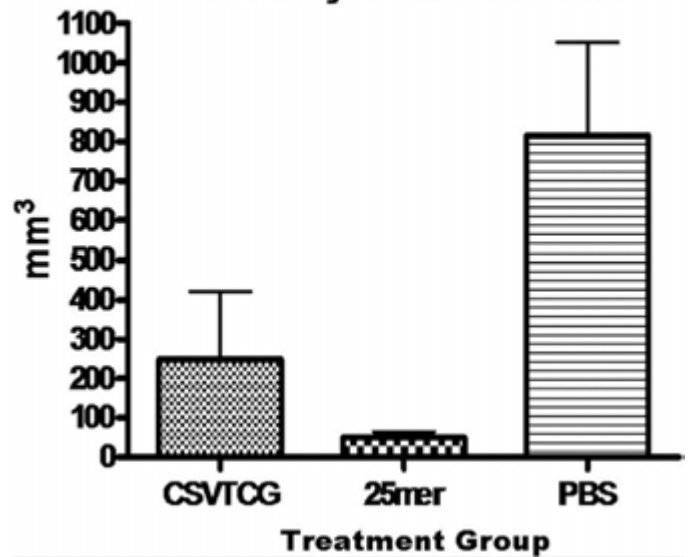


expression is deficient in diabetic wounds suggesting impaired progenitor cell recruitment may be a contributing factor in diabetes related wound healing impairment. Lentiviral-mediated overproduction of SDF-1 $\alpha$  is sufficient to correct the pathophysiologic abnormalities in diabetic wound healing resulting in complete epithelialization at 2 weeks. SDF-1 $\alpha$  mediated improvement in diabetic wound healing has significant implications for the development of novel therapeutic strategies to facilitate wound closure which target progenitor cell mobilization and recruitment.

**77. INHIBITION OF ANGIOICIDIN BY TWO NOVEL PEPTIDES DECREASES TUMOR BURDEN IN AN ORTHOTOPIC NUDE MOUSE MODEL.** C. Liebig<sup>1</sup>, N. Agarwal<sup>1</sup>, G. Ayala<sup>1</sup>, G. Verstovsek<sup>1</sup>, G. P. Tuszynski<sup>2</sup>, D. Albo<sup>1</sup>; <sup>1</sup>Baylor College of Medicine, Houston, TX, <sup>2</sup>Temple University, Philadelphia, PA

**Introduction:** We have recently identified angiocidin, a novel thrombospondin-1 receptor. We have previously shown that angiocidin promotes colon cancer tumor cell invasion in vitro. Two angiocidin inhibitory peptides recently developed in our laboratory show a potent inhibitory effect on colon cancer tumor cell invasion in vitro. In the present study we look at the expression patterns of angiocidin in human colon cancer specimens and evaluate angiocidin as a potential therapeutic target in colon cancer. We hypothesize that human colon cancer expresses angiocidin and that inhibition of angiocidin results in decreased tumor burden in vivo. **Methods:** We created a tissue array composed of 50 consecutive patients who underwent resection of primary colon cancers at our institution. We included normal colonic tissue, primary tumor, negative lymph nodes and when available, positive lymph nodes and metastases from each patient. Angiocidin expression was determined by immunohistochemistry. Staining intensity was evaluated by two blinded observers and graded on a scale of 1 (negative) to 4 (strongly positive). KM12L4 human colon cancer cells were injected into the spleens of nude mice and twenty-four hours after tumor cell injection, animals began QOD intra-peritoneal injections of either 10mg/kg of CSVTCG peptide, 10mg/kg of 25-mer peptide or 10ml/kg PBS (control). Animals were sacrificed at four weeks and assigned a health score (HS) based on activity level, nuchal fat and external evidence of primary tumor burden. At necropsy, the primary tumor was measured, liver metastases were counted and animals were assigned an internal disease score (IDS) based on extent of local tumor invasion. Using Western blots and computerized image analysis, angiocidin expression was measured in both the primary tumor and in liver specimens from each group. **Results:** Seventy-seven percent of primary tumor specimens in the tissue array expressed angiocidin, with 62% of those staining strongly positive. Normal colonic tissues were negative or only weakly positive in 92% of specimens. Normal lymph nodes were negative or weakly positive in 90% of specimens. Eighty-five percent of positive lymph nodes expressed angiocidin with 64% staining strongly positive. All liver metastases (6/6) stained strongly positive for angiocidin. Angiocidin expression in both the primary tumors and the livers of peptide-treated mice was 50% higher in those animals with combined HS and IDS greater than 3 when compared to peptide-treated mice with combined scores of 3 or less ( $p < 0.05$ ). Animals treated with CSVTCG peptide or 25-mer peptide showed a five-fold and sixteen-fold reduction, respectively, in primary tumor volume when compared to controls ( $p < 0.001$ ) (figure 1). Animals in both peptide treatment groups showed at least 30% improvement in HS and IDS when compared to control animals ( $p < 0.001$ ). **Conclusions:** Angiocidin is expressed in human colon cancer specimens. Angiocidin expression correlates with tumor burden and disease severity in vivo. Treatment with angiocidin inhibitory peptides results in decreased primary tumor volume and decreased tumor burden in nude mice.

