

# ABSTRACTS

## Ochsner's Eighth Annual Research Night May 10, 2011 Ochsner Clinic Foundation New Orleans, LA

<b>BASIC RESEARCH</b>	<b>1–16</b>
<b>CLINICAL RESEARCH</b>	<b>17–70</b>
<b>CASE REPORTS</b>	<b>C1–C11</b>

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## 1 GAMMA SECRETASE INHIBITOR DAPT SYNERGIZES WITH VINCRISTINE IN INHIBITING B CELL LYMPHOMA FORMATION

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**Background:** Evidence accumulated for the past decade has indicated that the microenvironment plays a prominent role in tumor cell survival and growth. Focused on non-Hodgkin B cell lymphoma, we discovered that lymph node stromal cells, follicular dendritic cells (FDCs), have a significant impact on tumor cells' response to chemotherapy.

**Objectives:** To examine whether blocking Notch signaling from FDCs in combination with the conventional chemotherapy drug vincristine (VCR) is more effective than VCR alone in suppressing tumors in the human B cell lymphoma xenograft model.

**Methods:** B lymphoma cell line, Raji, was injected alone or with FDCs into severe combined immunodeficiency/nonobese diabetic mice. The mice were treated with DAPT alone, VCR alone, or DAPT plus VCR for 2 weeks, and tumor formation was monitored.

**Results:** VCR at a dose of 20 µg per mice (1 mg/kg) prevented tumor formation by B lymphoma cells alone, while mice coinjected with FDCs formed tumors with the same dose of VCR. The addition of DAPT to the VCR completely abrogated tumor formation supported by FDC, although DAPT alone did not suppress tumor formation.

**Conclusions:** FDC-derived Notch signaling is essential for the survival of B cells supported by FDCs. DAPT would prevent drug resistance in combination therapy with VCR.

## 2 MOLECULAR MECHANISM OF INCREASED T FOLLICULAR HELPER CELLS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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**Background:** Systemic lupus erythematosus (SLE) is a chronic autoimmune disease characterized by autoreactive B cells and autoantibody production. These autoantibodies bind to self-antigens, leading to multisystem disease. T follicular helper (T<sub>FH</sub>) cells are CD4<sup>+</sup> T cells that promote B cell proliferation and differentiation into antibody-producing plasma cells.

**Objectives:** To identify the factors produced by T<sub>FH</sub> cells in SLE patients and elucidate their role in maintaining autoimmune status.

**Methods:** Peripheral blood was collected from SLE patients and healthy controls. T<sub>FH</sub> cells were identified by the expression of surface markers (CD3<sup>+</sup>, CD4<sup>+</sup>, CD8<sup>-</sup>, CD57<sup>+</sup>, CXCR5<sup>+</sup>) via flow cytometry. Tonsil T<sub>FH</sub> cells isolated by MACS column were used as a positive control. The mRNA expression level of cytokines produced by T<sub>FH</sub> cells was measured by reverse transcription polymerase chain reaction test. Interleukin (IL)-21 protein level was determined by flow cytometry. Antibody production was detected by enzyme-linked immunosorbent assay.

**Results:** The percentage of T<sub>FH</sub> cells was significantly increased in the peripheral blood of SLE patients compared to healthy controls ( $P < .01$ ). Compared to normal CD4<sup>+</sup> T cells, T<sub>FH</sub> cells from SLE patients expressed significant amounts of IL-21, which was comparable to the tonsillar T<sub>FH</sub> cells. There was no difference between T<sub>FH</sub> cells and normal CD4<sup>+</sup> T cells in the production of other cytokines (B cell activating factor, IL-1β, IL-2, and interferon-γ). Recombinant IL-21 promoted peripheral B cell differentiation into plasma cells to produce antibodies.

**Conclusions:** Ectopically located T<sub>FH</sub> cells are upregulated in SLE patients. By secreting IL-21, these circulating T<sub>FH</sub> cells may promote autoantibody production. These studies may lead to breakthroughs in understanding the causes of SLE and developing novel drugs.

### 3 LYMPHOMA-ASSOCIATED MACROPHAGES HAVE AN IMMUNOSUPPRESSIVE PHENOTYPE YET GOOD PHAGOCYTOTIC CAPACITY

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**Background:** The presence of tumor-associated macrophages has been reported to predict patient outcome in B cell lymphomas. Rituximab (anti-CD20) is one of the standard therapies for B cell lymphomas. Because rituximab kills lymphoma cells through effector macrophages, it is important to characterize lymphoma-associated macrophages for effective therapy.

**Objectives:** To characterize lymphoma-associated macrophages in terms of immune response and phagocytic capacity in the presence or absence of rituximab.

**Methods:** Monocytes from the blood of healthy donors were induced to differentiate into macrophages (normal macrophages, nM $\phi$ ). Normal macrophages were cultured for an additional 72 h in B lymphoma cell-conditioned medium to generate tumor-associated macrophages (TAM $\phi$ ). The expression of the molecules involved in phagocytosis and immune response was examined on the protein and mRNA levels using fluorescence-activated cell sorting (FACS) staining and real-time polymerase chain reaction, respectively. In addition, the phagocytic capacity was compared between nM $\phi$  and TAM $\phi$  in the presence or absence of an anti-CD20 antibody (rituximab) using FACS analysis and microscopy.

**Results:** B lymphoma cells switched cocultured macrophages to immunosuppressive/tolerogenic phenotype by altering the expression of T cell costimulatory and coinhibitory molecules. However, lymphoma-associated macrophages have better phagocytic capacity than normal macrophages with anti-CD20.

**Conclusions:** Reversing the immunosuppressive/tolerogenic phenotype of lymphoma-associated macrophages could improve B cell lymphoma therapy.

### 4 HOST BONE MARROW CELLS PARTICIPATE IN TUMOR VESSEL FORMATION THAT SUPPORTS COLON CANCER CELL GROWTH

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**Background:** Infiltrating cells, especially endothelial progenitor cells, play an important role in hypoxia-triggered tumor vasculogenesis. However, the homing mechanisms of these cells to tumors are still unclear.

**Objectives:** Using a major histocompatibility complex-matched green fluorescent protein (GFP<sup>+</sup>) bone marrow (BM) transplantation model, we investigated the recruitment of infiltrating cells in human colon cancer xenograft.

**Methods:** BM cells from GFP<sup>+</sup> donor mice were transplanted into lethally irradiated nonobese diabetic/severe combined immunodeficiency mice, which are nongreen and deficient in natural killer cells and lymphocytes. After 4 weeks of engraftment, the recipient mice were inoculated with human colon cancer cell line HT-29 cells in the presence or absence of stromal cell line HK cells. Two to four weeks after tumor cell injection, mice were sacrificed and tumors were extracted. Tumors were evaluated using immunohistochemistry, and the enzyme-digested tumor cells were analyzed by flow cytometry. BM-derived cells were identified by GFP<sup>-</sup> and colon cancer cells by CD326 expression.

**Results:** GFP<sup>+</sup> cells were found in the tumor, indicating the migration of BM cells to the colon cancer tumor site. Colocalization of GFP and CD31 demonstrated that endothelial cells were derived from BM. The coinoculation of stromal cells with tumor cells increased the CD31<sup>+</sup> cells' infiltration to tumor sites and enhanced tumor formation. The inhibitor specific to stromal cell-derived factor-1 (SDF-1) reduced this infiltration.

**Conclusions:** Stromal cells recruit more endothelial cells from BM to the tumor site and accelerate tumor growth, which is partially mediated by SDF-1 signaling. Targeting the signal from stromal cells may have therapeutic potential.

**5 INCREASED COLLAGEN PER SE MAY NOT AFFECT LEFT VENTRICULAR FUNCTION IN SPONTANEOUSLY HYPERTENSIVE RATS**

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**Background:** Left ventricular fibrosis is considered to participate in the development of cardiac dysfunction in various conditions (hypertension, aging, etc). Because cardiac myocytes are also affected in these conditions, it is difficult to define quantitatively the role of fibrosis.

**Objectives:** We hypothesized that by inducing myocardial collagen accumulation via treatment with an inhibitor (doxycycline) of matrix metalloproteinases—which, by itself, should not affect cardiac myocytes—we may examine a more specific role of fibrosis in cardiac dysfunction.

**Methods:** To this end, adult male spontaneously hypertensive rats were divided into 2 groups. The control group received no treatment; the second group was given doxycycline (30 mg/kg/d) for 6 months. Arterial pressure, pulse wave velocity, indices of heart function (end-diastolic pressure, maximal rates of pressure rise and fall: dP/dT maximum and dP/dT minimum, diastolic time constant: Tau), weight indices, and myocardial collagen concentration were determined at the end.

**Results:** The results demonstrated that treatment with an inhibitor of matrix metalloproteinases induced ventricular collagen accumulation, as indicated by increased ventricular hydroxyproline concentration. However, arterial pressure, aortic stiffness (pulse wave velocity), and heart function were unaffected.

**Conclusions:** These findings suggest that moderate collagen accumulation does not by itself adversely affect cardiovascular function and that changes in collagen properties (eg, formation of advanced glycation end-products) may be responsible for the adverse effects of myocardial fibrosis.

**6 LOSS OF INSULIN SIGNALING ACCELERATES VASCULAR SMOOTH MUSCLE CELL PROLIFERATION AND MIGRATION THROUGH REGULATION OF P27<sup>KIP1</sup>**

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**7 INTRACELLULAR ENHANCED CYAN FLUORESCENT PROTEIN/ANGIOTENSIN II DOES NOT MODIFY ANGIOTENSINOGEN ACCUMULATION IN TRANSGENIC MICE**

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**Background:** We have shown enhanced cyan fluorescent protein/angiotensin II (ECFP/Ang II) transgenic (Tg) mice display elevated blood pressure and kidney thrombotic microangiopathy; mouse Lines A and D differ in transgene copy number. Angiotensinogen (AGT) levels were compared in homozygous (HO) and corresponding wild type (WT) littermates in the kidney, liver, and brain.

**Objectives:** This study was designed to evaluate the effect of intracellular ECFP/Ang II on AGT mRNA and protein levels in ECFP/Ang II Tg mice.

**Methods:** Total mRNA was extracted and purified with the Qiagen RNeasy kit. Proteins were extracted by homogenization in Invitrogen Tissue Extraction Reagent I buffer. Northern blots for angiotensinogen mRNA and control 18S ribosomal RNA were performed.

**Results:** Densitometric results from Northern blots showed that liver mRNA levels were an average of 12-fold greater than brain or kidney levels in both Lines A and D with no quantifiable differences between WT and HO Tg mice. Immunoblots for AGT protein levels were evaluated together with actin and tubulin controls. Liver AGT protein levels were 32-fold greater than brain or kidney levels with no observed difference between WT and HO organs.

**Conclusions:** Transgene expression does not alter AGT mRNA or protein levels in the kidneys, livers, and brains of Tg mice. The altered blood pressure and kidney thrombosis observed in these Tg mouse lines are not the result of increased intracellular AGT synthesis and corresponding resultant increases in free extracellular angiotensin II. This finding is consistent with our published studies of these Tg mouse lines, which indicate no increase in circulating Ang II by radioimmunoassay.

## 8 CELL PENETRATING PEPTIDES CORRESPONDING TO THE ANGIOTENSIN II TYPE 1A RECEPTOR CARBOXY-TERMINUS REDUCE RECEPTOR ACCUMULATION AND CELL SURFACE EXPRESSION

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**Background:** Our previous published studies have established the  $\gamma$ -aminobutyric acid (GABA) receptor-associated protein (GABARAP) as a trafficking protein for the angiotensin II type 1A receptor (AT<sub>1</sub>R). GABARAP overexpression increases both AT<sub>1</sub>R protein accumulation and translocation to the plasma membrane. Our present study was designed to test the inhibitory effects of decoy peptides, corresponding to the 7th transmembrane proximal region of the AT<sub>1</sub>R cytoplasmic domain, upon receptor expression and plasma membrane accumulation. This region is implicated in binding to the trafficking protein, GABARAP.

**Objectives:** This competitive binding study was designed to test the potential of this approach to serve as a therapeutic tool to reduce AT<sub>1</sub>R levels and modulate blood pressure and cellular growth.

**Methods:** AT<sub>1</sub>R and GABARAP plasmids were transfected into mammalian cell lines together with cell penetrating peptides (CPPs). CPP-1 and CPP-2 consist of the penetratin (pANT<sup>43-58</sup>) CPP with downstream fusions of GKKFKKYFLQL (AT<sub>1</sub>R) and GKKFEEAFLQL (AT<sub>1</sub>R-mutant) amino acids, respectively. CPP-3 is the HIV TAT<sup>48-60</sup> CPP with GKKFKKYFLQL (AT<sub>1</sub>R) fused downstream. Western blot and three-dimensional deconvolution microscopy experiments were employed.

**Results:** Immunoblots and live cell deconvolution microscopy demonstrated that CPP-1 and CPP-3 blocked GABARAP-induced intracellular AT<sub>1</sub>R accumulation by approximately 6.7-fold and cell surface accumulation by approximately 3.8-fold. The control peptide, CPP-2, had no significant effect on AT<sub>1</sub>R.

**Conclusions:** In the present study, cell penetrating inhibitory decoys that were designed to block GABARAP:AT<sub>1</sub>R interaction effectively reduced AT<sub>1</sub>R intracellular accumulation and cell surface trafficking. The binding interaction site between AT<sub>1</sub>R and GABARAP represents a potential effective therapeutic target.

## 9 COMPARISON OF 3 ETEST METHODS AND TIME-KILL ASSAY FOR DETERMINATION OF *IN VITRO* ANTIMICROBIAL SYNERGY AGAINST MULTI-DRUG RESISTANT BACTERIA

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**Background:** Increasing antimicrobial resistance makes *in vitro* synergy testing important, but there is a lack of a gold standard for such testing. Time-kill assay (TKA) is commonly used, but Etest methods are faster and easier to perform.

**Objectives:** To compare results from 3 Etest synergy methods with TKA.

**Methods:** Thirty-one clinical genetically unique multi-drug resistant bacteria were synergistic by TKA ( $\geq 2 \log_{10}$  decrease in CFU/mL at 24 h by the antimicrobial combination compared to the most active single agent) with different antimicrobial combinations: 7 *Klebsiella pneumoniae* (KP), 6 *Stenotrophomonas maltophilia* (SM), 8 *Acinetobacter baumannii* (AB), and 10 *Enterococcus faecium* (EF). The following combinations were tested: KP-meropenem (MICs 16 to  $> 32 \mu\text{g/mL}$ ) + polymyxin B (MICs 1-2  $\mu\text{g/mL}$ ); SM-levofloxacin (MICs  $> 32 \mu\text{g/mL}$ ) + meropenem (MICs 0.38-24  $\mu\text{g/mL}$ ); AB- meropenem (MICs 24 to  $> 32 \mu\text{g/mL}$ ) + polymyxin B (MICs 0.5  $\mu\text{g/mL}$ ); and EF-daptomycin (MICs 1-4  $\mu\text{g/mL}$ ) + rifampin (MICs 0.008 to  $> 32 \mu\text{g/mL}$ ). Synergy testing was performed by 3 Etest methods, each in triplicate: (A) direct overlay, (B) cross, and (C) MIC:MIC. The summation fractional inhibitory concentration ( $\sum\text{FIC}$ ) was calculated: synergy  $\leq 0.5$ . Mean  $\sum\text{FIC}$  was compared to the TKA for each isolate.

**Results:** Overall, synergy determination by Etest (including all organisms and antimicrobial combinations) showed the following agreement with TKA: Method A: 6/31 (19%), Method B: 5/31 (16%), and Method C: 23/31 (74%). Agreement of Etest with TKA varied by organism and antimicrobial combination.

**Conclusions:** Of the 3 Etest methods compared with TKA, the MIC:MIC method had the highest agreement for *in vitro* synergy (74%) and should be evaluated more extensively.

## 10 *IN VITRO* SYNERGISTIC ACTIVITY OF POLYMYXIN B AND MEROPENEM AGAINST CARBAPENEMASE-PRODUCING *KLEBSIELLA PNEUMONIAE*

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**Background:** Serious nosocomial infections (SNIs) due to multi-drug resistant carbapenemase-producing *Klebsiella pneumoniae* (KPC) are now problematic. Polymyxins are not always active *in vitro*. SNIs are frequently empirically treated with meropenem (MER) plus an additional antibiotic.

**Objectives:** To test polymyxin B (PB) + MER for *in vitro* synergy against KPC-producing *K. pneumoniae* using time-kill assay (TKA) and Etest.

