Digestive tract decontamination reduces mortality in the ICU.

**Background:** Infectious complications remain a major concern in critically ill patients. Preventive measures are clearly better than treatment. Selective decontamination (SDD) of the upper digestive tract is one method that has had mixed results. Numerous questions exist as to whether or not gastrointestinal (GI) decontamination should be routine or not.

**Objective:** To determine the effectiveness of SDD and selective oral decontamination (SOD) on mortality in critically ill patients.

**Design:** Controlled, crossover, randomized study in 13 ICUs in the Netherlands.

**Participants:** 5,939 patients were enrolled in 3 arms; 1,990 patients had standard care, 1,904 had SOD, and 2045 had SDD. Each ICU used all 3 regimens introduced randomly over a 6-month period.

**Methods:** Patients were eligible on ICU admission if they were expected to be intubated for at least 48 hours or have an ICU stay of >72 hours. Crude mortality and adjusted mortality using a random effects logistic regression model was reported. The primary endpoint was 28-day mortality rates. A secondary end point was the development of antibiotic resistance.

**Interventions:** SDD and SOD included topical application of tobramycin, colistin, and amphotericin B in the oropharynx. This paste was also instilled in the stomach for SDD patients. SDD patients also received 4 days of IV cefuroxime. Cultures were taken for point prevalence studies every third Tuesday of the month.

**Results:** Crude mortality was 27.5% in the standard care patients, 26.9% for SDD patients, and 26.6% for SOD patients. The adjusted reduction in mortality for SDD was 13% and 11% for SOD compared to standard therapy. Antibiotic resistance was not significantly different between SDD and SOD, and both were less than standard care.

**Conclusions:** SDD or SOD reduces mortality in ICU patients without impacting antibiotic resistance.

**Reviewer's Comments:** This well done clinical study showed a beneficial effect for decontamination of the GI tract in critically ill patients. Will it be enough to recruit intensivists to GI decontamination? The major worry for many clinicians has been the use of 4 days of systemic cephalosporins in the SDD approach. The authors properly point out that since there is no difference in the benefit between SDD and SOD and that maybe SOD should be the approach of choice. SOD avoids systemic antibiotics and uses less of the antibiotic paste. Both will make the approach more cost effective. We use antiseptics as the oral "mouthwash." The authors also mention antiseptics as another alternative. While this study controlled many aspects of care, the 10% reduction in antibiotic use in SDD and SOD patients was not in their regression analysis. Could fewer antibiotics be the real answer? Extremely interesting question and one I think we should all ponder. (Reviewer-John A. Weigelt, MD).

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Keywords: ICU Patients

Print Tag: Refer to original journal article
Better glucose control does not mean fewer cardiovascular complications.

**Background:** Cardiovascular disease is the most common cause of death among diabetic patients. The relationship between glucose control and cardiovascular complications is not clear.

**Objective:** To compare cardiovascular events in patients with standard glucose control to patients with intensive glucose control.

**Design:** Prospective, randomized, open-label study.

**Participants:** 1,791 patients were randomized; 760 patients with standard therapy and 772 with intensive therapy completed the study.

**Methods:** Type 2 diabetic patients were included. Risk factors for cardiovascular disease were similar in both groups and treated in both groups. This included treatment for hypertension and hyperlipidemia as well as exercise. The primary outcome was the time to the first occurrence of a cardiovascular event. This included myocardial infarction (MI), stroke, new or worsening congestive heart failure, surgical intervention for cardiac disease, peripheral vascular disease, cerebral vascular disease, death from cardiovascular events, inoperable coronary artery disease, and amputation for gangrene.

**Interventions:** All patients were given oral hypoglycemic agents. Insulin was given if glycated hemoglobin levels were >9% in the standard therapy or 6% in the intensive therapy group. The goal for treatment in the intensive therapy group was an absolute reduction of 1.5% in glycated hemoglobin levels.

**Results:** Median follow-up was 6 years. The mean glycated hemoglobin level at baseline in both groups was 9.4%. At baseline, 52% of patients were on insulin. Weight gain during the study was higher in the intensive therapy patients. The median glycated hemoglobin levels in follow-up were 8.4% for standard therapy and 6.9% for intensive therapy. Major cardiovascular events occurred in 34% of standard and 30% of intensive therapy patients. Treatment did not correlate with outcome. Hypoglycemia was more common among intensive therapy patients (24% vs 18%).

**Conclusions:** Intensive control of glucose had no significant reduction in major cardiovascular events in type 2 diabetics.