Figure 1  
Primary Tumor Volume



**78. DO STANDARDIZED TEMPLATES IMPROVE DOCUMENTATION OF QUALITY OF CARE?** J. Parikh<sup>1</sup>, I. Yermilov<sup>1</sup>, S. Jain<sup>1</sup>, C. KO<sup>1</sup>, M. Maggard<sup>2</sup>; <sup>1</sup>West Los Angeles Veterans Administration Hospital, Los Angeles, CA, <sup>2</sup>University of California, Los Angeles, Los Angeles, CA

**Introduction:** Data abstraction from patient charts is a common method for measuring quality of surgical care; however, it has inherent difficulties (i.e., lack of documentation of data in medical records). Recently there has been increased use of standardized templates and clinical pathways in many surgical fields. Whether or not the use of standardized templates is associated with better documentation of quality of care measures remains unknown. This study investigates adherence rates of documentation for intraoperative bariatric quality measures by comparing surgeons who use standardized operative dictation templates to those who do not. **Methods:** Two independent reviewers evaluated adherence to established intraoperative bariatric quality measures from 40 charts (20 charts from surgeons who used standard template operative reports, and 20 charts from those who did not). An abstraction tool, which included possible responses of yes, no, not reported, and not applicable was utilized. Operative reports for both laparoscopic and open gastric bypass were reviewed, which included cases from 4 surgeons who used a standardized template to dictate operative reports, and 8 surgeons who did not. Four quality measures were investigated: 1) exploration of the abdomen, 2) intra- or postoperative evaluation of the anastomosis for leak, 3) closure of the small bowel mesenteric defect, and 4) closure of the large bowel mesenteric defect or antecolic placement of Roux limb. **Results:** Comparing the total responses of “yes/no” for all 4 quality measures, operative reports more consistently contained quality assessment information for cases where a dictation template was used versus where it was not (84% vs. 55%, respectively,  $p < 0.0001$ ). The greatest discrepancies between surgeons that used a standardized operative report and those that did not were found in the “exploration of the abdomen” measure (100% vs. 35%,  $p < 0.0001$ , respectively) and in the “evaluation of the anastomosis for leak” measure (95% vs. 75%, one-sided  $p = 0.04$  respectively). Rates for closure of mesenteric defects were similar in both groups. “Closure of small bowel mesenteric defect” adherence rate was similar between groups (80% for each). “Closure of the large bowel mesentery/antecolic placement of Roux limb” adherence rate was 80% for cases where a standardized operative report template was used, as compared to 65% where it was not used ( $p = 0.14$ ). Of

note, clear errors in reporting were identified during our review of cases with standardized templates; for example, in 4 records, we noted documentation of a normal gallbladder in patients who had previously undergone cholecystectomy. **Conclusion:** The use of standardized operative templates is associated with improved documentation of adherence to quality measures in bariatric surgery. Alternatively, quality measures that were performed, but poorly documented, would not be appreciated from this abstraction process. Standardized templates may allow for documentation of care that was in fact not provided. The discovery of the incidentally noted errors brings into question the validity of all documented quality measures. Routine audits of representative cases could potentially improve adherence and the quality of care provided. Standardized operative templates may only be a first step toward measuring actual quality of care provided.

## INTEGRATED ORAL SESSION 2: THURS 2/8 1:00 PM

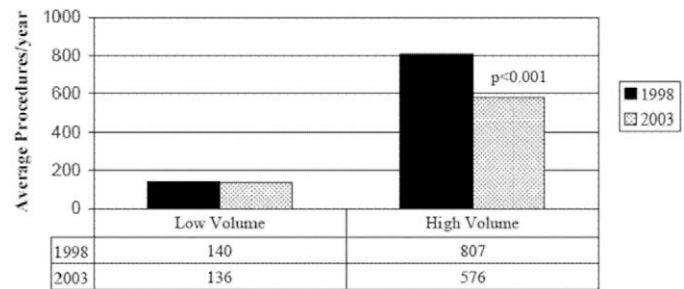
### CLINICAL TRIALS/OUTCOMES I: SYSTEM-BASED PRACTICE

#### 79. DO RECENT PRACTICE PATTERNS REFLECT GREATER REGIONALIZATION FOR CORONARY CARE?

J. W. Ogilvie, Jr.<sup>1</sup>, N. Baxter<sup>2</sup>, B. Virnig<sup>1</sup>, P. Dahlberg<sup>1</sup>, R. Ricciardi<sup>3</sup>; <sup>1</sup>University of Minnesota, Minneapolis, MN, <sup>2</sup>University of Toronto, Toronto, ON, Canada, <sup>3</sup>Lahey Clinic, Tufts University School of Medicine, Burlington, MA