**Methods:** Eleven genetically unique (by rep-PCR) multi-drug resistant clinical KPC-producing *K. pneumoniae* isolates were evaluated. MICs ( $\mu\text{g/mL}$ ) were PB 0.5-2, MER 16 to  $> 32$ . TKA was performed using 1,  $\frac{1}{2}$ , and  $\frac{1}{4}$  MIC for PB and  $1 \times$  MIC for MER at 0 h and 24 h. We performed the Etest method in triplicate.

**Results:** Etest showed synergy (summation fractional inhibitory concentrations [ $\Sigma$ FIC], 0.3-0.5) in 5/11 isolates or additivity ( $\Sigma$ FICs, 0.6-0.9) in 3/11 isolates totaling 8/11 (73%). TKA showed synergy in 7/11 (64%) isolates with all combinations of PB ( $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $1 \times$  MIC) + MER ( $1 \times$  MIC). Three isolates were indifferent by Etest ( $\Sigma$ FICs, 1.2, 1.4, 1.3) and TKA ( $-1.2$ ,  $-1.3$ ,  $0.2 \log_{10}$  change in CFU/mL after 24 h). The remaining isolate was additive by Etest ( $\Sigma$ FIC 0.8) and indifferent by TKA ( $0 \log_{10}$  change in CFU/mL after 24 h). Concordance between methods occurred in 10/11 (91%) isolates.

**Conclusions:** *In vitro* synergy/additivity with PB + MER against KPC-producing *K. pneumoniae* may or may not translate into *in vivo* benefit, but if it does, a lower dose of PB combined with MER might prove both efficacious and less toxic. Further testing with this combination should be performed against KPC-producing bacteria.

## 11 THE ROLE OF MESENCHYMAL STEM CELLS IN TUMORS

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**Discussion:** Currently, many promising clinical trials are using mesenchymal stem cells (MSCs) in cell-based therapies; however, clinical concerns are growing because MSCs are known to track to tumors and, once resident in the tumor microenvironment (TME), to support tumor growth and spread. We recently established that MSCs in the ovarian TME promoted tumor growth and favored angiogenesis. We also recently reported that distinct *ex vivo* priming of MSCs polarized them into a newly described antitumor MSC1 phenotype or the established protumor MSC2 phenotype. Moreover, we determined a distinct manner by which MSC1 and MSC2 affected tumor growth and spread when introduced in murine xenograft models of cancer. As hypothesized, MSC1 attenuated the growth of various tumors, while MSC2 promoted tumor growth and spread as determined by *in vivo* and *in vitro* assays. MSC1 and MSC2 resident in TMEs of various cancer types contributed to the secretion of different cytokines and chemokines. As a result, the migration potential of tumor cells was also differentially affected by MSC1 and MSC2. By providing a better understanding of the distinct contributions of tumor-resident MSCs, these studies should clarify and possibly resolve growing concerns of whether or not to use potentially tumor-supportive MSCs in clinical trials employing these cells.

**12 TRANSRECTAL INJECTION OF COLON CANCER CELLS IN A MURINE MODEL**

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**Background:** The literature has described multiple methods for using different parts of murine anatomy as colon cancer models. These include but are not limited to subcutaneous flank injection; laparotomy with direct injection into the colon or rectum, kidney, or liver; or via portal vein. Each method has its benefits as well as its limitations.

**Objectives:** Our aim was to prepare a model that would grow a tumor with the normal surrounding stromal cells of the rectum, while placing the mouse under as little physiologic stress as possible.

**Methods:** Using a combination of nude and nonobese diabetic/severe combined immunodeficiency mice and cells that were harvested from either the HT-29 cell line or human colon cancer specimens, we performed a transrectal injection into the rectal smooth muscle. The mice were first anesthetized with 2.5% isoflurane and then secured in a holding device. With the use of lubricated forceps, the anus was opened and the cells were injected into the rectal wall via a 30-gauge 20 µL syringe under loupe magnification.

**Results:** Sixteen mice grew rectal tumors that were directly adherent to the rectal wall. This was confirmed with hematoxylin and eosin staining. None of the mice developed any extraintestinal metastasis at the time of dissection.

**Conclusions:** Transrectal injection is a viable model. This model can be used with different modifications for multiple research purposes including targeted drug therapy, isolated stem cell injections, and evaluation of metastatic disease.

**13 AN *IN VIVO* MODEL USING PATIENT SPECIMENS TO EVALUATE THE EFFECT OF LYMPH NODE STROMAL CELLS ON COLORECTAL CANCER**

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**Background:** Lymph node (LN) metastasis is one of the strongest negative prognostic factors for colorectal cancer (CRC). It is unclear how this supportive LN microenvironment results in extranodal tumor recurrence despite appropriate treatment. A proper *in vivo* model is needed. We have previously shown that the addition of stromal cells to a small number of CRC cell line HT-29 cells allowed the development and growth of tumors in nude mice.

**Objectives:** To extend our observation in a CRC cell line to patient specimens and establish an *in vivo* model evaluating the effect of LN stromal cells on CRC.

**Methods:** Follicular dendritic cells were coinoculated with enzyme-digested single-cell suspensions of CRC patient specimens into nonobese diabetic/severe combined immunodeficiency mice, re-creating a humanized microenvironment similar to the LN, a common destination of CRC metastasis. We evaluated the morphology of patient specimens and their tumors from mice, as well as fluorescence-activated cell sorter analysis data for these tumor cell suspensions.

**Results:** Thirteen out of 36 injections of CRC cells ( $0.01-1 \times 10^6$  cells/site) formed tumors in the presence of stromal cells, while only 2 tumors formed in 36 cancer cell injections without stromal cells, suggesting that stromal cells play a key role in cancer cell survival, tumor initiation, and growth. The morphology of xerographs is similar to original tumors.

**Conclusions:** We have established an *in vivo* platform for testing novel agents against both CRC cells and LN microenvironmental factors. Closer scrutiny of LN microenvironmental factors will lead to a better understanding of extranodal CRC recurrence and, ultimately, to novel targeted therapies.

#### 14 PREGANGLIONIC PELVIC NERVE CRUSH RESULTS IN UNDERACTIVE BLADDER IN THE RAT

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**Background:** Underactive bladder (UAB) resulting from functional denervation is an unfortunate outcome of aging, central nervous system lesions, outlet obstruction, and neuropathic disease states. As a first step toward the development of effective therapies, we produced a preclinical UAB model in the rat using bilateral pelvic nerve crush (PNC).

**Methods:** Bilateral PNC was performed in 15 adult female Sprague Dawley rats under anesthesia. A clamp was used to crush each pelvic nerve for 30 seconds. Fourteen additional rats underwent sham PNC. The rats were divided into 3 groups of 5 and recovered 1, 2, and 4 weeks prior to cystometry under urethane anesthesia. Intermicturition interval, intercontraction interval (ICI), bladder contraction duration (BCD), and area under the curve (AUC) for both ICI and BCD were measured.

**Results:** One week following PNC, ICI was doubled. ICI AUC increased only by 33% due to decreased baseline pressures. Additionally, prothrombin time increased in the 2-week and 4-week PNC groups. These data demonstrate decreased afferent sensitivity and increased compliance, consistent with UAB in the PNC groups. By 4 weeks, no differences were seen in these measures, suggesting recovery of bladder function from PNC.

**Conclusions:** Bilateral PNC in the rat is a promising model of UAB, demonstrating both bladder and outlet dysfunction consistent with denervation. Future model development will include isovolumetric cystometry and concomitant external urethral sphincter electromyography testing to further elucidate the nature of this UAB model.

#### 15 PEROXYNITRITE HAS POTENT VASODILATOR ACTIVITY INDEPENDENT OF L-PEN

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**Background:** Peroxynitrite (PN) is a reactive oxygen species that is generated in the body by the rapid reaction of nitric oxide (NO) and superoxide. Although PN is reported to worsen pathologic disorders associated with oxidative stress and inflammation, beneficial biologic effects of this molecule have also been reported. PN has been reported to have vasodilator as well as vasoconstrictor properties that depend on the vascular bed studied. The mechanism by which PN relaxes vascular smooth muscle has been reported to involve the interaction of tissue constituents to form substances that act as NO donors.

**Methods:** In the present study, responses to PN were investigated in the pulmonary and systemic vascular beds of the intact-chest rat, and the hypothesis that formation of S-nitrosothiols is involved in the response to PN was examined in experiments with L-Penicillamine (L-PEN), a known PN scavenger.

**Results:** The present study showed that PN has significant vasodilator activity in the pulmonary and systemic vascular beds and responses to PN were not attenuated by L-PEN, whereas responses to sodium nitroprusside and nitroglycerin were markedly decreased.

**Discussion:** These data show that PN has potent vasodilator activity in the pulmonary vascular bed of the intact chest rat and provide evidence in support of the hypothesis that a PN interaction with S-nitrosothiols is not the predominant mechanism involved in mediating the vasodilator response.



**16 PULMONARY AND SYSTEMIC VASODILATOR RESPONSES TO THE SOLUBLE GUANYLYL CYCLASE ACTIVATOR, BAY 60-2770, ARE NOT DEPENDENT ON ENDOGENOUS NITRIC OXIDE OR REDUCED HEME**

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**Background:** BAY 60-2770 is a nitric oxide (NO)-independent activator of soluble guanylyl cyclase (sGC) that increases the catalytic activity of the heme-oxidized or heme-free form of the enzyme.

**Methods:** In this study, responses to intravenous (IV) injections of BAY 60-2770 were investigated under baseline and elevated tone conditions induced by the thromboxane mimic U46619; when NO synthesis was inhibited by L-NAME; when sGC activity was inhibited by ODQ, an agent that oxidizes the heme moiety on sGC; and in animals with monocrotaline-induced pulmonary hypertension.

**Results:** The IV injections of BAY 60-2770 under baseline conditions caused small decreases in pulmonary arterial pressure, larger decreases in systemic arterial pressure, and no change or small increases in cardiac output. Under elevated tone conditions during infusion of U46619, IV injections of BAY 60-2770 caused larger decreases in pulmonary arterial pressure, smaller decreases in systemic arterial pressure, and increases in cardiac output. Pulmonary vasodilator responses to BAY 60-2770 were enhanced by L-NAME or by ODQ in a dose that attenuated responses to the NO donor, sodium nitroprusside. ODQ had no significant effect on baseline pressures and attenuated pulmonary and systemic vasodilator responses to the sGC stimulator BAY 41-8543. BAY 60-2770 and sodium nitroprusside decreased pulmonary and systemic arterial pressures in monocrotaline-treated rats.

**Discussion:** The present data show that BAY 60-2770 has vasodilator activity in the pulmonary and systemic vascular beds that is not dependent on endogenous NO and is enhanced by ODQ, suggesting that the heme-oxidized form of sGC can be activated *in vivo* to promote vasodilation. These results show that BAY 60-2770 and sodium nitroprusside decreased pulmonary and systemic arterial pressures in monocrotaline-treated rats, suggesting that BAY 60-2770 does not have selective pulmonary vasodilator activity in animals with monocrotaline-induced pulmonary hypertension.

**17 COMBINATION IMMUNOTHERAPY FOR HIGH-RISK AND ADVANCED MELANOMA PATIENTS**

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**Background:** Patients with metastatic melanoma have poor outcomes. We hypothesize that combination immunotherapy can synergistically activate host immunity to generate an effective treatment option for patients at high risk of or with metastatic melanoma.

**Methods:** We completed a Phase 2 clinical trial of the HyperAcute Melanoma Vaccine (NLG-12036, NewLink Genetics) combined with pegylated interferon (PEG-Intron, Schering-Plough, Whitehouse Station, NJ). Trial design was 12 weeks, with the initial 4 weekly treatments consisting of NLG-12036 alone (intradermally) followed by 8 additional treatments of NLG-12036 + PEG-Intron (subcutaneously, 6 µg/kg). Trial endpoints include clinical response, overall safety, and correlative studies for antitumor effect.

**Results:** A total of 25 patients were enrolled, with 21 completing the trial. Of 16 stage IV patients, 3/16 were (18.7%) responders, 2 complete responders (CR), and 1 stable disease. An additional 3/16 patients had no evidence of disease (NED) after resection, and 10/16 patients developed progressive disease, with 4 deaths. For stage III patients, 5/9 remained NED and 4/9 died. Relapse-free interval ranged from 4 to 25 months. In correlative studies among evaluable patients, anti-αGal antibodies increased in 23/24 (median 17-fold, range 3-109). All patients (21/21) seroconverted to production of autoimmune antibodies with antityrosinase antibodies in 4/23 correlating with 1 CR. Vitiligo developed in 4/25, correlating with 2 CRs. Of the 25 patients, 17/25 (68%) remain alive, with a median survival of 20 months.

**Conclusions:** Combinatorial immunotherapy with NLG-12036 plus PEG-Intron shows clinical efficacy with tumor regression and concomitant immune activation. Optimization of dosing schedules and addition of other potentially synergistic agents should be explored to further enhance the benefit of this novel approach.

**18 EVALUATION OF THE 2010 SCIENCE-TECHNOLOGY-ACADEMICS-RESEARCH (STAR) SUMMER PROGRAM FOR HIGH SCHOOL STUDENTS**

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**Background:** STAR was created in 2005 to stimulate the interest of local high school students, particularly underrepresented minorities, in biomedical science and healthcare, with the ultimate goal of expanding the pipeline to careers in these fields. In 2010, the program was expanded by accepting 16 STAR Scholars, a 33% increase from the prior year. As in 2009, students from all 7 parish school districts in the greater New Orleans area were eligible to apply.

**Objectives:** To analyze the quality and effectiveness of the program as perceived by the students and determine if these parameters were affected by program expansion.

**Methods:** Students anonymously completed and submitted various survey instruments (preprogram, postprogram, postexperimental, and weekly surveys). Data from these surveys and the initial application forms were analyzed and compared to the responses from the 2009 class.

**Results:** Compared to the 2009 class, the 2010 class had a similar level of representation from public schools (43% vs 40%) but higher percentages of minority (75% vs 58%) and male (44% vs 25%) students. Interestingly, after completing the program, a significantly higher number of 2010 students expected to attain a medical degree (75% vs 33%). No significant differences were observed between the 2009 and 2010 cohorts with respect to their expectations and perceptions of the quality and value of the program.

**Conclusions:** The quality and effectiveness of the STAR program were not adversely affected by expansion to 16 student scholars.

**19 ROUTINE SURVEILLANCE VERSUS SYMPTOMATIC INVESTIGATION FOLLOWING COMPLETE RESPONSE TO TREATMENT IN LARGE B CELL LYMPHOMA**

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**Background:** Diffuse large B cell lymphoma (DLBCL) is the most commonly diagnosed non-Hodgkin lymphoma. Following complete response (CR), patients are monitored with routine imaging to monitor for relapse. However, emerging data indicate that surveillance radiologic imaging may not be necessary.

**Methods:** We reviewed all cases of DLBCL for which electronic medical records were available from the Ochsner tumor registry from January 2000 through December 2010. We included all patients who had a documented course of chemotherapy with or without radiation therapy and excluded patients who either were not treated or had their care transferred out of the Ochsner system.

**Results:** Review of the tumor registry showed 108 patients who had chemotherapy for DLBCL with or without radiation therapy. A total of 87 patients obtained a CR after chemotherapy (80.6%). Twenty patients with documented CR were later found to have relapse of lymphoma (23% relapse rate). Of the 20 patients with relapse, 11 patients (55%) were found to have relapse based on investigation of new symptoms, while 9 relapsed patients (45%) were found to have relapse based on routine surveillance imaging.

**Conclusions:** More than half of the patients who had relapse of DLBCL treated at Ochsner between January 2000 and December 2010 were found to have relapse based on new symptoms. This finding supports a growing body of evidence indicating that frequent routine radiologic surveillance after CR in treatment of DLBCL may not be necessary. Further studies need to be conducted.

**20 A SINGLE-CENTER EXPERIENCE OF SMALL BOWEL ADENOCARCINOMAS**

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## 21 EMBOLI PROTECTION DEVICES IMPROVE MICROVASCULAR BLOOD FLOW AFTER RENAL STENTING

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**Background:** Atheroembolism during renal artery stenting (RAS) has been implicated as a precipitating factor for worsening renal function resulting from the damage to the microvasculature. Use of a distal embolic protection device (EPD) during RAS has been shown to be safe, with capture of debris in a high percentage of cases. Angiographic renal frame counts (RFCs) have been shown to be an objective method to assess renal blood flow.