**Reviewer’s Comments:** Better glucose control in the critically ill population is common although some still doubt its value in all patient populations. This report suggests that better glucose control in type 2 diabetics does not yield better cardiovascular outcomes. The study attempted to control for cardiovascular risk factors in both groups and then vary the intensity of glucose control. Assuming this was achieved, the results clearly demonstrate that better glucose control did not improve cardiovascular outcomes. The authors comment that their veteran population limits applying these data to women. They also suggest different agents for control could alter these results. However, similar results are now appearing in other reports. How these findings will be incorporated into practice by all physicians will be interesting, especially given all the recent hype about trying to achieve better glucose control among diabetics. (Reviewer-John A. Weigelt, MD).

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**Keywords:** Type 2 Diabetes

**Print Tag:** Refer to original journal article
Checklists for Surgery—Their Time Is Now

A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population.

Haynes AB, Weiser TG, et al:


A surgical checklist reduces complications.

**Objective:** To evaluate the effectiveness of a checklist in the operating room.

**Design:** Prospective study with pre- and post-intervention periods.

**Participants:** 8 hospitals were pilot sites; 3733 patients were in the pre- and 3955 patients were in the post-intervention periods.

**Methods:** The checklist included 19 items, as well as 6 patient safety measures. A local data collector was present at each site. After the baseline collection period was completed, feedback was offered to each site regarding findings. The checklist was introduced to each site by lectures, written materials, and recorded video. Complications were defined using American College of Surgeons National Surgical Quality Improvement Program (NSQIP) criteria. Compliance with the checklist, especially the safety measures, was recorded. The primary end point was the rate of complications and deaths.

**Interventions:** Implementation of the checklist and training that occurred between the pre- and post-intervention periods.

**Results:** Patient age, type of procedure, and urgency were similar in the pre- and post-periods. Compliance with all 6 safety measures during the pre-period was 34% and increased to 57% in the post-period. Mortality fell from 1.5% to 0.8%; complications fell from 11% to 7%. Surgical-site infection (SSI) and unplanned return to the operating room fell significantly, while pneumonia rates did not.

**Conclusions:** A checklist in the operating room reduced morbidity and mortality.

**Reviewer’s Comments:** This intervention is easy and not costly. The reduction in morbidity and mortality is suggestive that something occurred. The question is what caused the reduction. The reduction did not occur at each institution. SSI, unplanned return, and pneumonia are the most common complications reported. Two of the 8 centers had a significant reduction in SSI and unplanned return. No institution had a significant fall in pneumonia rates. When all complications were evaluated, 1 other hospital had a significant fall. Deaths were significantly reduced in 2 hospitals. Compliance with the major 6 safety measures was only 57% after the intervention. The authors conclude that there is a cause and effect from the checklist. They do mention limitations, including a possible Hawthorne effect. It is not surprising that pneumonia rates did not fall as the checklist has very little to do with pneumonia postoperatively. This idea about safe surgery is good. It focuses our attention on the patient and little things that are often over looked, but I am not sure we have a direct cause and effect. We have started this program at our institution, and it is not as painful as many surgeons feared. (Reviewer—John A. Weigelt, MD).

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Keywords: Patient Safety

Print Tag: Refer to original journal article
Aspirin should be continued through the perioperative period for most patients.

**Objective:** To review the perioperative use of antiplatelet agents.

**Methods:** All available studies were identified through searching PubMed, EMBASE, and the Cochrane databases. Specific drugs of interest were aspirin, thienopyridines (clopidogrel), and glycoprotein (Gp) IIb/IIIa inhibitors (abciximab, eptifibatide). The authors independently reviewed identified abstracts and excluded those not meeting inclusion criteria.

**Results:** The authors review the mechanism of action, indications for, bleeding risk, and perioperative recommendations for the 3 classes of antiplatelet agents. Aspirin works by irreversibly inhibiting thromboxane A$_2$ from platelets and prostacyclin from endothelial cells. The platelet dysfunction lasts for the life of the platelet, while the endothelial cell dysfunction lasts only during aspirin therapy. It is indicated for stable coronary artery disease, peripheral arterial disease, as primary prevention for coronary events, for carotid endarterectomy, and for atrial fibrillation. There is little evidence of increased risk of perioperative bleeding except for intracranial surgery. Due to the risk profile, it is not recommended to stop aspirin use perioperatively except for intracranial surgery or other limited specific cases in which the small chance of bleeding outweighs the benefit of ongoing thromboprophylaxis. Thienopyridines irreversibly bind the platelet receptor, and are used in patients with unstable angina and patients undergoing percutaneous coronary intervention (PCI). They must be continued for at least 4 weeks after placement of a bare metal stent, with recommendations for 1 year of treatment. There is no role in primary prevention. Bleeding risk is high. Due to the significant bleeding risk, clopidogrel should be stopped at least 5 days prior to elective surgery. However, they should not be stopped in the setting of recent drug-eluting stent implantation. Gp IIb/IIIa inhibitors competitively inhibit the Gp IIb/IIIa receptor, lasting only as long as the drug is taken. They are used in patients with acute coronary syndrome and those undergoing PCI. There is an increased risk of perioperative bleeding, although very little data. These must be discontinued for at least 12 hours preoperatively to allow normal hemostasis.