**Introduction:** The association between high-volume hospitals and improved outcome is particularly robust for complex procedures such as coronary artery interventions. Given the extensive evidence supporting the volume-outcome relationship for coronary care, we hypothesized that utilization of coronary interventions has shifted towards greater regionalization of care. **Methods:** We identified patients who underwent coronary artery bypass grafting (CABG) or percutaneous transluminal coronary interventions (PTCI) using standard ICD-9 codes from statewide discharge data in California, Arizona, Washington and New Jersey spanning the years 1998 through 2003. We then categorized hospitals into tertiles based on previously established volume cutoffs - for CABG, low-volume ( $\leq 249$  cases/yr), mid-volume (250-499 cases/yr) and high-volume ( $\geq 500$  cases/yr) - for PTCI, low-volume ( $< 200$  cases/yr), mid-volume (200-399 cases/yr) and high-volume ( $\geq 400$  cases/yr). We determined statistical significance with the Student's t-test and Chi-square test. **Results:** CABG procedures declined from 52,531 in 1998 to 44,711 in 2003 (a 15% decline). CABG volume decreased in 69% of hospitals despite a small increase in hospitals performing CABG surgery (3.5%) during the study period. High-volume CABG hospitals experienced a 29% reduction in CABG procedures whereas low-volume CABG hospitals noted a 2% reduction ( $p < 0.001$ , table). During the study period, 55% of high-volume CABG hospitals remained high-volume facilities, whereas 94% of low-volume hospitals experienced an increase in volume or remained stable ( $p < 0.001$ ). PTCI increased from 82,852 in 1998 to 111,180 in 2003 (a 25% increase). In addition, PTCI increased in 73% of hospitals in conjunction with a 15% increase in hospitals performing PTCI. The proportion of high-volume PTCI hospitals increased from 36% in 1998 to 47% in 2003 ( $p < 0.001$ ). **Conclusions:** Our results reveal that more hospitals are performing PTCI and that the majority of hospitals performed significantly more PTCI procedures regardless of volume designation. On the contrary, there has been a decline in CABG surgery, which has disproportionately affected hospitals designated as high-volume while relatively sparing the low-volume CABG hospitals. These data do not substantiate a trend toward greater regionalization for CABG surgery.

#### CABG Volumes Based on 1998 Volume Designations



#### 80. WHAT CONSTITUTES A "HIGH VOLUME" HOSPITAL FOR PANCREATIC RESECTION? R. A. Meguid, N. Ahuja, D. C. Chang; Johns Hopkins University School of Medicine, Baltimore, MD

**Introduction:** Volume-outcome relationships for pancreatic cancer resections have been previously demonstrated. Resection volume has been proposed for defining centers of excellence. However, various cutoffs for defining "high volume" centers have been used in the literature. The purpose of this study is to define an objective evidence-based threshold of operative volume associated with improvements in operative outcome for pancreatic resection. **Methods:** A retrospective analysis was performed using data from the 1998-2003 Nationwide Inpatient Sample file, representing 20% of hospitals from 37 states (~8 million records/year). Inclusion criteria were patients  $> 18$  years old who had undergone pancreatic resections (pancreaticoduodenectomy ICD-9 procedure code 52.7 and total pancreatectomy 52.6) for pancreatic cancer (ICD-9 diagnosis codes 157.x). Multivariate analysis (MVA) was performed with perioperative death as outcome, and resection volume, age, gender, race, procedure year, Charlson Comorbidity Index, and academic medical center status as independent variables. Different models of "high" volume ( $\geq 1$  to  $\geq 158$  resection/yr) were substituted in the MVA. The goodness-of-fit of each model was compared by pseudo  $r^2$ , a measurement of the amount of data explained by the model. **Results:** 5110 patients were included in the analysis (50.8% female, mean age 64.8 years). The median annual institution resection volume was 13 (range: 1 - 158). The overall mortality rate was 6.93%. The mortality rate of the "high volume" centers ranged from 1.83% ( $\geq 74$  resections/year) to 6.7% ( $\geq 2$  resection/year). The different models of "high volume" vs mortality rates and percent of variance in the data explained, is presented in Figure I. The best modeling of a "high volume" center was at an annual institution resection volume  $\geq 31$  with a pseudo  $r^2$  of 0.0842, or 8.42% of variance in the data explained. In this model, the mortality rate of the "high volume" centers was 2.98%. However, there was very little difference in percentage of variance in the data explained between this best model and other models with different volume cutoffs (range of 7.04% - 8.42%). In comparison, the model without any volume variable yielded a pseudo  $r^2$  of 0.0695, or 6.95% of variance in the data explained. This suggests that the volume variable explained  $< 2\%$  of variance in the data on perioperative death of pancreatic resection patients. **Conclusions:** The best model for defining a "high volume" center for pancreatic resections was an annual institution resection volume  $\geq 31$ . However, in comparison there is very little difference in the explanatory powers of other models of "high volume" centers. Although volume has an important impact on mortality, volume cutoff is necessary but not sufficient for defining centers of excellence. Volume appears to function as an imperfect surrogate for other variables, which may better define centers of excellence. Additional work is needed to identify these variables.