**Objectives:** We sought to measure RFC as a quantitative angiographic assessment to evaluate microvascular compromise by atheroembolism following RAS.

**Methods:** We retrospectively reviewed a control group of 30 consecutive patients (33 kidneys; 39% male) who underwent RAS without EPD and compared them to a study group of 33 consecutive patients (33 kidneys; 67% male) who underwent RAS with EPD using RFC measurement.

**Results:** The mean ages of the control and study groups were  $67.3 \pm 9.4$  years vs  $71.9 \pm 8.9$  years, respectively ( $P = .045$ ). The pre-stent and post-stent mean RFC for the control group was  $30.4 \pm 12.1$  vs  $23.7 \pm 9.9$ , respectively ( $P = .002$ ). For the study group, they were  $42.6 \pm 12.6$  vs  $28.3 \pm 9.2$ , respectively ( $P < .0001$ ). A larger improvement in renal blood flow, manifested by a greater reduction of the RFC ( $\Delta$  RFC)— $14.2 \pm 15.2$  vs  $6.7 \pm 11.7$ , respectively ( $P = .03$ )—was noted in the RAS with EPD group vs the control.

**Conclusions:** The use of an EPD following RAS significantly improved renal blood flow (lower RFC). These data suggest that a larger, controlled trial measuring the impact of EPDs on post-RAS renal function should be performed.

## 22 LEAN MASS INDEX INDEPENDENTLY PREDICTS MORTALITY IN STABLE CORONARY HEART DISEASE

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**Background:** Obesity is a risk factor for coronary heart disease (CHD). However, in cohorts of CHD, an obesity paradox exists in which obese patients have a better prognosis than leaner patients. This paradox is often examined by defining obesity based on body mass index (BMI). We evaluated whether the lean mass index (LMI) is an independent prognostic factor in CHD patients.

**Methods:** We calculated LMI in 570 consecutive patients with CHD following major CHD events and divided patients based on LMI into Low ( $n = 97$ ), Medium ( $n = 216$ ), and High ( $n = 257$ ). Total mortality was assessed by the National Death Index during a 3-year follow-up.

**Results:** Mortality was inversely related to LMI, being highest in the low LMI (10.3%;  $P < .0001$  vs High LMI;  $P = .003$  vs Medium LMI) and lowest in the High LMI group (2.7%). Intermediate mortality was demonstrated in the Medium LMI group (4.2%;  $P = .2$  compared with the High LMI.) In multiple logistic regression analysis, both low body fat (OR 0.90; CI 0.83-0.97) and low LMI (OR 0.75; CI 0.58-0.97) were independent predictors of mortality.

**Conclusions:** Both body fat and LMI independently affect mortality, with higher values being protective. More research is needed to determine an optimal body composition as well as the mechanisms behind this phenomenon.

**23 BODY COMPOSITION SURVIVAL IN STABLE CORONARY HEART DISEASE: IMPACT OF LEAN MASS INDEX AND BODY FAT IN THE OBESITY PARADOX**

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**Background:** In coronary heart disease (CHD), an inverse relationship between obesity, as determined by both body mass index (BMI) and percent body fat (BF), and subsequent prognosis has been demonstrated (the obesity paradox). However, few data exist on more detailed assessment of body composition, including the combined impact of lean mass index (LMI) and BF on prognosis in stable CHD.

**Methods:** We studied 570 patients with CHD following major CHD events, dividing them into Low (cutoff  $\leq 18.9$  kg/m<sup>2</sup> for men and  $\leq 15.4$  kg/m<sup>2</sup> for women) and High LMI, as well as Low (cutoff  $\leq 25\%$  men and  $\leq 35\%$  women) and High BF. Four groups were analyzed by total mortality over a 3-year follow-up by the National Death Index: Low BF/Low LMI (n = 62), High BF/Low LMI (n = 53), Low BF/High LMI (n = 179), and High BF/High LMI (n = 276).

**Results:** During the 3-year follow-up, mortality was highest in the Low BF/Low LMI group (15%), which was significantly higher than the other 3 groups (4.5% for Low BF/High LMI [P = .0001], 5.7% for High BF/Low LMI [P = .0025], and 2.2% for High BF/High LMI [P < .0001]). The High BF/High LMI group had significantly lower mortality than all other groups (P = .003 vs High BF/Low LMI; P = .03 vs Low BF/High LMI). In multiple logistic regression analysis, adjusting for age, gender, ejection fraction, and exercise capacity, high LMI (OR 0.75; CI 0.58-0.97) and high BF (OR 0.9; CI 0.83-0.97) were independent predictors of lower overall mortality.

**Conclusions:** In patients with CHD, both LMI and BF are independent predictors of mortality, with mortality being particularly high with low LMI and low BF, whereas mortality is lowest with high LMI and high BF. Further studies are needed to determine optimal body composition in primary and secondary prevention.

**24 BODY COMPOSITION AND MORTALITY IN PATIENTS WITH CORONARY HEART DISEASE: THE OBESITY PARADOX**

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**Background:** Despite the well-known adverse effects of obesity on almost all aspects of coronary heart disease (CHD), many studies of CHD cohorts have demonstrated an inverse relationship between obesity, as determined by both body mass index (BMI) and percent body fat (BF), on subsequent prognosis (the obesity paradox). To our knowledge, the combined effects of BMI and BF on prognosis in CHD have not been reported.

**Methods:** We studied 581 patients with CHD following major CHD events, who were divided into Low ( $< 25$  kg/m<sup>2</sup>) and High ( $\geq 25$  kg/m<sup>2</sup>) BMI, as well as Low ( $\leq 25\%$  men and  $\leq 35\%$  women) and High ( $> 25\%$  in men and  $> 35\%$  in women) BF as determined by the sum of the skin-fold method. Four groups were analyzed by total mortality over 3-year follow-up by the National Death Index: Low BF/Low BMI (n = 119), High BF/Low BMI (n = 26), Low BF/High BMI (n = 125), and High BF/High BMI (n = 311).

**Results:** During 3-year follow-up, mortality was highest in the Low BF/Low BMI group (11%), which was significantly (P < .0001) higher than the other 3 groups (3.9%, 3.2%, and 2.6%, respectively). Excluding 6 patients with underweight BMI  $< 18.5$  kg/m<sup>2</sup> who had 50% mortality, the results were similar (8.9% mortality in Low BF/Low BMI, P < .0001 compared with other groups). In multivariate logistic regression for mortality, when entered individually both high BMI (OR 0.79; CI 0.69-0.90) and high BF (OR 0.89; CI 0.82-0.95) were independent predictors of lower mortality.

**Conclusions:** Although both low BF and low BMI are independent predictors of mortality in patients with CHD, only those patients with combined low BF/low BMI appear to be at particularly high risk for mortality during follow-up. These results suggest that the obesity paradox is confined to the Low BF/Low BMI subgroups.

## 25 BODY FAT AND MORTALITY IN PATIENTS WITH CORONARY HEART DISEASE: THE OBESITY PARADOX IS ALL IN THE FAT

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**Background:** Although obesity is a risk factor for coronary heart disease (CHD), in cohorts of CHD, an obesity paradox exists in which patients with obesity have a better prognosis than leaner patients. We have demonstrated this obesity paradox using body mass index and percent body fat (BF), but only limited data are available on prognosis in CHD patients with various BF classifications.

**Methods:** We evaluated 581 consecutive patients with stable CHD and divided them based on Gallagher BF categories into Underweight (n = 12), Normal BF (n = 189), Overweight (n = 214), and Obese (n = 166). Total mortality was assessed by the National Death Index during a 3-year follow-up.

**Results:** Mortality based on Gallagher BF was U-shaped, being highest in the Underweight group (25%; P < .0001 compared to all other groups) and lowest in the Overweight group (2.3%). Intermediate mortality was demonstrated in the Normal BF group (6.4%; P = .02 compared with the Overweight group) and Obese (3.6%) group. In multiple logistic regression analysis, high BF was an independent predictor of lower overall mortality (OR 0.89; CI 0.82-0.95), and lower Gallagher class was an independent predictor of higher mortality (OR 0.46; CI 0.25-0.84.)

**Conclusions:** Based on Gallagher BF, an obesity paradox exists, with highest mortality noted in the Underweight and Normal BF categories, and the lowest mortality in those classified as Overweight. Greater emphasis needs to be directed toward percent BF to help understand this puzzling obesity paradox.

## 26 IMPACT OF OBESITY ON LEFT ATRIAL ENLARGEMENT: DOES LEFT VENTRICULAR GEOMETRY AND HYPERTROPHY MATTER?

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**Background:** Obesity has been identified as a strong independent determinant of left atrial enlargement (LAE). However, studies examining the independent association of obesity with LAE in relation to left ventricular (LV) mass and LV geometric patterns are lacking.

**Methods:** We evaluated 47,749 patients [29,181 nonobese (body mass index [BMI] < 30 kg/m<sup>2</sup>; age: 63.4 ± 16.2 years) and 18,568 obese (BMI ≥ 30 kg/m<sup>2</sup>; age: 58.6 ± 13.7 years)] with preserved ejection fraction to determine the significance of LV mass and geometric patterns in assessing the impact of obesity on LAE.

**Results:** Obese patients had significantly higher LAVi (left atrial volume index; 36.9 ± 13.9 vs 31.4 ± 13.6, P < .0001), LAE (6% vs 4%, P < .0001), LVMi (LV mass index; 45.3 ± 15.0 vs 34.1 ± 13.1, P < .0001), and (LV hypertrophy; 28% vs 11%, P < .0001) than the nonobese. Patients with LAE had higher BMI (31.5 ± 7.9 kg/m<sup>2</sup> vs 29.3 ± 6.9 kg/m<sup>2</sup>, P < .0001), obesity (51% vs 38%, P < .0001), LVMi (53.6 ± 18.9 vs 39.6 ± 13.8, P < .0001), and LVH (51% vs 16%, P < .0001). Patients with LVH had higher LAVi compared to patients without LVH but showed no difference in LAVi by obesity status. In multivariate analysis, to remove the confounding impact of LVMi, the association of obese vs nonobese patients with LAE was assessed separately in patients with normal or increased LVMi as well as by different LV geometric patterns. This analysis showed that a significant independent association of obesity with LAE was present only in patients without LVH or normal LVMi.

**Conclusions:** Although obesity, LAE, and LV geometry are closely linked, LV geometry significantly impacts the association between obesity and LAE.

27 ASSOCIATION OF LEFT VENTRICULAR GEOMETRY WITH LEFT ATRIAL ENLARGEMENT IN PATIENTS WITH PRESERVED EJECTION FRACTION

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**Background:** Left ventricular (LV) hypertrophy is a known independent determinant of left atrial (LA) size. However, controversy exists about whether LV geometric patterns are associated with LA enlargement (LAE).

**Methods:** We evaluated 47,865 patients with preserved ejection fraction to determine the relationship of LV geometry with LAE as determined by LA volume index (LAVi)  $\geq 34$  mL/m<sup>2</sup>.

**Results:** We identified abnormal LV geometry in 42% of patients, with concentric remodeling (CR) the most frequent abnormal LV geometric pattern (27%). LAE was identified in 27% of patients with associated higher prevalence of abnormal LV geometry (58% vs 37%,  $P < .0001$ ). Both LV mass index (LVMI) and relative wall thickness (RWT) were independent determinants of LAE ( $P < .0001$ ). LAVi and prevalence of LAE differ significantly by LV geometric patterns ( $P < .0001$ ), being greater in patients with CR, eccentric hypertrophy (EH), and concentric hypertrophy (CH) than in those with normal LV geometry, and also in patients with EH and CH compared with CR. Similarly, in multivariate analysis, compared to patients with normal LV geometry, those with CR, EH, and CH had progressively increasing independent associations with LAE; compared to CR, both EH and CH were related to LAE. However, LAE was unrelated to the type of LVH.

**Conclusions:** LAE assessed as increased LAVi is strongly associated not only with LVMI but also with RWT. Furthermore, LAE was common in patients with abnormal LV geometry and was independently associated with CR, EH, and CH compared with normal LV geometry. However, LAE was unrelated to the type of LVH.

28 AMONG SEVERAL SURFACE ECHOCARDIOGRAM MEASUREMENTS AND CLINICAL INDICATORS, ONLY TPEAK-TEND AND CORNELL VOLTAGE PREDICT APPROPRIATE IMPLANTABLE CARDIOVERTER DEFIBRILLATOR THERAPY IN PATIENTS WITH ISCHEMIC CARDIOMYOPATHY

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**Background:** Cardiomyopathy with a depressed left ventricular ejection fraction (LVEF) confers high risk for sudden cardiac death due to ventricular tachyarrhythmia, but further risk stratification within this population is needed. Echocardiography (ECG) markers of dispersion of ventricular repolarization—including Tpeak-Tend (Tpe), QTc, and Q-Tpeak—have been suggested as risk markers for ventricular arrhythmia. We assessed which variables and clinical indicators are most powerful for predicting arrhythmic events.

**Methods:** We prospectively evaluated 327 patients (79% male, age  $67 \pm 11$  years) with LVEF  $\leq 35\%$  (mean,  $23\% \pm 7\%$ ) and an implantable cardioverter defibrillator (ICD). Baseline clinical data were collected, and ECG measurements were taken using validated GE Healthcare algorithms. Tpe was corrected for heart rate via  $Tpe/\sqrt{RR}$  (abbreviated Tpec). Follow-up for appropriate ICD therapy for ventricular tachycardia or ventricular fibrillation was conducted via chart review and device interrogation.

**Results:** Over  $17 \pm 12$  months, 61 (19%) patients had appropriate ICD therapy. Univariable predictors of events were Tpec (mean  $108 \pm 23$  ms; 1.19 RR per 10 ms;  $P = .003$ ), QTc (mean  $460 \pm 38$  ms; 1.07 RR per 10 ms;  $P = .050$ ), and Cornell voltage (mean  $17 \pm 11$  mV; 1.03 RR per 1 mV;  $P = .009$ ). On multivariable analysis, Tpec and Cornell voltage remained significantly predictive (adjusted RR: 1.18 per 10 ms,  $P = .005$ , and 1.03 per 1 mV,  $P = .02$ , respectively) but QTc was no longer predictive ( $P = .78$ ).

**Conclusions:** In patients with left ventricular systolic dysfunction, Tpec and Cornell voltage each independently and powerfully predict appropriate ICD therapy. These factors may be helpful in identifying which patients are most likely to benefit from ICD implantation.

**29 INFLUENCE OF COMPLEMENT FACTOR H AND LOC387715 GENOTYPE ON OUTCOME OF FULL MACULAR TRANSLOCATION FOR AGE-RELATED MACULAR DEGENERATION**

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**Objectives:** To determine whether an association exists between complement factor H (CFH; Y402H) or LOC387715 (A69S) genotype and full macular translocation surgery (FMT) outcomes for neovascular age-related macular degeneration (AMD).

**Methods:** This was a retrospective analysis of 47 patients who underwent FMT for AMD. CFH and LOC387715 genotype were grouped and compared based on homozygous status. Subjects were also grouped by the total number of risk alleles they possessed. Group A had 0 or 1 risk allele, and Group B consisted of individuals who had 3 or 4 risk alleles. Visual acuity and ocular signs of AMD were recorded over the course of 1-4 years following surgery. Primary outcome was visual acuity change 1 year after surgery.

**Results:** The percentage of individuals who lost 3 or more lines of visual acuity at 1 year was higher in the LOC++ group (57% vs 10%) than the LOC-- group (P = .018). Additionally, the LOC++ group was more likely to experience clinical signs of AMD at 2 years postsurgery. Group B individuals were more likely to experience at least 1 measured clinical sign of AMD at 2 years postsurgery (P = .0004).

**Conclusions:** A higher frequency of patients who were homozygous for LOC387715 (A69S) experienced worse visual outcomes, which were seen in an allele dose-dependent manner. Those homozygous for CFH Y402H were overrepresented in the data, preventing statistical comparison to their low-risk homozygous negative counterparts. Finally, combined risk allele dose correlated to higher incidence of postoperative clinical manifestations of AMD.

**30 DOSE RESPONSE OF SELECTIVE LASER TRABECULOPLASTY FOR OPEN ANGLE GLAUCOMA**

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**Background:** Glaucoma is a leading cause of blindness, and lowering intraocular pressure (IOP) is the only effective means of treatment. The use of selective laser trabeculoplasty (SLT) to lower IOP is well accepted. However, the impact of varying total laser energy (TLE) is not well understood.

**Objectives:** To evaluate the response to SLT across a range of TLE in patients with glaucoma while ocular drug therapy was held constant over a 1-year period.