**Conclusions:** Premature withdrawal of antiplatelet agents is associated with a 10% risk of thrombotic vascular events. In the setting of recent stent placement, particularly drug-eluting stents, these thromboses may be fatal. There are currently no guidelines for the perioperative use of these ubiquitous, potentially dangerous agents.

**Reviewer’s Comments:** As more and more patients will continue to take these life-sustaining drugs that can significantly increase perioperative morbidity, guidelines that help us all balance risk and benefit would be extremely helpful. The authors present some helpful recommendations, but the rigor of the analysis and the paucity of the data fall well short of guideline status. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Antiplatelet Agents

Print Tag: Refer to original journal article
Perforation During Colonoscopy Has High Mortality


Teoh AYB, Poon CM, et al:

Arch Surg 2009; 144 (January): 9-13

High ASA class and antiplatelet therapy are associated with mortality.

**Background:** Teoh et al review their series of patients with colonoscopic perforations, focusing on predictors of mortality and stoma formation.

**Methods:** Medical records of all patients with colonoscopic perforations between January 1, 1998, and December 31, 2005, from 3 institutions serving a population of approximately 1 million in Hong Kong were reviewed. Data abstracted included indication for colonoscopy, procedural details, demographics, and outcomes. Diagnosis of perforation was based on clinical, radiologic, and operative information. Colonoscopies were classified as diagnostic if no biopsy or a mucosal-only biopsy was done and as therapeutic if an endoluminal procedure was performed. A complete colonoscopy required visualization of the cecum and/or terminal ileum. Factors associated with mortality and colostomy formation were analyzed by regression.

**Results:** 37,971 colonoscopies were performed during the study period, with 43 colonoscopic perforations. The overall perforation rate decreased over time, with an overall average of 0.113%. Twenty-seven patients perforated during diagnostic colonoscopy, with 16 perforations during therapeutic colonoscopy. Patients with perforations during diagnostic colonoscopy were more likely to have severe looping, an incomplete colonoscopy, and factors predisposing to a difficult colonoscopy. Ten perforations in the diagnostic group and 3 in the therapeutic group were recognized by the colonoscopist during the procedure. The diagnosis of perforation was made most often by clinical examination and plain radiograph; only 3 patients required CT scan or water-soluble contrast enema for diagnosis. Thirty-nine patients underwent surgical intervention. Eleven patients underwent simple suture repair, 13 underwent resection with anastomosis, and 14 underwent stoma formation with or without concomitant resection. Thirty-day mortality was 25.6%, with a 30-day morbidity rate of 48.7%. Factors associated with stoma formation included the presence of moderate to severe contamination and the presence of malignancy. Factors not associated with stoma formation included adequacy of bowel preparation, time to presentation, and age. Factors associated with mortality included concomitant antiplatelet therapy and an American Society of Anesthesiologists (ASA) class ≥3. Factors not associated in a multivariate model included age, time to presentation, degree of contamination, and adequacy of bowel preparation.

**Conclusions:** The authors conclude that colonoscopic perforation is occurring with decreasing frequency, and suggest that patients with significant comorbidities, as defined by ASA class and the use of antiplatelet therapy, should undergo operative management.

**Reviewer's Comments:** The choice of nonoperative management of colonoscopic perforation is dependent on many things, with the patient’s clinical presentation and underlying diagnosis being paramount. Approximately 10% of patients in this series underwent nonoperative management (a fairly low number). Only by comparing operative to nonoperative therapy in patients who are candidates for either can a recommendation for operative therapy based on factors other than abdominal examination and evidence of sepsis be made.

(Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Colonoscopic Perforation

Print Tag: Refer to original journal article
The primary determinant of survival associated with tourniquet use is the presence or absence of shock.

**Background:** To report the effectiveness of field tourniquets in Iraq.

**Methods:** A prospective observational study was conducted from March 19, 2006, to October 4, 2006, of all patients with tourniquet use pre-hospital or in the emergency department. Tourniquet use was categorized both by location of use and relationship of application to the presence or absence of shock. Shock was defined as a weak or absent radial pulse. Patients with tourniquet use were also matched to patients with similar injuries where a tourniquet was not used.

