recorded. Prediction accuracy was assessed using Brier scores and receiver operating characteristic under the curve (AUC).

RESULTS: One hundred forty-two patients were included. ACS predictions were accurate for cardiac complications (Brier = 0.02), VTE (Brier = 0.08), reoperation (Brier = 0.10), and mortality (Brier = 0.01). Significantly underestimated outcomes included SSI (Brier = 0.14), serious complications (Brier = 0.30), and any complication (Brier = 0.34). Discrimination ranged from highly accurate (mortality, AUC = 0.99) to indiscriminate (SSI, AUC = 0.57). Predicted length of stay was 3-fold shorter than observed (2.4 vs 7.4 days, P < 0.001).

CONCLUSION: The ACS Risk Calculator accurately predicted medical complications, reoperation, and 30-day mortality. SSIs, serious complications, and length of stay were significantly underestimated. These findings suggest that additional considerations are needed to better estimate complications after open VHR.