**Methods:** We performed a retrospective chart review of 43 patients to construct a dose-response function of TLE across serial IOP measurements.

**Results:** The average TLE utilized for SLT was 116.46 mJ (range 63.9-207.1 mJ). The average pretreatment IOP was 17.8 mmHg, and the average posttreatment IOP was 15.4 mmHg. A 2-factor repeated-measures analysis of variance demonstrated that SLT produced a significant decrease in IOP (2.4 mmHg). No significant difference in the degree of IOP change as a function of TLE was seen. Complications were self-limited and included 5 patients (11.63%) who experienced an IOP spike > 15%; this group received an average TLE of 183.72 mJ.

**Conclusions:** The IOP-lowering effect of SLT is independent across the range of TLE measured in this study. IOP spikes tend to occur when using TLE higher than 180 mJ per session. SLT across the range of TLE used in this study is a useful adjunctive therapy in patients with glaucoma who are not achieving target IOP with ocular drug therapy.

### 31 NO LIGHT PERCEPTION VISUAL ACUITY IN PATIENTS WITH EXUDATIVE AGE-RELATED MACULAR DEGENERATION

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**Objectives:** To determine the incidence of no light perception (NLP) visual acuity in patients with exudative age-related macular degeneration (ARMD).

**Methods:** A total of 9,017 exudative ARMD patients were seen at the Wills Eye Institute in Philadelphia from 1998 to March 2, 2009. The number of patients with NLP visual acuity was assessed with detailed chart review, fundus photography, fluorescein angiography, and optical coherence tomography. We considered and ultimately ruled out other possible causes of NLP visual acuity after performing a repeat examination.

**Results:** We found 5 cases of NLP visual acuity in patients with exudative ARMD, indicating an incidence of 0.06%. This population subset included patients who had received intravitreal injection of anti-vascular endothelial growth factor (VEGF) agents and those who did not: 3 and 2, respectively. All 5 patients possessed a 360° fibrous elliptical disciform scar surrounding both the macula and the optic nerve in the horizontal axis that was superior and inferior to the optic disc vertically.

**Conclusions:** The percentage of exudative ARMD patients who progress to NLP visual acuity is exceptionally low, 0.06%. In this small population, progression to NLP visual acuity occurred regardless of anti-VEGF agent administration. Finally, all cases possessed a distinct 360° fibrous elliptical disciform scar surrounding both the macula and the optic nerve, a newly described and unique posterior pole finding in exudative ARMD patients.

### 32 COLPOCLEISIS FOR ADVANCED PELVIC ORGAN PROLAPSE

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**Background:** Several apical prolapse repairs exist, but for advanced prolapse in older women who do not seek to preserve vaginal coital function, colpocleisis offers high anatomic success rates and patient satisfaction. We sought to characterize our experience with the procedure.

**Methods:** We performed a retrospective review of demographics, preoperative urodynamics, presenting symptoms, complications, and outcomes for patients undergoing colpocleisis from 11/2001 to 7/2010.

**Results:** We identified 53 patients, with mean age of 80 years (range 67-90 years), mean parity of 3.2 (range 0-11), mean body mass index of 25.6 kg/m<sup>2</sup> (range 18.9-33.7 kg/m<sup>2</sup>), and mean follow-up of 9.2 months. On history, 38 patients had incontinence: 8 stress (SUI), 8 urge, and 22 mixed. All were pelvic organ prolapse quantification stage 3 or greater or Baden Walker grade 3 or higher. Of these patients, 71.7% underwent total colpocleisis; 28.3% underwent Le Fort; and 56.6% underwent concomitant sling.

Complications included 1 patient requiring transfusion, 1 pulmonary embolus, 1 clot evacuation, and 1 cystotomy. In patients not undergoing sling, SUI persisted in 3 patients and occurred de novo in 2. Of these, 1 patient was treated successfully with sling and 1 with urethral bulking.

**Conclusions:** In a selected patient population, colpocleisis is safe and efficacious. Sling may be performed safely at the time of colpocleisis. De novo SUI may result from colpocleisis alone, and patients should be screened for occult SUI with their prolapse reduced to determine who will benefit from concomitant sling placement. In an aging patient population with an expected increase in demand for pelvic floor reconstruction, colpocleisis is a useful approach for the urologist.



### 33 HIGHER TESTOSTERONE LEVELS ARE NOT CORRELATED WITH BETTER SEMEN PARAMETERS IN INFERTILE MEN

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**Background:** Testosterone is a vital component of male reproduction. However, serum testosterone levels are extremely variable, with a wide range of normal values (300 ng/dL-1,000 ng/dL). It is not well understood how the variability of serum testosterone correlates with semen parameters.

**Objectives:** To examine the relationship between testosterone and semen characteristics in men with a normal serum testosterone.

**Methods:** We performed a retrospective chart review of 292 men presenting for an infertility evaluation at our institution between 2002 and 2009. All men had a morning serum testosterone drawn at presentation and at least one semen analysis performed within 30 days of testosterone measurement. Men were then grouped into low-normal testosterone (300 ng/dL-500 ng/dL) or high-normal testosterone (501 ng/dL-1,000 ng/dL). A total of 242 patients were in the low-normal group, and 50 were in the high-normal group. Average age was 34.9 years (range 14-61 years).

**Results:** The mean sperm concentration was 44.8 million/mL (95% CI; 38.3-51.2) and 36.4 million/mL (95% CI; 22.5-50.3) in the low-normal and high-normal groups, respectively. Mean ejaculate volume was 3.0 mL in each group. Average motility was 47.9% in the low-normal group and 48.5% in the high-normal group. Mean morphology (using strict criteria) was 7.8% in the low-normal group and 7.7% in the high-normal group. The difference in sperm concentration failed to reach statistical significance ( $P < .15$ ). None of the values compared was statistically significant.

**Conclusions:** In men with normal testosterone, no statistical difference existed between men with low-normal testosterone and those with high-normal testosterone with respect to their semen parameters.

### 34 CD133 AS A MARKER FOR LYMPH NODE METASTASIS

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**Background:** Colon cancer stem cells or tumor-initiating cells have been implicated in both the recurrence and metastatic spread of the disease. CD133 is a specific biologic marker that may be a marker of colon cancer stem cells. Data suggest that metastasis and recurrence are caused by stem cells that are resistant to chemotherapy. In our study, we link a specific cell marker (CD133) with the degree of lymph node involvement.

**Methods:** We isolated patient colon cancer samples via enzymatic digestion. CD133<sup>+</sup> cancer cells were detected by fluorescence-activated cell sorting (FACS) analysis using CD133-specific antibodies. The percentage of cancer cells that were CD133<sup>+</sup> was recorded and compared to the total number of viable cancer cells. The percentage of cells was then correlated to the number of lymph nodes present on final pathologic staging.

**Results:** We obtained 17 patient samples that contained enough viable tumor cells to perform FACS analysis. The percentage of CD133<sup>+</sup> cells ranged from 0.2% to 30.09%. Of the 17 patients, 7 had evidence of lymph node metastasis on final specimen: 4 patients had N1 disease, and 3 patients had N2 disease. The correlation coefficient was 0.6 ( $r = 0.6$ ) between the percentage of CD133<sup>+</sup> cells and the presence of positive lymph nodes.

**Conclusions:** The percentage of CD133<sup>+</sup> cells correlates with the development of lymph node metastasis. Further studies are being performed to determine whether this marker, as well as others, can give consistent prognostic information and may serve as biologic chemotherapeutic agents to help halt the spread and recurrence of colorectal cancer.

35 COLECTOMY AND MORTALITY RATES IN INFLAMMATORY BOWEL DISEASE: A NATIONWIDE ANALYSIS

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**Objectives:** To analyze nationwide adult ( $\geq 18$  years) inpatient data from 2002 to 2007 to determine statistical significant factors in colectomy and mortality rates for patients presenting with fulminant inflammatory bowel disease.

**Methods:** This is a cross-sectional retrospective study using hospital discharge data from the US Nationwide Inpatient Sample from 2002 to 2007. We analyzed patient admission characteristics. We identified 161,903 and 95,201 discharged patients with Crohn disease (CD) and ulcerative colitis (UC), respectively, as identified by International Classification of Diseases-9 code. The primary outcomes were inpatient colectomy (total or partial) and mortality rate. Risk factors specific to UC (*Clostridium difficile* infection and proximity of colitis) were also analyzed.

**Results:** Discharges of patients with CD and UC increased from 2002 to 2007 by 24.3% and 25.4%, respectively. Overall inpatient mortality of patients with CD and UC remained relatively constant during this period, at 0.89% and 1.79%, respectively. Mortality rate for UC patients with inpatient colectomy was nearly 4 times greater than for patients who did not have a colectomy. Procedure rates (either partial or total colectomy) associated with CD and UC decreased by 13.7% and 22.8%, respectively. Patients with concomitant *C. difficile* infection were more likely to have a colectomy. Patients with pancolitis UC were 4 times more likely to have a colectomy compared to other types of UC (ileocolitis, proctitis), while patients with left-sided UC were 2 times more likely to have colectomy compared to other types of UC.

**Conclusions:** Colectomy rates for UC and CD have decreased with time; however, inpatient mortality has remained relatively constant over the past decade. Patients with pancolitis were more likely to have a colectomy performed compared to patients with less extensive presentations of disease. Demographic analysis suggests variability in colectomy rates based on region, ethnicity, age, gender, and hospital types.

36 PREDICTORS OF MORBIDITY AND MORTALITY AFTER PALLIATIVE RESECTION IN ASYMPTOMATIC STAGE IV COLORECTAL CANCER

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**Background:** Palliative resection in asymptomatic stage IV colorectal cancer (CRC) patients is controversial. Recent meta-analysis of retrospective data estimates a 6-month survival advantage for resection over chemotherapy alone.

**Objectives:** To identify prognostic indicators of 30-day mortality, morbidity, and long-term survival.

**Methods:** Retrospective data on patients with asymptomatic stage IV CRC resection were reviewed for age, gender, hypertension, coronary artery disease, congestive heart failure (CHF), respiratory disease, preoperative creatinine ( $\geq 1.8$  or  $< 1.8$  mg/dL), diabetes (DM), stroke, or smoking; T stage (T4, T1-3); N stage (N2, N0-1); tumor grade (poorly or well/moderately differentiated); and liver-only metastases. Morbidity was divided into medical (cardiac, pulmonary, or urinary—within 30 days) and surgical (reoperation, wound or bowel, anastomotic leak, abscess, bleeding, or fistula—within 6 months) complications. Predictive factors for 30-day mortality, 2-year survival, and morbidity were analyzed using log-rank test and Fisher's exact test.

**Results:** Overall morbidity was 35.9% (n = 154). Median survival was 19 months. Thirty-day mortality was 7.5% and associated with age  $\geq 70$  years (RR 3.57, 95% CI, 1.10-11.6) (P = .041) and N2 disease (5.18, 1.16-23.2) (P = .024). Poor long-term survival was associated with N2 disease (1.42, 1.09-1.85) (P = .013). Predictors of medical complications were age  $\geq 70$  years (4.30, 2.01-9.21) (P = .0001) and CHF (2.9, 1.24-6.80) (P = .049). Predictors of surgical complications were T stage (2.14, 1.19-3.88) (P = .018) and DM (0.19, 0.03-1.32) (P = .04). Log-rank test comparing survival in N2 vs N0-1 disease indicated a statistically significant difference (P = .013); median survival of 17 vs 25 months, respectively.

**Conclusions:** Despite 30-day mortality of 7.5%, resection long-term survival compares favorably to chemotherapy alone. Surgery is reasonable for younger patients without advanced nodal disease.

## 37 THE EXPERIENCE OF LIGATION OF THE INTERSPHINCTERIC FISTULA TRACT (LIFT)

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**Background:** Fistula-in-ano is the chronic sequela of anorectal abscess, characterized by cyclical drainage and pain. Parks classified fistulas by relation to the anal sphincters. Complex fistulas are less common (crossing more than 30%-50% of the external sphincter, anteriorly in females, multiple tracts, recurrent, occur with incontinence, previous irradiation, or Crohn disease). Their treatment is more difficult, with higher risk of incontinence. Treatment aims to prevent recurrent infection and drainage while maintaining sphincter integrity, but it is fraught with recurrence and incontinence. Commonly used treatments are fistulotomy, tract debridement, setons, fibrin-glue injection, fistulectomy, and advancement flaps. Rojanasakul described the LIFT procedure in 2007. The fistula tract is identified, isolated, and divided in the intersphincteric groove, making alterations in continence unlikely. Few studies have evaluated LIFT.

**Objectives:** To evaluate outcomes and complications of LIFT.

**Methods:** We performed a retrospective review of LIFT cases performed at Ochsner from October 2008 to October 2010.

**Results:** A total of 19 patients underwent LIFT during the study period (median age 47 years, range 25-80 years); 11 males, 8 females. Fifteen patients (79%) had complex fistulae; 16 patients (84%) had cryptoglandular disease, and 3 (16%) had Crohn, ulcerative colitis, or severe perineal trauma. Six (32%) had previous surgery for fistula-in-ano (excluding drainage procedures or setons). Median follow-up was 3 months (range 17 days to 23 months). Successful healing occurred in 13/19 patients (68%). Six (32%) had recurrence; all had or will undergo further surgery. All recurrences except one were in complex fistulae. No incontinence occurred.

**Conclusions:** LIFT is a safe, simple procedure with virtually no risk of incontinence.

## 38 CECAL INTUBATION AS QUALITY INDICATOR OF COLONOSCOPY

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**Background:** Several colonoscopy metrics have been evaluated in the literature: documentation of cecal intubation, polyp detection, and procedure time.

**Objectives:** This study is a retrospective analysis of patients who underwent colonoscopies by the colon and rectal surgeons to evaluate if cecal intubation is a quality metric for colonoscopy.

**Methods:** We evaluated all screening colonoscopies done in 2004 by 5 colon and rectal surgeons. Information about patient demographics, the number of polyps and adenomas detected, and whether the cecum was intubated was obtained from the colonoscopy report. The patients' charts were then investigated for follow-up colonoscopy and any cancers detected from 2004 to 2007.

**Results:** The average age of the 2,278 patients receiving screening colonoscopies was 61.98 years. Polyps were found in 497 (21.8%). The average number of polyps was 1.55, and the average number of adenomas was 0.96. In 2,211 (97.1%), the cecum was reached. Chi-square analysis found no difference in the 5 surgeons' rates of reaching the cecum ( $P = .2110$ ). Comparing adenoma detection to reaching the cecum, no statistical difference was seen ( $P = .1032$ ). However, we did find a difference in polyp detection rate and reaching the cecum ( $P = .0101$ ). Also, 40.85% of patients receiving screening colonoscopies had a repeat colonoscopy at our institution, and in 2 patients missed cancers were detected at 3 years. Both had colonoscopies that reached the cecum ( $P = .8069$ ).

**Conclusions:** Cecal intubation is a quality metric of colonoscopy. Two patients out of 2,278 (0.09%) had a missed cancer. Getting to the cecum is more important in polyp detection than adenoma detection.

### 39 PARASTOMAL HERNIA REPAIRS

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**Background:** Parastomal hernias are a common complication of any ostomy. The reported incidence varies with the type of ostomy. Multiple repair methods have been described, but none has thus far been proven to consistently prevent recurrence. We reviewed our experience with parastomal hernias: the risk factors associated with their development, the techniques used to repair them, and their rate of recurrence.

**Methods:** We performed a retrospective chart review of patients over age 18 years who had International Classification of Diseases-9 and Common Procedural Terminology codes for any procedure that would create an ostomy or repair a parastomal hernia from January 1999 through December 2009. Prognostic information included age, gender, steroid use, tobacco use, diabetes, body mass index, presence of an abdominal malignancy, type of repair relocation, primary repair, and the use and type of mesh. A chi-square analysis compared risk factors.

**Results:** Forty patients underwent at least one parastomal hernia repair during the 11-year period. Of those 40, 14 developed a recurrence, 52.5% were female, and ages ranged from 20 to 78 years. Sixteen patients had ileostomies, and 24 patients had colostomies. Of the factors reexamined, diabetes was the only one that reached statistical significance ( $P = .0045$ ). However, the use of biologic mesh compared to synthetic mesh approached significance ( $P = .053$ )

**Conclusions:** Parastomal hernias are a common complication. Our experience suggested that only the presence of diabetes altered recurrence. Larger studies are needed to evaluate the role of various mesh reinforcement.