**Results:** 232 patients had 428 tourniquets applied to 309 limbs; 194 tourniquets were applied pre-hospital, and the average time between injury and application was 10 minutes (range, 0 to 75 minutes). Shock was present in 6 of the patients in whom the tourniquet was applied pre-hospital. A total of 38 tourniquets were applied in the emergency department; shock was present in 4 patients. Average duration of tourniquet use was 1.3 hours. Overall survival was 87% and related to location of tourniquet use and presence of shock. In the absence of shock, survival was 90% compared to 10% if tourniquet use was associated with shock. Pre-hospital use was associated with an 11% mortality compared to 24% when tourniquets were used in the emergency department ($P=0.05$). When the presence or absence of shock was considered, location of use was not significant ($P=0.06$). Five patients with isolated limb injuries (average age, 41 years) in whom tourniquets were not used all died; 13 patients with isolated limb injuries (average age, 27 years) in whom tourniquets were used had a 77% survival rate. There were 10 nerve palsies; 6 were at the level of the wound and 4 were at the level of the tourniquet. Only 1 of the 4 palsies at tourniquet level persisted >24 hours.

**Conclusions:** Tourniquet use in the absence of shock is lifesaving. There were no significant complications seen with tourniquet use.

**Reviewer’s Comments:** There has been considerable debate about the use of tourniquets in the civilian setting, primarily due to a lack of evidence of effectiveness and the number of previous case reports of distal ischemia when they were used (albeit improperly). The most important aspect of this series is the association of shock with mortality, which is not new news. The remaining question is whether application of the tourniquet prior to onset of shock can prevent the fatal consequence. (Reviewer-Karen J. Brasel, MD, MPH).
Mortality and long-term survival are similar following total pancreatectomy (TP) and partial pancreatectomy, thus TP should be performed when oncologically appropriate.

**Background:** Total pancreatectomy (TP) for pancreatic adenocarcinoma is controversial. Higher operative morbidity and mortality for TP and adverse effects of permanent endocrine and exocrine insufficiency have been reported. Contemporary comparisons are lacking.

**Objective:** To determine the perioperative and long-term outcomes of a large population-based cohort of patients undergoing TP versus partial pancreatectomy (PP) for pancreatic adenocarcinoma.

**Design:** Retrospective cohort study.

**Methods:** Resected pancreatic adenocarcinoma patients were identified from the Surveillance, Epidemiology, and End Results (SEER) database (1998 to 2004) utilizing histology and site codes. Outcomes were perioperative mortality and long-term survival. Mortality 1 and 3 months after diagnosis was a surrogate for perioperative death. Survival after TP versus PP was compared by tumor location.

**Results:** 376 out of 4021 patients underwent TP for pancreatic adenocarcinoma. Of the 3,280 patients with pancreatic head tumors, 292 (9%) underwent TP and 2988 (91%) underwent pancreaticoduodenectomy (PD). Of the 315 patients with body/tail tumors, 32 (10%) underwent TP and 283 (90%) underwent distal pancreatectomy (DP). Of the 426 patients with unspecified tumor locations, 52 (12%) underwent TP and 374 (88%) underwent PP. The TP versus PD groups varied only by number of nodes evaluated ($P=0.01$). Patients with body/tail tumors undergoing DP were older ($P=0.03$), but otherwise similar. For unspecified tumor locations, the 2 groups were similar. The percentage of TP versus PP increased over time (9% to 14.3% by 2004), and year of diagnosis was the only variable that predicted TP versus PP (odds ratio [OR], 1.21 per year; $P<0.001$). Year of diagnosis predicted TP receipt for pancreatic head tumors (OR, 1.25 per year; $P<0.001$), but there were no significant predictors in body/tail or unspecified location groups. For all resected patients, 1- and 3-month mortality was 6.5% and 10.9%, respectively. One-month mortality after TP was 9.0% for head tumors, 9.3% for body/tail, and 5.8% for unspecified locations. Three-month mortality after TP was 13.5% for head tumors, 19.1% for body/tail, and 12.1% for unspecified. The 1 and 3-month mortality for TP did not differ from PP in any tumor location ($P>0.05$). **Discussion:** This study included all patients with nonmetastatic pancreatic adenocarcinoma regardless of tumor site; it analyzed >30-day mortality and also evaluated mortality based on tumor location. Controlling for patient and tumor factors, the long-term survival after TP versus PD was indistinguishable. **Conclusion:** Perioperative mortality and long-term survival are similar following TP versus PP for pancreatic adenocarcinoma, supporting the use of TP when oncologically appropriate.

**Reviewer's Comments:** This retrospective study is vulnerable to selection bias in terms of therapeutic modality. Also, the SEER database does not contain margin status. These data do provide a comprehensive population-based assessment of perioperative TP risk and suggest that it can be done safely with similar outcomes to PP. (Reviewer-Kathleen Christians, MD).

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Keywords: Total Pancreatectomy

Print Tag: Refer to original journal article
PLG US characteristics consistent with neoplasia are diameter ≥6 mm, single polyps, vascularity, or liver invasion.

Background: Polypoid lesions of the gallbladder (PLGs) are true polyps or benign pseudopolyps (cholesterol, inflammatory, or adenomyomas). Gallbladder cancer arises from adenomas by the adenoma to adenocarcinoma sequence. Cholecystectomy has been recommended for polyps ≥10 mm. Endoscopic ultrasound is unable to differentiate benign from malignant polyps.