### 40 DOES ENDOSCOPIC MONITOR SIZE MATTER?

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**Background:** High definition endoscopic monitors are touted as providing a better view for detecting polyps in colonoscopy.

**Objectives:** To investigate the value of high-definition (HD) (1080 hpi) vs standard-definition (SD) (480 hpi) monitors, the polyp and adenoma detection rates using each type of monitor were evaluated.

**Methods:** All screening colonoscopies performed from January 1, 2009, to June 30, 2009, by 5 colon and rectal surgeons were evaluated. Patient demographics, number of polyps and adenomas detected, cecal intubation rates, and type of monitor used were obtained from the colonoscopy report. To evaluate the role of eye strain and/or fatigue, we compared cases before 11 am to later cases for each type of monitor. Surgeon preference for type of monitor was questioned.

**Results:** In 1,609 screening colonoscopies, 857 (53.2%) patients were female, and 752 (46.8%) were male. The average age was 61 years. SD screens were used in 826 and HD screens in 783. Polyp detection between the SD and HD was 0.562 vs 0.55,  $P = .8196$ . Adenoma detection between SD and HD was 0.34 vs 0.324,  $P = .6728$ . There was no difference in time of day (before 11 am or 11 am and after) in polyp or adenoma detection rate ( $P = .3625$  and  $P = .8219$ , respectively). All surgeons preferred a HD monitor when given a choice.

**Conclusions:** Subjectively, the 5 endoscopists reported less eye strain with the HD monitor. However, the type of monitor used did not make a difference in polyp or adenoma detection rate.

**41 COLECTOMY RATES IN LOWER GASTROINTESTINAL BLEEDING**

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**Background:** Lower gastrointestinal bleeding (LGIB) rate is about 21 of 100,000 adult hospitalizations in the United States. Colectomy rates have been quoted as being 5%-10% per year. However, these data are from the era before interventional radiology (IR) became widely used.

**Objectives:** We hypothesize that the colectomy rate for LGIB is lower nationally than prior estimates and even lower in institutions with IR capabilities.

**Methods:** The Nationwide Inpatient Sample (NIS) database (part of the Healthcare Cost and Utilization Project) was used to identify admissions for LGIB from 2001-2005. Diagnostic codes (ICD-9) were used to identify LGIB, and Current Procedural Terminology codes were used to identify colectomies and IR. We related IR codes for aortogram/arteriogram and colectomy codes (partial and total) to the number of LGIB admissions. Also, we linked institutions with IR capabilities to colectomies.

**Results:** For LGIB, IR rates in 2001-2005 were 2.1%, 2.4%, 2.2%, 2.2%, and 2.3%. Surgery rates for all institutions for the same years were 3.3%, 3.2%, 3%, 3.2%, and 3%. Surgery rates for institutions with IR capabilities were 3.5%, 3.5%, 3.15%, 3.08%, and 5.4%.

**Conclusions:** The percentage of IR and colectomies stayed consistent over the 5 years. The rates of colectomies in hospitals with IR capabilities were 3% for 4 years and 5.4% for 1 year. This analysis confirmed that colectomy rates are lower overall than the generally quoted average of 5%-10% but surprisingly the same in hospitals with and without IR.

**42 HEPATORENAL INDEX AS AN ACCURATE, SIMPLE, AND EFFECTIVE TOOL IN SCREENING FOR STEATOSIS**

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**Background:** Hepatorenal index (HRI) has been reported in the past to be a sensitive and noninvasive test to quantify steatosis, but it is cumbersome and time consuming and requires specialized software.

**Objectives:** The aim of this study was to simplify HRI calculation and determine whether it is an effective tool for differentiating patients with and without steatosis, thereby eliminating the need for biopsy in a large portion of patients.

**Methods:** A total of 101 patients who had undergone ultrasound-guided percutaneous liver biopsy at our institution were selected from a patient database. Patients with renal disease or liver masses and patients whose livers and right kidneys were not included on the same image were excluded. Images were acquired with high-resolution ultrasound, and HRI was calculated based on a modification of methods established by Webb et al and Soder et al. HRI and the histologic fat percentage were compared.

Using freeware available online from the National Institutes of Health, we calculated HRI values for all patients. Our data showed a strong correlation between HRI and percentage of fat (0.71,  $P < .0001$ ).  $HRI \geq 1.34$  had a 92% sensitivity for identifying fat  $> 5\%$ , 62% specificity, 0.593 positive predictive value, and 0.93 negative predictive value. If this method had been used prospectively to select patients for biopsy in our sample, 41% of biopsies could have been avoided.

**Conclusions:** HRI is a simple, cost-effective, and accurate screening tool for identifying patients who should undergo liver biopsy. It should be used to avoid unnecessary liver biopsies.

#### 43 HEPATIC ARTERY ANGIOPLASTY AND STENTING IN POST-LIVER TRANSPLANT PATIENTS

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**Background:** Hepatic artery stenosis (HAS) and hepatic artery thrombosis (HAT) are serious complications of orthotopic liver transplantation (OLT). Graft loss after HAT is common and carries a mortality rate as high as 50%. Treatment of this complication has included surgical reconstruction of the hepatic artery (HA) and retransplantation. Recently, endovascular repair has played a prominent role at our institution.

**Methods:** Over 18 months, OLT patients with evidence of HAS were treated endovascularly. HAS was diagnosed using ultrasound criteria, including HA peak systolic velocities more than twice the initial posttransplant evaluation, resistive indices (RI) less than 0.5, and tardus parvus waveforms. Interventions included percutaneous transluminal angioplasty (PTA) or PTA with stenting (PTAS). Mean HA velocities and RIs were compared using a two-tailed *t* test.

**Results:** During the study period, 5 patients (3.1%) met criteria for HAS (mean follow-up 51 days [range 22-111 days]). Two patients underwent PTA, 2 underwent PTAS, and 1 patient had no stenosis on angiography. Both patients undergoing PTA developed restenosis within 2 weeks, requiring PTAS. Mean HA preintervention velocity was  $774 \pm 29.6$  cm/sec; post-PTAS mean HA velocity decreased to  $302 \pm 44.5$  cm/sec. Mean RI prior to intervention was  $0.40 \pm 0.03$ ; post-PTAS, mean RI was  $0.61 \pm 0.02$ . Tardus parvus waveforms resolved in every case. Differences were found in both HA velocity ( $P = .0001$ ) and mean RI ( $P < .0001$ ). Mean follow-up of 7 months (range 5-12 months) indicates no HAT and 100% graft survival.

**Conclusions:** Stenting hepatic artery stenosis in OLT patients provided excellent initial and mid-term results. Patients who underwent PTA alone had early restenosis. Endovascular therapy is an attractive alternative to traditional treatments.

#### 44 ANTI-HEPATITIS B POSITIVE DONOR LIVERS IN NAÏVE HEPATITIS B RECIPIENTS: 10 YEARS' EXPERIENCE

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**Background:** Use of livers from hepatitis B HBsAg-negative/anti-HBc-positive donors in naïve (anti-HBc-negative) recipients for orthotopic liver transplantation (OLT) is still controversial because of the lack of standard antiviral prophylaxis and long-term follow-up.

**Objectives:** To evaluate our 10-year experience using anti-HBc positive donor livers in naïve hepatitis B recipients.

**Methods:** Recipients received hepatitis B immunoglobulin (HBIG) during the anhepatic phase and then lamivudine daily; their immunosuppression was tacrolimus based. HBsAg and hepatitis B virus (HBV) DNA were tested periodically. De novo hepatitis B was defined by HBV DNA seroconversion.

**Results:** Between January 1999 and December 2010, 933 OLTs were performed. A total of 60 (6.4%) anti-HBc negative patients received an anti-HBc positive liver. All donor sera were negative for anti-HBc immunoglobulin M (IgM) and HBV DNA. Mean follow-up was 38.4 months (range 1-142 months). Seven of the 60 patients developed de novo HBV (11.7%). Mean time from OLT to de novo HBV was 13.8 months (range 10.8-92.8 months). De novo HBV was related to noncompliance with lamivudine in 2 patients, while YMDD mutation was detected in 3 of 5 compliant patients who developed de novo HBV infection. Recurrence was successfully treated with HBIG and/or adefovir/tenofovir. Overall patient survival at 1, 3, and 5 years was 93.3%, 86.8%, and 73%, respectively. No deaths were related to de novo hepatitis B.

**Conclusions:** Using our prophylaxis regimen, de novo hepatitis B occurs infrequently after transplanting anti-HBc positive donor livers into naïve recipients. Salvage therapies are effective for patients who develop de novo hepatitis B. Given the late risk of developing hepatitis B following transplantation with an anti-HBc positive liver, we recommend lifelong prophylaxis and surveillance.

**45 LIVER TRANSPLANT BILIARY MISMATCH: BILIARY TRANSPOSITION VS BILIARY DUCTOPLASTY**

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**Background:** Biliary complications remain a significant problem following liver transplantation.

**Methods:** We compared biliary transposition (T) to recipient biliary ductoplasty (D) in cadaveric liver transplant.

**Results:** A total of 22 reconstructions were performed. In the T group (n = 12), 5 reconstructions were performed using an internal stent (8 Fr pediatric feeding tube), and 7 were performed without. All 10 ductoplasties were performed without stents. Follow-up ranged from 2 months to 5 years. All patients were managed with standard immunosuppression and ursodiol. No patients in the T group required reoperation, 1 patient had an internal stent removed for recurrent unexplained leukocytosis, and 2 patients required endoscopic retrograde cholangiography and stent placement. There were 2 anastomotic leaks in the D group. Two patients required reoperation for biliary complications. All patients had improvement in biochemical markers of posttransplant biliary flow. There was no significant difference in biopsy-proven episodes of acute cellular rejection, recurrent hepatitis C, graft, or patient survival.

**Conclusions:** Our results indicate that biliary reconstruction can be performed with either biliary transposition or ductoplasty. These techniques are particularly useful when a significant mismatch in diameter exists between the donor and recipient bile duct.

**46 LESSONS LEARNED FROM THE INTRODUCTION OF A ROBOTIC-ASSISTED DONOR NEPHRECTOMY PROGRAM**

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**Background:** Robotic operations performed with the da Vinci Surgical System (Intuitive Surgical, Sunnyvale, CA) are increasing. The advantages include higher magnification with a 3-dimensional image, increased dexterity and maneuverability of the instruments, and decreased manipulation of adjacent tissues. We hypothesized that these advantages would make robotic-assisted donor nephrectomies safe with decreased pain leading to shorter lengths of stay.

**Methods:** From July 2009, all live kidney donor nephrectomies were performed using robotic assistance. Retrospective groups include the first and last 20 laparoscopic hand-assisted donor nephrectomies.

**Results:** A total of 42 live kidney donors underwent robotic-assisted donor nephrectomies. The average patient was 36 years old with a body mass index of 27.2 lbs/in<sup>2</sup>. Of the robotic-assisted donors, 6 were right kidneys and 8 had double arteries. The total average operative time was 2 hours, 30 minutes. Recipients of robotic-assisted donors had excellent graft function. Of the robotic-assisted patients, 26 were discharged on day 1, compared to only 10 of the laparoscopic patients. Because of the shortened length of stay, the average cost for the donor was decreased.

**Conclusions:** Our early results indicate robotic-assisted donor nephrectomies are safe and have low complication rates. Robotic assistance has allowed our program to use more donors with multiple vessels and right kidneys. We have reduced our donor costs by reducing the length of stay.

47 **BRONCHIAL BLOCKERS AS THE PRIMARY MODE OF LUNG ISOLATION IN AN ACADEMIC THORACIC SURGERY PRACTICE: A REVIEW OF 130 CASES**

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**Background:** One-lung ventilation (OLV) for thoracic surgery can be achieved with specialized endotracheal tubes (sETT) such as a double-lumen tube (DLT) or a Cohen bronchial blocker (CBB). However, less is known about comparative success rates and incidence of airway injury in a major medical center.

**Methods:** Following Institutional Review Board approval, we retrospectively reviewed the medical records of 130 patients who underwent thoracic surgery to determine the success rates of OLV with either type of sETT and the incidence of airway complications. Inclusive findings of the preoperative airway examination, history of prior difficult intubation, number of intubation attempts, type and size of sETT to achieve OLV, quality of lung isolation, events surrounding sETT exchange, incidence of airway complications, and duration of postoperative intubation were analyzed. Patients with a history of previous airway injury, established tracheostomy, or ongoing positive pressure ventilation were excluded.

**Results:** Lung isolation and OLV were 100% successful in 113/130 patients when a CBB was utilized and in 17/130 patients when OLV was achieved with a DLT. There were 4 reports of difficult sETT placement, in which 1 patient could only achieve OLV with a CBB (P = .3), 2 patients had tracheal injury, and 2 patients had postoperative hoarseness.

**Discussion:** Several factors may have contributed to these successful findings; only anesthesiologists experienced with the CBB were included in this study, and the thoracic surgeon was instrumental in furthering OLV success. The findings suggest that either type of sETT provides safe, effective care in patients undergoing OLV during thoracic surgery.

48 **DOES ENDOTRACHEAL TUBE SIZE AFFECT TIME TO EXTUBATION IN ADULT CARDIAC SURGERY?**

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**Background:** The decision of what size endotracheal tube (ETT) to use is based on the patient's size and direct laryngoscopy. Fast-track cardiac anesthesia brought attention to the benefits of early extubation. With regard to extubation times, no study has evaluated its relation to ETT sizes. We sought to determine if the size affects the time to extubation in patients having primary, nonemergent cardiac procedures using cardiopulmonary bypass.

**Objectives:** The primary objective for the study was to determine if ETT size affects time to extubation following surgery. Secondary objectives included time spent in the intensive care unit, reintubation rates, postoperative bleeding, and narcotic usage.

**Methods:** Retrospective study reviewing charts from 2005 to 2010. Medical records were screened for inclusion and exclusion criteria.

**Results:** Of the 650 patients reviewed, 142 (108 males, 34 females) met the inclusion and exclusion criteria, with 7 patients requiring 7.0 mm, 73 requiring 8.0 mm, and 60 requiring 9.0 mm ETTs (2 patients were excluded because their extubation times were outliers). Analysis showed no statistical association between time to extubation and ETT sizes (P = .47). Body mass index had no effect on time to extubation (P = .67). Additionally, midazolam, not fentanyl, had an effect on time to extubation: midazolam, 8.0 mm ETT (P = .03), 9.0 mm ETT (P = .003); fentanyl, 8.0 mm ETT (P = .18), 9.0 mm ETT (P = .16).

**Conclusions:** Interests in fast-track cardiac anesthesia have brought attention to decreasing the time to extubation following cardiac surgery. From our findings, there is no statistical difference in time to extubation among different ETT sizes. Moreover, body mass index does not affect the time to extubation, and midazolam dose, but not fentanyl, has a statistical association with time to extubation.



**49 AN ANALYSIS OF POSTOPERATIVE EPIDURAL ANALGESIA**

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**Background:** Regional analgesic techniques are commonly administered to control postoperative pain; studies have reported improved benefits in blocking the afferent spinal cord pathways with a combination of local anesthetic/opioid mixtures (LAOMs). Although a number of studies have reported benefits with LAOM, little is known about these LAOMs in a single-center institution.

**Methods:** Following Institutional Review Board approval, clinical data from all adult patients undergoing epidural catheter placement for postoperative analgesia were collected and evaluated from July 1, 2009, to the present. Data included patient demographics and types of LAOM utilized, postoperative pain levels at rest and with activity, peripheral neurologic function, and side effects (respiratory depression, nausea/vomiting, pruritus, hypotension, sedation, back pain, headache, and urinary retention).

**Results:** Preliminary findings suggest that although all six LAOMs provide comparable analgesia scores at rest and with activity on postoperative days 1 through 3 (rest: P = .78, .87, and 0.96, respectively; activity: P = .74, .60, and .27, respectively), the presence of aggregate side effects was higher with the use of hydromorphone (70%) as the opiate and with a higher dose (5 mcg/cc) of fentanyl (75%) (P = .64, .69, and 0.37, respectively). In contrast, LAOMs demonstrated no significant findings of sensory or motor block (P = .35, .26, and .63, respectively).

**Discussion:** These data suggest that the six LAOMs provide safe, effective postoperative epidural analgesia but that the long-acting opiate hydromorphone and the higher dose of fentanyl (5 mcg/cc) are clinically different in that they require additional healthcare services and pharmaceuticals to manage aggregate side effects.

**50 PLEDGETED REPAIR OF LARGE HIATAL HERNIA PROVIDES EXCELLENT LONG-TERM RESULTS**

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**Background:** Primary repair of large hiatal hernias avoids complications associated with mesh repair. Few papers address the long-term follow-up of patients undergoing pledgeted primary repairs.

**Objectives:** To evaluate the long-term results of pledgeted primary repair of large hiatal hernias.

**Methods:** We retrospectively reviewed laparoscopic antireflux procedures at Ochsner Clinic Foundation from November 1997 to October 2006 (380 cases). Inclusion criteria were primary crural closure with pledgets and large hiatal hernia, defined as greater than one-third of the stomach intrathoracic by barium swallow, greater than 5 cm in length endoscopically, or greater than one-third of the stomach intrathoracic operatively. Patients were contacted by telephone and were administered the Modification of Reflux Symptom Index (MRSI) and Quality of Life Scale for Gastroesophageal Reflux Disease (QLSGR) questionnaires.

**Results:** A total of 89 patients met the inclusion criteria. Mean follow-up was 161 days. On the most recent clinic visit, 62% of patients were asymptomatic. Symptoms included dysphagia (16%), reflux/emesis (5%), bloating (5%), nausea (4%), and epigastric pain (4%). Six (6.7%) hiatal hernias recurred, 5 of which were symptomatic. Average time to recurrence was 24.5 months.

In the telephone interview, 29/89 (33%) completed the questionnaire, with a mean follow-up of 69.7 months (range 31-137 months). Average MRSI score was 12 (maximum possible 45). Average QLSGR was 12 (maximum possible 45). Of respondents, 82.7% were satisfied or very satisfied with their present condition.

**Conclusions:** Laparoscopic primary repair of large hiatal hernias provides excellent long-term results. On last clinic visit, 62% of patients were asymptomatic and 83% were satisfied or very satisfied. Recurrence was low (6.7%).

## 51 ARTHROSCOPIC MANAGEMENT OF INTRAARTICULAR HIP PATHOLOGY: A PROSPECTIVE COHORT STUDY

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**Background:** Recent advances in diagnostic imaging and clinical evaluation tools have expanded our understanding of intraarticular hip pain and pathologies. Hip arthroscopy has emerged as a useful tool for evaluating and treating intraarticular hip pathology.

**Objectives:** To report the initial results of hip arthroscopy in a prospective cohort.

**Methods:** All patients undergoing hip arthroscopy at our institution have been prospectively assessed with the visual analog pain scale, Harris Hip Score, and Short Form (SF)-12 quality of life assessment preoperatively and then postoperatively at 6 weeks, 3 months, 6 months, and 12 months.

**Results:** Between February 2008 and February 2010, 55 patients (58 hips) underwent hip arthroscopy at an academic medical center by one surgeon. Follow-up data were available for 37 patients. The predominant diagnosis was femoroacetabular impingement (FAI) with associated labral pathology. Procedures performed included labral debridement (17/37), labral repair with acetabular rim trimming (19/37), femoral neck osteoplasty (36/37), psoas tenotomy (9/37), and ligamentum teres debridement (8/37). Average visual analog pain scores improved from 8.1 preoperatively to 2.1 and 2.5 at 6 weeks and 6 months postoperatively, respectively. Average Harris Hip Score improved from 58 preoperatively to 81 and 82 at 6 weeks and 6 months postoperatively, respectively. Harris Hip data demonstrated superior functional outcomes for labral repair (75) versus debridement (62) at final follow-up. Subjectively, SF-12 data improved at each follow-up visit.

**Conclusions:** Hip arthroscopy for the treatment of intraarticular hip pathology, particularly FAI, can produce substantial clinical improvements. Superior functional outcomes have been observed in those who undergo labral repair versus debridement.

## 52 FEASIBILITY STUDY ON COLLECTION, STORAGE, AND ANALYSIS OF PRETERM BREAST MILK IMMUNE FACTORS

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**Background:** Human milk provides immune protection for preterm infants. When preterm infants weighing  $\leq 1,500$  g consume their mothers' milk, they experience shorter lengths of stay and lower incidence of nosocomial infections and necrotizing enterocolitis than formula-fed infants. Maternal physical characteristics are predictors of immune components in milk. Perceived stress is linked to suppressed innate and adaptive immune responsiveness as well as preterm birth. Maternal stress may be transmitted to preterm infant immunity through altered human milk immune components.

**Objectives:** To evaluate the relationships between maternal and infant characteristics, perceived stress, and human milk cytokines.

**Methods:** A convenience sample of mothers of infants weighing  $\leq 1,500$  g meeting inclusion criteria was used. Milk samples were collected on postdelivery day 7. Samples were frozen and then shipped for analysis. The Perceived Stress Scale and a survey to determine mothers' feelings about participation in this study were also collected on day 7 after delivery.

**Results:** All 10 patients consented to the study, and all would recommend participation in like studies. Maternal age negatively correlated with milk interferon (IFN)- $\gamma$  ( $r = -.710$ ,  $P = .032$ ), and weeks of gestation negatively correlated with interleukin (IL)-10 ( $r = -.845$ ,  $P = .004$ ) and tumor necrosis factor (TNF) ( $r = -.685$ ,  $P = .042$ ). Confidence in handling problems correlated with milk INF- $\gamma$  ( $r = .689$ ,  $P = .04$ ) and controlling irritations correlated with IL-10 ( $r = .690$ ,  $P = .04$ ), IL-6 ( $r = .685$ ,  $P = .042$ ), and TNF ( $r = .674$ ,  $P = .047$ ). Lack of control negatively correlated with milk INF- $\gamma$  ( $r = -0.741$ ,  $P = .022$ ).

**Conclusions:** Perceived maternal stress may influence the balance of milk cytokines. Subsequent studies should also examine the relationships between human milk cytokines and preterm infant outcomes.

## 53 GLYCEMIC VARIABILITY AS A PREDICTOR OF HYPOGLYCEMIA

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**Background:** Severity of sepsis correlates with hyperglycemia and severe hypoglycemia. Hypoglycemia is more common in diabetics with increased glycemic variability (GV), as measured by continuous glucose monitoring, suggesting a role for GV in the prediction of severe hypoglycemia.

**Objectives:** To characterize the effects of GV on morbidity and mortality in patients with sepsis for the purpose of predicting hypoglycemia via routine blood glucose (BG) monitoring.

**Methods:** The study design involved a retrospective cohort study in an academic tertiary care hospital. Subjects were selected from 470 adults consecutively admitted to noncritical care units during 2009 with a primary diagnosis of septicemia and secondary diagnosis of hyperglycemia. A total of 41 patients, with mean age of 65 (range 36-91 years), met inclusion criteria. GV was measured by averaging the first 10 BG measurements taken routinely by point-of-care testing during the first 48 hours of hospitalization, thus capturing fasting and interprandial glucose excursions. The standard deviation (SD) and coefficient of variation (CV) of the BG values were obtained for each subject. CV (SD corrected for BG mean) was used as the marker for increased individual GV. Outcomes measured were mortality, hyperglycemia (BG > 300 mg/dL), hypoglycemia (BG ≤ 70 mg/dL), severe hypoglycemia (BG < 40 mg/dL), length of stay, transfer to intensive care, and 30- and 60-day readmission.

**Results:** Subjects were grouped by statistically significant GV ranges (P = .0001) for analysis, representing high, moderate, and low GV. None of the 41 patients died, were transferred to intensive care, or suffered severe hypoglycemia. Readmission rates and length of stay were higher than those for other medicine patients but did not significantly differ among groups. Hypoglycemia occurred in 50% of patients with high GV compared to 9% to 10% of patients with low or moderate GV. The patients with greatest GV were previously diagnosed with diabetes.

**Conclusions:** Increased GV (high SD and CV < 3) is associated with increased hypoglycemia and potentially predictive of hypoglycemia in patients with diabetes and sepsis admitted to general medical units.

## 54 A STUDY OF THE EFFECTS OF THE DIABETES BOOT CAMP ON MEASURES OF DIABETIC CARE IN AN INTERNAL MEDICINE CLINIC

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**Background:** Diabetic patients should receive self-management education to improve self-care and quality of life but are frequently unable to attend such programs because of the time commitment required.

**Objectives:** This retrospective study sought to determine if the Diabetes Boot Camp—a novel 2-hour intensive educational program by a multidisciplinary team—was effective in lowering mean hemoglobin A1c (HbA1c) levels in diabetic patients when compared to the standard of care.

**Methods:** The Diabetes Boot Camp population was defined as all those diabetic patients referred to the clinic from the 10 physicians who sent the most patients to the clinic from July 2009 through July 2010. A control population was randomly selected from these same physicians' diabetic patients as identified in the Ochsner primary care diabetes database during the same period. Preintervention and postintervention HbA1c measurements on the same patients in both groups were then analyzed. Subpopulations studied included those with HbA1c ≥ 9% and those with HbA1c < 9%.

**Results:** The Diabetes Boot Camp group (n = 121) showed a mean decrease in HbA1c of 1.25% versus 0.11% in the control group (n = 95) (P < .0001). The subgroup of patients with HbA1c values ≥ 9% showed improvements in HbA1c from 11.02% to 8.24% in the intervention group versus 10.89% to 10.16% in the control group. The differences in mean HbA1c in both subpopulations when compared to control were significant (P < .0001).

**Conclusions:** An intensive 2-hour multidisciplinary diabetes clinic demonstrated significant improvements in glycemic control as measured by HbA1c when compared to standard treatment.

**55 A STUDY OF THE COLLATERAL EFFECTS OF TARGETED HEMOGLOBIN A1C INTERVENTIONS ON IMPROVEMENT IN LOW-DENSITY LIPOPROTEIN MEASURES**

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**Background:** Diabetes is an illness with multiple quality indicators, and the discovery of cost-effective interventions has the potential to improve outcomes at a lower cost.

**Objectives:** This study evaluated whether interventions directed at improving HgA1c quality indicators had collateral benefits on low-density lipoprotein (LDL) quality indicators. Objectives included preintervention and postintervention measurements comparing (1) changes in HgA1c levels with changes in LDL levels, (2) changes in the percentage of patients with HgA1c  $\geq$  9% (poor glycemic control) with changes in the percentage of patients with LDL  $\geq$  100 mg/dL (poor lipid control), and (3) changes in the rates of no testing of HgA1c and LDL levels.

**Methods:** The deidentified primary care diabetic patient electronic databases from 2008 (n = 16,503) and 2010 (n = 23,040) were analyzed. Mean HgA1c, percentage of patients with HgA1c  $\geq$  9%, percentage of patients without an HgA1c measurement, mean LDL level, percentage of patients with LDL  $\geq$  100 mg/dL, and percentage of patients without an LDL measurement were calculated.

**Results:** The proportion of patients with poor glycemic control and poor lipid control both decreased from 13.2% to 9.35% and from 46.3% to 41.2%, respectively (both P < .0001). The no testing rate for HgA1c and for LDL both decreased, from 10.9% to 9.1% (P < .0001) and from 20% to 18.6% (P = .0005), respectively. The mean LDL level improved from 106.4 mg/dL to 97.6 mg/dL (P < .0001).

**Conclusions:** Sustained interventions directed at the glycemic control of a large population of diabetic patients were associated with significant improvement in their glycemic control and had collateral benefits regarding indicators of their lipid control.

**56 UNION OF OPENING-WEDGE HIGH TIBIAL OSTEOTOMY USING A LOCKING TITANIUM WEDGE PLATE**

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57 **PROSPECTIVE STUDY OF CLINICAL OUTCOME AFTER MINIMALLY INVASIVE TRANSFORAMINAL LUMBAR INTERBODY FUSION (MI-TLIF) FOR DEGENERATIVE SPONDYLOLISTHESIS GRADES I-III**

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**Background:** Minimally invasive transforaminal lumbar interbody fusion (MI-TLIF) is a new surgical technique that allows for circumferential arthrodesis with adequate decompression of neural structure without excessive iatrogenic soft tissue/muscle injuries. The technique is supposed to reduce blood loss, length of stay, postoperative pain, and surgery-related morbidity. However, only a few studies have carefully and prospectively collected and reported clinical outcomes in patients with degenerative spondylolisthesis treated with MI-TLIF. Here, we present a comprehensive analysis of our experience.

**Methods:** We analyzed preoperative, intraoperative, and postoperative clinical data on patients undergoing MI-TLIF for degenerative spondylolisthesis grades I-III at Ochsner Clinic Foundation. Data included patient demographics, spinal level(s), nonsurgical treatments, worker's compensation status, previous spine surgery, psychosocial history, surgical estimated blood loss and postoperative morbidity and mortality, and length of stay. All patients completed the Oswestry low back pain disability index (ODI) and visual analog pain scale preoperatively and at 6 weeks and 3, 6, 12, and 24 months. ODI scores and visual analog pain scale are being surveyed by phone at 3, 4, and 5 years. Cost of surgery was also collected and is compared to that of open TLIF.

**Results:** A total of 32 patients underwent MI-TLIF for grades I-III spondylolisthesis from August 2008 through December 2010. Patient age ranged between 27 and 83 years (mean 62.5 years and median 66 years). Body mass index was between 20 and 59 kg/m<sup>2</sup>, with median of 31 kg/m<sup>2</sup>. All patients had leg and back pain for at least 6 months, and all but 4 (who refused nonsurgical treatment because of the severity of their pain) had tried some form of conservative treatment, including chiropractic, physical therapy, spinal injections, and pain medications. Nine percent of our patients had had previous back surgery.

MI-TLIF was performed at the L3-L4, L4-L5, L5-S1 spine levels; 25% had 2 spinal levels with spondylolisthesis and the rest had 1 level. L4-L5 (58%) was involved in majority of cases, followed by L5-S1 (37%) and L3-L4 (5%). About 50% of patients had a psychiatric history (anxiety, depression, mood swings). One patient was referred via worker's compensation, and 2 patients were involved in ongoing lawsuits.

Eighty percent of our patients have at least 6 months' follow-up, with half of them at 1 year. The average hospital stay was 3.5 days (with most patients staying ≤ 48 hours) for 1-level and 4 days for 2-level MI-TLIF. Estimated blood loss was 160 mL for 1 level and 300 mL for 2 levels; overall mean was 200 mL. Two patients required revision surgery to reposition medialized pedicle screws. There was no incidence of cerebrospinal fluid leak, dural tear, neurological worsening, or positioning injury (skin breakdown, compressive neuropathy). As of the last follow-up, no long-term complications were found, including nonunion, adjacent-level disease, and instrumentation failure requiring revision.

A 10% improvement in ODI relative to the baseline is considered a meaningful change in disability. All patients achieved a 10% improvement in ODI. The preoperative ODI ranged from 20-94, with mean of 61.25, meaning that most patients were either severely disabled or crippled. The mean postoperative ODI at the 6-week follow-up improved to 36.70; at 6 months, it was 26.8 and at 1 year 23.78.

**Conclusions:** MI-TLIF is a safe and effective treatment for degenerative spondylolisthesis.

**58 THE UTILITY OF LABORATORY DATA IN PREDICTING PLACENTAL ABRUPTIONS**

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**Objectives:** To determine whether laboratory data are superior to clinical assessment of patients with suspected placental abruption.

**Methods:** This was an Institutional Review Board–approved, retrospective chart review of all pregnant patients above 20 weeks' gestation at our institution who had the following abruption laboratory tests performed from January 2007 to January 2009: complete blood count, prothrombin time (PT), international normalized ratio (INR), partial thromboplastin time (PTT), fibrinogen, D-dimer. For each episode, objective and subjective data relevant to the risk of developing a placental abruption were abstracted from the medical records. Although the focus of this study was to determine if laboratory work is predictive of placental abruption, fetal evaluation using abdominal ultrasonography and external fetal monitoring were also studied to determine if these were predictive in determining placental abruption. Fisher's exact test was used to identify whether any of the subjective or objective data points were predictive of an abruption. A  $P \leq .05$  was used to define statistical significance.

**Results:** A total of 268 separate evaluations were performed among 250 pregnancies, with 9.6% ( $n = 24$ ) ending with the clinical diagnosis of placental abruption. When stratified by abruption diagnosis, statistically significant differences were established for white blood count, PT, INR, PTT, fibrinogen, D-dimer, drug use, external fetal monitoring, ultrasonography, and pathology.

**Conclusions:** None of the laboratory tests drawn have the sensitivity or specificity necessary to categorize them as robust screening tests for placental abruption. In the face of normal initial laboratory results, serial collections are both inefficient at predicting placental abruption and not cost effective.