Objective: To compare preoperative PLG US characteristics with histopathology utilizing updated US technology.

Methods: Patients with gallbladder USs undergoing cholecystectomy between August 1996 and July 2007 were included; gallbladder adenocarcinomas were excluded. USs were re-read if available, or the original report was used. Histopathology was obtained from original pathology reports. Neoplastic lesions included adenomas and adenocarcinomas, while pseudopolyps were considered benign.

Results: Of 130 patients, only 94 PLGs were identified on histopathology (79 pseudopolyps, 15 true polyps). No PLGs were found in 36 patients (27%). Thirty-one PLGs had malignant US traits; 29 of these were ≥10 mm, 12 demonstrated vascularity, and 1 invaded the liver. Eight were actually neoplastic (2 benign adenomas, 2 with low- and 2 high-grade dysplasia, and 2 adenocarcinomas). Of the PLGs thought to be benign, 7 were neoplastic (4 benign and 2 dysplastic adenomas; 1 adenocarcinoma). Fifteen total PLGs had neoplasia. US characteristics for neoplasia were size ≥6 mm, single polyps, vascularity, and liver invasion. Diameters were overestimated in 22% and underestimated in 6% by >4 mm. Twenty-five patients underwent serial USs. Nine polyps grew and 4 were neoplastic; 1 PLG did not grow, but was dysplastic. The positive predictive value (PPV) and negative predictive value (NPV) for US diagnosing a neoplastic PLG based on size ≥10 mm was 28.5% and 93.1%, respectively, with a false-negative rate of 5.0%. For PLGs ≥6 mm, the PPV and NPV were 18.5% and 100%, respectively, with a false-negative rate of 0%. Discussion: US criteria significant for neoplasia included vascularity, liver invasion, and size. Expanding size to ≥6 mm maintained statistical significance; studies show up to 13% of PLGs <10 mm are neoplastic. Preoperative US and pathology were discordant in >50%, usually over diagnosis of PLG when there was none. PLG diameters were wrong in 28%. US did not reliably distinguish benign from malignant PLGs.

Conclusions: Histopathology remains the gold standard verifying malignancy in PLGs. US cannot differentiate benign from malignant with certainty. Cholecystectomy is recommended for patients with primary sclerosing cholangitis, who cannot be followed, or are symptomatic. PLGs that grow, invade, are vascular, or ≥6 mm should be resected.

Reviewer's Comments: In this retrospective review, USs were not reviewable in 21% and incidental PLGs may not have been evaluated as thoroughly as in a prospective study. US accuracy remains limited by the examiner, the technology, and the question being answered. (Reviewer-Kathleen Christians, MD).
Laparoscopic repair of giant paraesophageal hernia is durable with a radiographic recurrence rate of 15% and a reoperation rate of 4.4%.

**Background:** Some controversy exists over whether a laparoscopic approach to the repair of giant paraesophageal hernia (LRGPEH) is appropriate given the comparatively high rates of recurrence and reoperation.

**Objective:** To evaluate the long-term recurrence rates and symptom improvement in patients after LRGPEH and correlate these findings with radiographic recurrence and risk factors for recurrence.

**Design:** Retrospective review.

**Methods:** Consecutive patients undergoing LRGPEH were identified from 1997 to 2003 at a single institution, allowing a minimal potential follow-up of 5 years. Demographic data were extracted from the medical records. Long-term follow-up was accomplished through telephone communication and questionnaires, and patients were asked to obtain a current barium esophagram (BE). Clinical outcomes and quality of life (QOL) were measured.

**Results:** 187 consecutive patients were identified who met the follow-up criteria. Of these, laparoscopic repair was accomplished in 185 patients. Questionnaires were completed in 65% and BE performed in 86% of patients. All patients completed routine clinical follow-up (median follow-up, 77 months). Most patients were female (71%); 53% were ≥70 years and 47% <70 years of age. Pulmonary disease was present in 35 (19%) preoperatively. Preoperative hernia size was estimated from the amount of intra-thoracic stomach on barium esophagram (BE): complete intrathoracic stomach, 43 (27%); 75% to 99%, 32 (20%); 50% to 75%, 64 (20%); and 30% to 50%, 22 (14%). Esophageal lengthening procedures were performed in 160 patients (86%) and crural reinforcement with mesh in 30 patients (16%). Postoperative Gastroesophageal Reflux Disease Health-Related QOL (GERD-HRQOL) scores were excellent to good in 86.7%. BE was performed a median 51 months postoperatively, and demonstrated radiographic hernia recurrence in 15% of patients. There was no statistically significant association of preoperative variables with radiographic recurrent paraesophageal hernia although a trend with preoperative pulmonary disease was noted. No symptoms were associated with radiographic recurrence; most radiographic recurrences were small (<30%). There was no association of esophageal lengthening procedure and recurrence or lack thereof. The reoperation rate was 4.4% (n=7); reoperations were performed for symptomatic recurrence at a median of 44 months postoperatively.

**Conclusions:** LRGPEH provides a durable repair with a radiographic recurrence rate of 15% and a reoperation rate of 4.4%. At a median follow-up of 6 years, patients were satisfied and had preservation of GERD-related QOL.

**Reviewer’s Comments:** This study is the largest of its kind to report long-term radiographic data on paraesophageal recurrence. To provide context, it is useful to realize that series from the open literature describe a radiographic recurrence rate of 2% to 20%. Also, the number of esophageal lengthening procedures performed in this cohort of patients was much higher than most practices and crural reinforcement lower. The authors are tempted to attribute the relatively low recurrence rate to this fact, but no such association was seen on analysis. (Reviewer-Todd A. Kellogg, MD).

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**Keywords:** Paraesophageal Hernia

**Print Tag:** Refer to original journal article
Laparoscopic Exploration for Early Postoperative Complications

Laparoscopic Diagnosis and Treatment of Postoperative Complications.

Kirshtein B, Domchik S, et al:


Laparoscopic re-exploration for early postoperative complications after both open and laparoscopic primary procedures is feasible and safe, and in most cases can avoid unnecessary laparotomy.

**Background:** Despite previous reports suggesting a benefit, there remains no clear consensus regarding the use of laparoscopic exploration for the diagnosis and treatment of early postoperative complications after primary laparoscopic and open procedures.

**Objective:** To determine the role of laparoscopy in the management of suspected early postoperative complications.

**Design:** Retrospective review.

**Methods:** The records of patients who underwent laparoscopy for complications of previous surgery from 2000 to 2005 were reviewed. Demographic and clinical variables were extracted from the record. These included age, gender, American society of Anesthesiologists (ASA) score, type of primary surgery and its complication, indication for reoperation, time course between operations, operating room (OR) time, diagnostic accuracy and therapeutic interventions, conversions, complications, and mortality.

**Results:** During the 6-year period, 64 patients underwent laparoscopy for early postoperative complications. Mean patient age was 51 years (range, 20 to 96 years) and 49 were women. The majority of patients were ASA Class 2 (n=57). Primary surgeries consisted of 49 laparoscopies, 14 laparotomies, and 1 endoscopic procedure. The median time interval between operations was 2 ± 4.5 days; mean operative time was 34.3 ± 18.3 minutes. Diagnostic laparoscopic re-exploration was negative in 28% (n=18). The majority (n=23) of laparoscopic re-explorations were after cholecystectomy (n=23) of which 7 bile leaks, 5 infected hematomas, 2 subhepatic abscesses, and 1 small bowel perforation were diagnosed and treated. In addition to cholecystectomy, the majority of laparoscopic re-explorations were performed after bariatric procedures (n=9; all laparoscopic), hernia repair (n=11; 4 open, 7 laparoscopic), and appendectomy (n=5; 2 open, 3 laparoscopic). The most common indications for laparoscopic re-exploration was peritonitis (n=22) and abdominal pain (n=18) followed by intra-abdominal sepsis (n=7) and small bowel obstruction (n=6). The procedure was accomplished laparoscopically in 86% (n=18) with conversion to open in 14% (n=9). Repeat re-laparoscopy was necessary in 7 patients. No cases were misdiagnosed. The postoperative complication rate associated with laparoscopic re-exploration was 12.5%. There were no deaths directly associated with laparoscopic re-exploration.

**Conclusions:** Laparoscopic re-exploration for early postoperative complications after both open and laparoscopic primary procedures is feasible and safe, and can usually avoid unnecessary laparotomy.

**Reviewer’s Comments:** The authors report no mortalities directly associated with laparoscopic re-exploration, despite an 11% overall mortality rate in these patients. It could be argued that the laparoscopic approach did not provide adequate treatment and this contributed to these deaths, which were due to uncontrolled bile leak, irreversible sepsis, and respiratory failure among other things. Unfortunately, the data set as presented is not able to address this issue. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Diagnostic Laparoscopy

Print Tag: Refer to original journal article
Metabolic Surgery for DM2

Narrative Review: Effect of Bariatric Surgery on Type 2 Diabetes Mellitus.

Vetter ML, Cardillo S, et al:


The various bariatric procedures result in a differential physiologic response involving the enteroinsular axis, with procedures that bypass the foregut providing an earlier and more powerful impact on DM2.

**Background:** Bariatric surgery leads to substantial and durable weight loss. The incidence of type 2 diabetes (DM2) in these morbidly obese patients is 30%. DM2 has been reported to undergo remission in 84% to 98% of diabetic patients undergoing bypass procedures (eg, Roux-en-Y gastric bypass or duodenal switch) and 48% to 68% for restrictive operations such as banding procedures.