**59 SEXUAL FUNCTION AND ANTIHYPERTENSIVE MEDICATION ADHERENCE IN OLDER ADULTS**

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**60 MAJOR LIFE EVENTS, ANTIHYPERTENSIVE MEDICATION ADHERENCE, AND BLOOD PRESSURE CONTROL IN OLDER ADULTS**

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## 61 HOSPITAL ECONOMICS OF CAROTID ENDARTERECTOMY AND CAROTID STENTING

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**Background:** Cost effectiveness has become an important endpoint in comparing therapies that may be considered to have clinical equipoise. Prior economic analysis of carotid artery treatment has been limited by small sample size.

**Methods:** A retrospective analysis of hospital costs and 30-day clinical outcomes was performed on patients undergoing carotid endarterectomy (CEA) and carotid stenting with embolic protection (CAS) from January 2008 through September 2010 at a single institution. Cost (not charges) of the index hospitalization included direct and indirect costs and was normalized to 2010 values. Data are mean  $\pm$  SD.

**Results:** A total of 306 patients underwent either CEA (n = 174) or CAS (n = 132). Patients undergoing CEA trended toward a higher prevalence of being symptomatic (44.8%) compared to those undergoing CAS (34%, P = .09). Age was not significantly different between patients undergoing CEA and CAS (70.2 vs 72, respectively, P = .36). Carotid artery disease was more common in patients undergoing CAS (60.3% vs 39%, P = .003). The prevalence of chronic obstructive pulmonary disease, renal failure, hypertension, and diabetes was not significantly different between cohorts.

Mean hospital cost for CAS was \$9,426  $\pm$  \$5,776, while CEA cost was \$6,734  $\pm$  \$3,935 (P < .0001). This cost differential was driven by the significantly higher direct supply costs for CAS (\$5,634) vs CEA (\$1,967), P < .0001. These higher costs for CAS were seen consistently in symptomatic, asymptomatic, elective, and urgent subgroups. The 30-day stroke/death/myocardial infarction rate was 2.3% (4/174) in the CEA group and 3.8% (5/132) in the CAS group, P = .5. Overall length of stay was 2.1 days in both groups (P = .9)

**Conclusions:** Treatment of carotid artery disease with CAS was 40% more costly than CEA and did not provide better clinical outcomes or a reduction in length of stay. The cost differential was driven entirely by the increased supply costs in the CAS cohort. At present, carotid stenting cannot be considered a cost-effective treatment for carotid artery disease.

## 62 OPPORTUNITY COST OF A 1-YEAR FOLLOW-UP OF TUBE VERSUS TRABECULECTOMY

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**Objectives:** To report the opportunity cost of a 1-year follow-up based on an investigation similar to the Tube versus Trabeculectomy (TVT) Study.

**Methods:** Based on the TVT Study inclusion and exclusion criteria, patients received either a 350-mm<sup>2</sup> Baerveldt (Abbott Medical Optics, Abbott Park, IL) glaucoma implant or trabeculectomy with mitomycin C. Outcome measurements and interventional visits were evaluated. Using the Medicare reimbursement fee schedule in the state of Louisiana, opportunity costs were calculated.

**Results:** A total of 53 eyes were analyzed, with 26 eyes undergoing trabeculectomy and 27 eyes undergoing Baerveldt tube implantation. The surgical success rate was similar to that of the TVT Study. The mean number of visits in a 1-year period was 12.27  $\pm$  3.1 in the trabeculectomy group and 9.41  $\pm$  2.6 in the tube group. The mean number of interventional visits in a 1-year period was 2.00  $\pm$  1.13 in the trabeculectomy group and 0.15  $\pm$  0.4 in the tube group. Taking the Medicare reimbursement fee schedule for noncomprehensive ophthalmic visits and the difference in reimbursements between Baerveldt surgery and trabeculectomy surgery in the state of Louisiana, opportunity costs were \$737.20 per surgery in a 1-year follow-up period.

**Conclusions:** In a 1-year follow-up study based on the TVT Study, we had similar results to those documented by the TVT Study. With similar success rates, we calculated that the average first-year opportunity cost of performing a single Baerveldt surgery rather than a trabeculectomy was \$737.20.

**63 IMPROVING NURSES' ACCURACY OF PRESSURE ULCER STAGING USING COMPUTERIZED CLINICAL DECISION SUPPORT**

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**Background:** More than 2.5 million pressure ulcers (PUs) occur in US hospitals each year, with negative consequences to patient outcomes and provider reimbursement. Early recognition and documentation of abnormal skin characteristics and accurate PU staging are critical to clinical outcomes. Therefore, innovative approaches to improve PU staging are needed.

**Objectives:** A PU staging system was developed by wound care experts in collaboration with nursing informatics. A computerized clinical decision support (CCDS) program, using an algorithm based on the National Pressure Ulcer Advisory Panel definitions, was created to assist nurses in identifying, staging, and documenting PUs accurately. The purpose of this project was to evaluate nurses' accuracy in staging PUs using this CCDS program.

**Methods:** Thirty-one hospital nurses were recruited to participate in this descriptive study. Nurses' accuracy in staging PUs was measured using a simulation exercise to test the program in a computer classroom. Each nurse was given 5 pictures of PUs to stage; however, only 123 stagings were included in data analyses.

**Results:** Nurses' overall accuracy in PU staging was 64% (79/123). Nurses accurately staged PUs using the CCDS-suggested stage in 55% (68/123) of cases. Interestingly, the other 11/79 accurately staged the PU using an override function even when inaccurate characteristics were selected. Nurses were significantly more accurate using CCDS-suggested staging than nurses who used the override to rate PUs, chi-square (1, n = 123) = 19.72, P = .000.

**Conclusions:** Findings suggest a potential benefit in using this CCDS program to improve nurses' accuracy in PU staging.

**64 NURSES' PERCEIVED BENEFIT OF USING A MULTIUSER VIRTUAL ENVIRONMENT TO FACILITATE NURSING JOURNAL CLUBS**

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**Background:** Nursing journal clubs (NJC) provide an opportunity to master competencies necessary to integrate research into practice and facilitate scholarly discussion. Innovative technological advances, such as the internet, for accessing virtual learning environments provide low-cost venues to engage nurses and mitigate barriers of face-to-face meetings.

**Objectives:** The purpose of this mixed-methods study was to describe the experience of using a multiuser virtual environment (MUVE) to facilitate NJCs.

**Methods:** Thirty-seven registered nurses in 6 facilities consented to participate in NJC activities in 1 of 4 specialty groups (adult, critical care, neonatal, psychiatric) from June through December 2010. Each group participated in 4 sessions: orientation, 2 critiquing sessions, and debriefing/planning for NJC sustainability. Chi-square and Fisher's exact tests were used to analyze project outcomes measured by pre-NJC, post-NJC, and 30-day follow-up surveys. The first two surveys (35 items) measured self-reported confidence (0-10 scale) addressing MUVE and critiquing skills. Content from NJC audio-video screencastings was analyzed for themes using NVivo 8 (QSR International, Doncaster, Victoria, Australia).

**Results:** Findings from 33/37 participants showed that Fisher's exact test identified significantly (P < .05) improved competencies in determining design, interpreting statistics, linking conclusions and findings, and identifying limitations after the NJCs. No differences were identified in determining population/sample or implications or interpreting qualitative findings. Qualitative analysis revealed that participants identified with their avatars' appearance as an extension of their persona, actively engaged in thoughtful reflection, engaged in scholarly discussion, and demonstrated progressive critical appraisal skill acquisition.

**Conclusions:** We found that nurses perceived and demonstrated improved competencies in critiquing research reports during the MUVE-facilitated NJCs and expressed a desire to continue virtual NJCs beyond the study.



65 **GLYCEMIC MEDICATION ERROR REDUCTION IN HOSPITALIZED PATIENTS: AN INTERDISCIPLINARY TEAMWORK APPROACH**

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**Background:** Team structure may be multidisciplinary, using the skills of individuals from different disciplines to approach a problem, or interdisciplinary, integrating disciplines with collaborative communication and team goals.

**Objectives:** To reduce glycemic medication errors via interdisciplinary teamwork.

**Methods:** A multidisciplinary (discipline-specific goals and parameters) task force was assembled to pursue Joint Commission (JC) certification in inpatient diabetes care. It rapidly evolved into an interdisciplinary team with collaborative communication and goals. Occurrence reports and the JC standards for Distinction for Inpatient Diabetes Care were used to identify defects in our care processes. Key quality characteristics were sequentially selected for improvement: glucometrics, hypoglycemia, insulin error reporting, revision of insulin order sets, nursing education, glycemic medication safety, prescriber education, and patient education. Specific interventions and results were tracked by annotated run charts.

**Results:** Initially, insulin errors were underreported, and glucometrics were lacking. A commercial glucometer patient identification safety system and interface capable of tracking hypoglycemia were purchased. Nursing electronic documentation was modified to chart hypoglycemia. A new electronic occurrence reporting system was implemented systemwide. Total occurrence reporting increased by 23%, and the overall occurrence rate increased by 3%. Total reported insulin errors increased by 50% and coincided with implementation of multiple newly revised insulin order sets. A nursing diabetes resource council was developed to promote understanding of the new protocols. Endocrinology fellows were recruited to assist with monthly hypoglycemia analysis. Tracking improved with full implementation of the glucometer-electronic medical record interface. Trends were identified that required formulary restrictions. An insulin verification sheet was developed and doubled the necessary nursing signatures for insulin infusion management. Our glycemic medication errors decreased by 15% within 2 years. Because no single intervention appears to be responsible, we believe that the interdisciplinary team structure was the central cause.

**Conclusions:** Interdisciplinary teamwork is more effective than multidisciplinary teamwork when dealing with the complexity of glycemic management in the hospitalized patient.

66 **A COMPARATIVE ANALYSIS OF MULTIFACTORIAL FALL PREVENTION INTERVENTIONS ON PATIENT FALLS ON A TRANSPLANT UNIT**

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**Background:** Inpatient fall-related injuries cost more than \$19 billion annually. Although multiple factors contribute to falls, nonadherence to safety instructions is a major contributor irrespective of cognition. Evidence demonstrates that multifactorial interventions work best at preventing falls. However, interventions are complex and increase nurses' work, making them difficult to implement.

**Objectives:** To evaluate whether hardwiring fall prevention interventions into nurses' work on a step-down unit reduced falls.

**Methods:** This 3-phase project included (1) collection of 12 months of fall data; (2) hardwiring a fall prevention program into admit/shift assessment that partners with patients and family; and (3) adding a patient contract into the prevention program that acknowledges fall risk and intent to comply with safety instructions. Phases 2 and 3 lasted 3 months each. Nurses' compliance with both strategies was audited daily.

**Results:** Data from 11,296 patient days (2009) and 5,823 patient days (1,075 patients) over 6 months (2010) were included in analyses. Overall, we saw a reduction in falls from 5.4/1,000 patient days to 2.4 during the 6-month period, which was significant when fall vs no fall was analyzed,  $\chi^2(1, n = 17,270) = 8.17, P < .01$ . Fall rate was 1.5/1,000 patient days (4 falls) when education alone was used and 3.6 (11 falls, 7 witnessed) when the patient contract was added,  $\chi^2(1, n = 5,974) = 3.64, P > .05$ . There were no serious injuries in the 15 falls and 6 minor injuries; 9 were due to toileting and noncompliance.

**Conclusions:** Hardwiring fall prevention reduced falls; however, no benefit was realized by having patients sign a behavioral contingency agreement.

## 67 ANALYSIS OF POSTANESTHESIA CARE UNIT UTILIZATION

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**Background:** The shortage of intensive care unit (ICU) beds along with the increase in the number of patients requiring extended periods of time in an ICU environment has required hospitals to examine alternative uses of the postanesthesia care unit (PACU). This care alternative has raised concerns from healthcare personnel: the increased costs of providing adequate services for this unplanned workload and the development of frequent delays in operation room admission to the PACU.

**Methods:** Following approval of the institution's Institutional Review Board, more than 100 surgical patients admitted into PACU extended stay (> 4 hours) were studied over an 8-month period. A specialized scoring tool was developed and approved by the ICU Executive Committee to record 15 patient-care parameters at PACU admission and every 4 hours until discharge from the unit.

**Results:** Admission score totals of 0-2 resulted in subsequent discharge to home, postsurgical floors, or step-down units. Higher admission values (> 2) resulted in a < 10% chance of requiring subsequent transfer to the surgical intensive care unit (SICU). Following logistic regression analysis, only 2 of the 15 patient-care parameters at PACU admission predicted eventual transfer to the SICU: dysrhythmias requiring intervention and hemodynamic instability requiring frequent or constant intervention (ROC = .91).

**Conclusions:** The preliminary findings from this analytical model may assist this unit in the development of more effective staffing protocols, improvement in staffing costs, and development of a patient-care tool for predicting subsequent care requirements in a busy tertiary medical center.

## 68 EVALUATION OF ABILITY TO CONVERT 3- AND 2-DIMENSIONAL STRUCTURES

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**Background:** Workers in anatomic pathology must be able to envision how a sliver of a 3-dimensional (3D) gross specimen will appear on a 2-dimensional (2D) histologic slide. Conversely, when a pathologist sees a piece of tissue on a glass slide, the pathologist must be able to envision from which part of an organ the tissue was taken. A method of evaluating this ability would enhance workforce decisions and career counseling.

**Objectives:** To devise a method for evaluating an individual's ability to convert 2D and 3D structures.

**Methods:** A 3D device (analogous to a lung with carcinoma and obstructive pneumonitis) was made from inexpensive products: modeling clay, shoe polish, and a plastic milk container. Then, 2D images were made with paper and colored markers. People of varied professions and varied ages (including teenagers) were tested for the ability to locate the origin within a 3D specimen for each of 8 2D images.

**Results:** There was tremendous variation in 3D-2D conversion ability, and those with low ability performed slowly with agony. No pathologist has ever incorrectly located a single image. All individuals who subsequently became excellent pathology assistants also did very well (missing at the most 1 question).

**Conclusions:** A very inexpensive, easily-made device effectively evaluates the ability to analyze 2D images in relation to 3D structures.

**69 FAILURE OF PHYSICIAN EDUCATION AND ELECTRONIC MEDICAL RECORD ALERT MECHANISM TO IMPROVE REPRODUCTIVE STATUS DOCUMENTATION AND CONTRACEPTIVE COUNSELING IN RHEUMATOLOGY PRACTICE**

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**Background:** Many rheumatic diseases occur in women of childbearing age. Most of these diseases require therapy with potentially teratogenic drugs. These patients need to be counseled on the importance of contraceptive use during treatment with these drugs in order to prevent potentially harmful effects to a developing fetus.

**Objectives:** To assess if increased awareness and implementation of an alert mechanism in the electronic medical record increase documentation of contraceptive counseling and use.

**Methods:** Documentation rates of counseling of contraceptive use and of the type of contraception used in patients using potentially teratogenic medications were assessed. The data were used to design a presentation to raise awareness on the subject.

The Department of Rheumatology, in conjunction with Ochsner's Quality Assurance group, was able to incorporate an alert mechanism in the electronic medical record for women of childbearing age in an attempt to prompt physicians to address contraceptive counseling. A repeat retrospective review of 90 charts of women between 16 and 40 years old with rheumatic diseases was performed. Routine clinic visits from February 2009 through February 2010 were reviewed.

**Results:** Approximately 40 different medications were prescribed to the 90 patients. The contraceptive counseling rates in our department ranged from 13.3% to 100% among staff physicians compared to 17% to 78% in the initial assessment. Of the 6 physicians evaluated, only 2 had marked improvement in counseling documentation, 3 had worse results, and there was no change in 1.

**Conclusions:** Even though a presentation that aimed to raise awareness of the results of the previous study was presented to the staff with details on improving data gathering, counseling techniques, and documentation, overall results were the same. The primary endpoint—increasing documentation of contraceptive counseling and use—was not met. It is important to discuss the teratogenic risks of these medications with patients. A more efficient mechanism to alert prescribers of teratogenic risk and continued physician education will not only improve the counseling rate, but will also save lives.

**70 IMPROVING THE TRANSITION OF CARE FOR INPATIENTS TRANSFERRED THROUGH THE OCHSNER MEDICAL CENTER TRANSFER CENTER**

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**Background:** Patient transfers from other hospitals within the Ochsner Health System to our main campus are currently coordinated by our Transfer Center, which was established in fall 2009. Transfers handled by the Transfer Center in 2010 numbered 3,116, compared to 1,040 transfers in 2008 prior to creation of the Transfer Center.

**Objectives:** We analyzed the current process for transfers to the main campus to assess distinct opportunities to enhance the overall transition of patient care.