**Objective:** To discuss the various bariatric procedures and how they improve DM2 by altering the enteroinsular axis.

**Design:** Narrative review.

**Methods:** English-language publications discovered by searching PubMed for articles published between 1967 and 2008 were considered after evaluating study quality.

**Results:** Glycemic control occurs rapidly after bariatric surgery and most likely results from caloric restriction and alterations in the gut hormones that control insulin secretion. The interplay between the gut and pancreas is referred to as the enteroinsular axis; insulin secretion and sensitivity are affected by a class of gut hormones called incretins, which include glucagon-like peptide-1 (GLP-1) and glucose-dependent insulino tropic peptide (GIP). Ghrelin and peptide YY (PYY) are hormones that decrease insulin secretion and have a prominent role in appetite. The effect of bariatric surgery on the enteroinsular axis differs for bypass procedures and restrictive procedures. Intestinal bypass procedures increase GLP-1 and PYY levels. In contrast, restrictive procedures do not increase incretin, ghrelin, or PYY levels. The effect of bypass procedures on ghrelin is not definitively known. Understanding the resultant physiology behind the various bariatric procedures will assist the physician in deciding which procedure is likely to be most beneficial for a given patient and assist in the postoperative care of the bariatric patient.

**Conclusions:** The relative glycemic normalization seen in DM2 after bariatric surgery is multifactorial. The various bariatric procedures result in a differential physiologic response involving the enteroinsular axis, with procedures that bypass the foregut providing an earlier and more powerful impact on DM2.

**Reviewer's Comments:** This narrative serves as a reasonable review of a very hot topic in surgery, that is, the prospect of "metabolic" surgery for the treatment of DM2. None of the current theories adequately explain the potential mechanism behind the improvement in glucose homeostasis seen after bypass procedures, which appears to be more powerful relative to restrictive procedures. Caloric restriction and other behavioral lifestyle factors certainly have an early role. Later, as a significant amount of weight is lost, increasing insulin sensitivity is an important factor, as evidenced by the pattern of improvement after restrictive procedures. The incretin GLP-1 likely has a role after bypass procedures; however, the effect of these procedures on the pancreas has not yet been studied. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Diabetes

Print Tag: Refer to original journal article
Carcinoid is the most common small bowel malignancy.

**Background:** Small bowel cancer does not represent a large percent of gastrointestinal malignancies. Small bowel tumors appear to be increasing. A better understanding of the epidemiology and outcome for patients with small bowel malignancies would be helpful to physician and patient alike.

**Objective:** To determine the incidence of small bowel cancers in the U.S. and to examine treatment and survival trends.

**Design:** A retrospective review of cancer databases was conducted. The National Cancer Data Base (NCDB) from 1985 to 2005 and the Surveillance Epidemiology and End results (SEER) from 1973-2004 were used.

**Participants:** 67,843 patients with small bowel malignancies were found in the NCDB.

**Methods:** The NCDB is not a population-based database and was used to determine clinical information. SEER is population-based and was used to determine epidemiologic trends. The primary outcomes included determining any changes in incidence, treatments, and survival.

**Results:** The types of tumors in the NCDB were carcinoid (37%), adenocarcinoma (37%), lymphoma (17%) and stromal tumors (8%). Carcinoid tumors were most common in the ileum and adenocarcinomas were in the duodenum. Nodal involvement was more common with carcinoid tumors. Distant metastases were most common with adenocarcinomas; 58% of adenocarcinomas presented as stage III or IV. Using the SEER data, carcinoid tumors showed the most dramatic increase in incidence from 2.1 to 9.3 per million, while adenocarcinomas increased from 5.7 to 7.3 per million. NCDB reports showed carcinoid tumors increased while adenocarcinomas decreased from 1985 to 2005. Surgery was more common as time progressed for carcinoid and stromal tumors. Adjuvant chemotherapy increased over time for adenocarcinomas. There was no difference in 5-year survival for any tumor type over time.

**Conclusions:** The incidence of small bowel tumors has increased over the last 20 years, but little change has occurred in treatment modalities and survival remains unchanged.

**Reviewer's Comments:** Interesting but not optimistic is how one could describe this report. Small bowel malignancies appear to be increasing with carcinoids being the most frequent type at this time. Treatments are not changing, and survival is not changing. These results are interesting since among all types of small bowel tumors, 76% to 86% of patients are presenting without distant metastases. Given the local nature of these tumors, one would expect that with adequate surgery and improved chemotherapeutic agents, our results would be better. Since gastrointestinal stromal tumors make up the majority of stromal tumors, it was surprising that improved survival was not documented based on chemotherapy for this tumor. It is clear we have our work cut out for us when it comes to managing small bowel tumors. (Reviewer-John A. Weigelt, MD).