**Methods:** This study was conducted with the approval of the Ochsner Clinic Foundation Institutional Review Board (No. 2010.168.A). Internal medicine residents and nocturnists were surveyed on the satisfaction of transfers for safety, efficiency, and usefulness of information provided at the time of transfer. A worksheet was then developed to be completed by the Transfer Center nurse. The process changed when an accepting resident was included on the call at the time of initial contact. A kaizen event occurred in which complementary goals for the institution and members of the study team were recognized. The group was resurveyed to evaluate improvement in the transfer process.

**Results:** The overall outcome was defined as the average of questions 1 through 5 on the survey tool. The 2 groups, preintervention and postintervention, were independent. The preintervention average score was 1.8 (SD = 0.46), while the postintervention score was 3.7 (SD = 1.01). A test was performed to determine whether there was a significant difference in the average scores between the preintervention and postintervention groups (P < .0001).

**Conclusions:** By including residents in the transfer calls, data were collected that facilitated fewer and higher quality handoffs that were performed in less time. Finally, there was increased awareness of the value of resident participation in institutional quality improvement projects, where they were deemed essential to providing quality patient care that was safe, timely, and realistic.

### C1 LIVER TRANSPLANTATION IN AN EHLERS-DANLOS PATIENT

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**Introduction:** Ehlers-Danlos syndrome is a heterogeneous group of inherited connective tissue disorders with manifestations including skin hyperextensibility, skin fragility, and joint hypermobility. To date, no cases of transplantation in a recipient with Ehlers-Danlos syndrome have been reported. We describe successful orthotopic liver transplantation in a patient with Ehlers-Danlos type II.

**Case Report:** The patient was a 39-year-old female with a medical history significant for end-stage liver disease secondary to nonalcoholic steatohepatitis complicated by hepatic encephalopathy with a history of Ehlers-Danlos syndrome type II. After the appropriate transplant evaluation, she underwent orthotopic liver transplantation. Her perioperative course was complicated by hemothorax, retroperitoneal hematoma, and small bowel perforation. Cordis catheter placement was the cause of the hemothorax that was treated with tube thoracostomy. Femoral arterial line placement caused the retroperitoneal hematoma that was treated with external iliac artery repair. The small bowel perforation was likely related to a traction-induced injury and was treated with primary repair. The patient recovered well and was discharged home, maintaining good allograft function 1 month after transplant.

**Discussion:** Manifestations of Ehlers-Danlos syndrome vary from skin hyperextensibility to spontaneous arterial or bowel rupture. This connective tissue disorder can present with challenging surgical complications secondary to tissue fragility and poor tensile strength as illustrated with our patient. Case reports describe spontaneous rupture of donor livers received from patients with Ehlers-Danlos syndrome. Our patient represents the first described case of liver transplantation in a recipient with Ehlers-Danlos syndrome.

### C2 ASSOCIATION OF CONE DYSTROPHY WITH CONGENITAL HYPOTRICHOSIS

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**Case Report:** A 14-year-old patient and her 9-year-old brother were followed from their initial presentation of decreased vision in both eyes secondary to cone dystrophy through a 5-year period. Confirmatory examination included electroretinography (ERG), color plates, and fundus examination. Both siblings developed classic signs of cone dystrophy around the age of 9, as confirmed by ERG, fundus fluorescein angiography, and color plates. Cone dystrophy and congenital hypotrichosis in both siblings were determined to be an autosomal recessive disorder.

**Discussion:** As determined by a previously published case report, the gene for this disorder has been localized to *16q22.1*, the region containing CDH3, which encodes P-cadherin, expressed in both retinal pigment epithelia and hair follicles. The cadherins are involved in the regulation of both hair and retinal development. The association of cone dystrophy and congenital hypotrichosis, although rare, has been determined to be an autosomal recessive inheritance pattern of the defective *16q22.1* gene. This gene defect leads to abnormal P-cadherins and altered cell-cell adhesion.

### C3 RETINAL VASCULAR OCCLUSIONS IN TWO PATIENTS WITH HETEROZYGOUS FACTOR V LEIDEN MUTATIONS

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**Introduction:** Factor V Leiden mutation is the most common inherited thrombophilia and a known risk factor for venous thrombosis. Current recommendations suggest that no long-term anticoagulation therapy is necessary unless 2 or more spontaneous thrombotic events occur.

**Case Report:** Patient 1 was a 17-year-old male smoker without significant medical or family history who presented with simultaneous central retinal artery occlusion (CRAO) and central retinal vein occlusion (CRVO) in the left eye. He subsequently developed neovascularization of the iris; despite treatment, he suffered a total tractional retinal detachment with complete loss of vision. A thorough hypercoagulable workup revealed that the patient was heterozygous for Factor V Leiden. This is the first reported case of simultaneous CRAO and CRVO in association with heterozygous Factor V Leiden. Patient 2 is a 53-year-old female with Crohn disease and remote history of renal cell cancer who presented with a nonischemic CRVO of the right eye. The patient's visual acuity is 20/30; however, her long-term outcome is still unknown.

**Discussion:** We report on 2 patients with significant retinal vascular occlusions in association with heterozygous Factor V Leiden mutations. Given the clinical impact of these events, anticoagulation therapy in these heterozygous Factor V Leiden patients may be given greater consideration.

**C4 LOSS OF ACCOMMODATION AND CHRONIC MYDRIASIS FOLLOWING RETINAL BARRICADE LASER TREATMENT**

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**Introduction:** Laser barricade is a technique commonly employed for cases of lattice degeneration, particularly in those individuals considered to be at high risk for retinal detachment and tears. Although tonic pupil has been reported in the literature in association with pan-retinal photocoagulation, it has not been reported with regard to laser barricade. We describe 2 cases in which patients underwent laser barricade for lattice degeneration with resultant tonic pupil and loss of accommodation. Studies have proposed that the damage results from laser applications to the parasympathetic nerve fibers that lie beneath the coagulated area and innervate the ciliary body and iris sphincter.

**Case Report:** Two patients were referred to the Retina Clinic following laser barricade at outside institutions. Patients were found to have unilateral mydriasis that was nonresponsive to light stimuli. Fundus examination revealed 360° barricade laser ablation, including the 3 and 9 o'clock regions. Pilocarpine was administered, resulting in miosis in both cases, demonstrating intact iris sphincter functioning. The patients complained of glare, reading difficulties, and a persistently dilated pupil. The patients were given refractive correction and reported improvement in reading capability.

**Discussion:** To our knowledge, this is the first reported set of cases in which laser barricade resulted in persistently dilated pupil. A complication of barricade laser treatment is persistent mydriasis secondary to posterior ciliary nerve burns, located at the 3 and 9 o'clock regions.

**C5 PROGRESSIVE QUADRIPARESIS DUE TO CERVICAL INTRADURAL ENDODERMAL CYST: A CASE REPORT AND REVIEW OF LITERATURE**

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**C6 PROGRESSIVE SPASTIC PARAPARESIS CAUSED BY EPIDURAL LIPOMATOSIS: A CASE REPORT AND REVIEW OF LITERATURE**

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**Introduction:** Spinal epidural lipomatosis is a rare entity involving hypertrophy of the adipose tissue overlying the epidural space. Clinically, it is most commonly asymptomatic and rarely presents with back pain or lower extremity weakness. Here, we report a case of progressive spastic paraparesis caused by epidural lipomatosis.

**Case Report:** A 59-year-old female with a history of insulin-dependent diabetes presented with a 1-year history of slowly progressive bilateral leg spasticity and weakness. On examination, she had spastic gait, showed bilateral lower extremity strength range from 2 to 3 out of 5, and was wheelchair bound at presentation. She was hyperreflexic with positive Babinski sign and clonus and had a sensory level at around T8-T10. Magnetic resonance imaging (MRI) revealed epidural lipomatosis with significant mass effect at the level of T5-T8. Given concordant clinical examination and MRI findings, we performed decompressive laminectomy and excision of epidural lipoma.

Postoperatively, she has demonstrated progressive improvement in her lower extremity strength and spasticity. At the last clinic follow-up, she walked with a cane, and her motor strength was normal. Her gait is impaired due to residual spasticity.

**Discussion:** Review of the literature reveals only 14 other case reports and case series involving patients with symptomatic epidural lipomatosis, with etiologies including obesity, chronic steroid use, and idiopathic sources. The only significant past medical history in our patient was the use of an insulin pump for insulin-dependent diabetes: It remains unclear whether this played a role. Surgical decompressive laminectomy and excision of the lipomatous lesion are the treatment of choice.

## C7 COMPLICATIONS OF THORACIC PARAVERTEBRAL BLOCKS

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**Introduction:** The thoracic paravertebral block (PVB) is an anesthetic technique that can provide significant postoperative analgesia following mastectomy. Although complications are rare, performance of thoracic PVBs comes with significant risks and complications. A thorough understanding of the risks and adequate preparation for complications from placement of thoracic PVBs are mandatory for the anesthesiologist who will be performing this procedure.

**Case Report:** A 70-year-old woman scheduled for total mastectomy had a thoracic PVB placed preoperatively for postoperative analgesia. Following block placement, the patient became apneic and hypotensive. We immediately recognized her condition and successfully resuscitated the patient. Without significant delay, we were able to proceed with the scheduled operation. Her postoperative course was uneventful.

**Discussion:** This known complication following a thoracic PVB, while rare, was taken into consideration in preparation for the block. American Society of Anesthesiology standard monitors and resuscitation equipment are always available in our regional block area. We will use this case to discuss the various complications associated with thoracic PVBs, the risk factors, and the management of complications.

## C8 A CASE OF ACUTE LYMPHOBLASTIC LEUKEMIA OF AMBIGUOUS LINEAGE

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**Introduction:** Adult acute lymphoblastic leukemia with mixed B and T lineage is a rare disease. We describe a patient with this ambiguous lineage who also had a 9:22 chromosomal translocation.

**Case Report:** The patient was a 49-year-old Caucasian male who had marked leukocytosis (white blood cell count of  $187.85 \times 10^3$  mL) with 97% blasts after he was admitted for right lower extremity cellulitis. At the time of admission, the patient also reported visual symptoms including scotoma and blurry vision, headache, and respiratory symptoms including shortness of breath and cough. The patient underwent urgent leukapheresis. Flow cytometry analysis of bone marrow aspirate was as follows: blast gate 95% containing cells' expression of CD19, CD34, HLA-DR, TdT, and cytoplasmic CD3 and partial expression of CD10/CD19, CD4, CD9, cytoplasmic CD22, and cytoplasmic CD79a. The blasts were negative for other T, B, and myeloid cell markers. Bone marrow karyotype results were as follows: 46,XY,t(9:22)(q34;q11.2)[18]/45, idem-7,-11,-16,+2mar[2]. The final pathologic diagnosis was consistent with mixed phenotype acute leukemia, not otherwise specified rare type (T/B lineage) with t(9:22)(q34;q11.2).

**Discussion:** There are two well-defined acute lymphoblastic leukemia lineages that feature some of the characteristics in this case. Mixed phenotype acute leukemia with t(9:22)(q34;q11.2) has either B and myeloid blasts or T and myeloid blasts. The combination of B and T is described in another lineage called mixed phenotype acute leukemia, not otherwise specified rare type; however, this leukemia does not demonstrate t(9:22). Both of these combined lineage leukemias are rare, and for a leukemia to have features of both is unique.

## C9 A CASE OF MIXED PHENOTYPE ACUTE LEUKEMIA

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**Introduction:** Approximately 17,000 new cases of acute leukemia are diagnosed in the United States annually; the vast majority are either myeloid or lymphoid. However, 2% to 5% of acute leukemias show a mixed phenotype of both myeloid and lymphoid origin. We describe a patient with such a presentation.

**Case Report:** A 70-year-old male presented with subjective muscle weakness, fevers, and blurry vision. His complete blood count showed leukocytosis (white blood cells:  $71.72 \times 10^3$  mL) with 86% blasts, anemia, and thrombocytopenia. Peripheral smear showed large, atypical cells consistent with blasts. Bone marrow aspiration and biopsy revealed 90% to 100% cellular bone marrow with 89% blasts. Morphologically, the blasts appeared to be of myeloid origin. Flow cytometry showed expression of CD4, CD9, CD13, CD33, CD34, HLA-DR, intracytoplasmic CD3, and partial CD15. Immunohistochemistry (IHC) was positive for partial expression of TdT and MPO. The phenotype by flow cytometry did not correlate with IHC. The patient's karyotype showed marked abnormalities: 43XY, add(1)(q21), -5, -7, -7, -16, -17, del(17)(q21q23), i(19)(q10), -21, +der(22), (7:22)(q11.2;p11.2)+2mar[2]/42, idem, -6, add(22)(q13)[18]. Overall findings are consistent with mixed phenotype acute leukemia.

**Discussion:** The patient's leukemia expressed markers specific to both myeloid and lymphoid leukemias, which represents a distinct and rare entity according to the 2008 World Health Organization classification. The diagnosis and subsequent management of such cases are complex and nonuniform, and the outcome is usually inferior to that of those with single-lineage acute leukemia.

**C10 CLOACAL DYSGENESIS SEQUENCE: ELUCIDATING THE MECHANISM OF MULTIPLE MALFORMATIONS USING FETAL IMAGING, GENETIC TESTING, AND AUTOPSY**

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**Introduction:** Cloacal dysgenesis sequence (CDS) is a rare disorder characterized by ambiguous genitalia and the absence of urethral, vaginal, and anal openings.

**Case Report:** We investigated a patient prenatally and postnatally using ultrasound (US), magnetic resonance imaging (MRI), genetic studies, and autopsy. The parents were third cousins. At 16 weeks' gestation, fetal bladder distension was detected on US. MRI showed oligohydramnios and megacystitis. Karyotype and oligoarray on amniocytes revealed a normal female. At 27 weeks, the fetus developed ascites and oligohydramnios. Another MRI showed 2 oval structures, dysplastic kidneys, hypoplastic lungs, and dilated sigmoid colon. The proband was delivered at 34 weeks and died shortly after birth. Autopsy showed ascites, anorectal atresia, dilated sigmoid colon, ambiguous genitalia, urethral stenosis, 2 large cystic structures, 2 ovaries, multicystic kidneys, and pulmonary hypoplasia. Oligoarray on postmortem tissue was negative. CDS occurs because of a failure of migration and fusion of the urorectal septum with the cloacal membrane, thus affecting urogenital and anorectal development. In our proband, urethral stenosis resulted in the bladder outlet obstruction, megacystitis, hydronephrosis, and renal dysplasia. The bladder ruptured, and ascites with oligohydramnios ensued, causing pulmonary hypoplasia. The 2 large cystic structures with ovaries on each side most likely represented a bladder and bicornuate uterus as one entity. The anorectal atresia and dilated meconium-filled sigmoid colon with microcalcifications may have occurred in parallel with genitourinary malformations.

**Discussion:** In conclusion, we demonstrate how various diagnostic modalities can be used to explore the mechanism of malformations in CDS, which may aid in elucidating its etiology.

**C11 METASTATIC PHEOCHROMOCYTOMA AS A RARE CAUSE OF DYSPNEA**

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**Case Report:** A 67-year-old female with neurofibromatosis type 1 (NF1) was admitted with chest pain and shortness of breath. She described episodes of sweating, palpitations, and dyspnea that lasted 2 minutes, similar to episodes she had 35 years ago when she underwent an adrenalectomy for a pheochromocytoma. During her hospital course, computed tomography revealed an extensive vascular mass in the mediastinum with compression of the trachea. A biopsy was considered, but plans were postponed after biochemical tests showed elevated serum norepinephrine, normetanephrine, and dopamine, suggesting that the mass was an extraadrenal pheochromocytoma.

The patient was started on phenoxybenzamine to prepare her for possible surgery. However, because of the size and location of the mass, surgical removal was deferred until localized external radiation was performed in an effort to shrink the tumor. She is currently awaiting surgery.

**Discussion:** This rare case illustrates the importance of considering the patient's history before deciding on invasive procedures. Both NF1 and the history of pheochromocytoma increase the suspicion for recurrent or metastatic pheochromocytoma. About 1% of patients with NF1 develop pheochromocytoma, which can be intraadrenal or extraadrenal. If the massive tumor were biopsied without proper adrenergic blockade, massive amounts of catecholamines could be released into the bloodstream and potentially cause an acute hypertensive crisis, cardiac arrest, or death. The fact that the original pheochromocytoma was removed 35 years ago does not rule out metastasis because the prognosis is variable. The treatment for pheochromocytoma or any metastasis is surgical removal if possible.