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**Keywords:** Small Bowel Cancer

**Print Tag:** Refer to original journal article
Apgar for Surgeons?

Utility of the Surgical Apgar Score: Validation in 4119 Patients.

Regenbogen SE, Ehrenfeld JM, et al:

Arch Surg 2009; 144 (January): 30-36

A simple clinical score correlates with patient outcomes.

**Background:** As surgical experience increases, a surgeon often gets a feeling that the patient is not going to "do well." Quantitating this feeling early could help decide management choices for patient, family, and physician.

**Objective:** To assess whether a simple postoperative score can be used to identify patients who will develop complications and have a high mortality.

**Design:** Prospective review of retrospective collected data.

**Participants:** 4,119 patients had complete electronic records from surgery and were included.

**Methods:** An Apgar score had been devised in a pilot study. This score used 3 intraoperative variables to predict 30-day morbidity and mortality. The 3 were estimated blood loss, lowest heart rate, and lowest mean arterial pressure. A total score of 10 is possible with lower scores indicating worse outcomes. Patients having major general and vascular surgical procedures were included. Outcomes were compared to National Surgical Quality Improvement Program (NSQIP) data on the same patients. The primary end points were major complications and death from the NSQIP data.

**Interventions:** Intraoperative data were obtained electronically on the patients and used to calculate the Apgar score.

**Results:** 581 patients had ≥1 major complications postoperatively and 94 patients died. There were 1441 patients with an Apgar score of 9 to 10, and 5% had complications and 0.1% died. There were 128 patients with Apgar scores ≤4, and 56% had complications while 19% died. Patients were further stratified by magnitude of operation, and the Apgar score continued to track with complications and death. NSQIP data still provided better discrimination than the Apgar score for morbidity and mortality.

**Conclusions:** Apgar scores can provide an early assessment of the risk of postoperative complications and death.

**Reviewer's Comments:** NSQIP beware. A simple score using 3 intraoperative parameters does a very good job of predicting patient outcomes. A low score is associated with a ≥50% complication rate and a 25% mortality rate. The immediate availability of the score is a distinct advantage. A low score could guide management approaches and help support a subjective feeling of the surgical team. Allowing the score to help identify patients needing ICU resources is one use. NSQIP can be used for quality assessments given its risk adjustment methods, but the Apgar score is not risk adjusted and should not be proposed as a quality yardstick. However, it is a unique and interesting approach to assess the risks of complications and death in the early postoperative period. (Reviewer-John A. Weigelt, MD).

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Keywords: Surgical Apgar Score

Print Tag: Refer to original journal article
Quality Monitoring of Surgical Patients Possible

Continuous Monitoring of Adverse Events: Influence on the Quality of Care and the Incidence of Errors in General Surgery.

Rebasa P, Mora L, et al:


AEs in surgical patients increase the length of hospital stay.

**Background:** Longitudinal evaluation of patient care is necessary to improve performance. Data must be obtained reliably and returned to providers in a form that is valid and easy to understand. This challenge has thwarted many an attempt at performance improvement programs.

**Objective:** To describe the results from a longitudinal performance improvement program for a general surgical hospitalized population.

**Design:** Prospective patient surveillance program.

**Participants:** 3807 consecutive patients.

**Methods:** A reporting system allowed any member of the surgical department to enter an event believed to be adverse for the patient. No specific list of events was constructed. A Peer reviewer was required to review the case and decide if it met the definition of an adverse event (AE) (ie, an unexpected consequence that was a result of treatment). A preventable AE was considered an error in care. Once an AE was confirmed, it was reviewed and deemed preventable or not, and the outcome of the event was recorded. The primary end point was the number of AEs. Patient outcome was another end point.

**Interventions:** An ACCESS database was used. The Peer review of the event and feedback to the entire department of surgery were done monthly and quarterly.

**Results:** 2193 AE were found (31%). The mean hospital stay was increased when an AE occurred; 330 AE (15%) were considered to be caused by an error. The 3 most common errors were electrolyte abnormality, surgical procedure with error, and pneumothorax. Over time, the number of patients with AEs remained constant; however, the number of AEs classified as errors decreased.

**Conclusions:** Concurrent monitoring for AEs and feedback can reduce the number of errors on a surgical service.

**Reviewer's Comments:** This report confirms what most of us know. Real-time monitoring of patients with appropriate feedback to providers helps improve the quality of care. This is no secret, just hard to accomplish in many of our systems today. The system described requires cooperation from all members of a surgical department. The Peer review of each case is not well described, especially in regard to how much time is spent on these reviews. How 30-day follow-up was obtained is also not described. No preconceived list of AEs was used initially. It will be interesting to see, over time, if a concise list of events can be developed that might make it easier to report these events. The list that was generated from this service is telling regarding what risks surgical patients must face during their hospitalization. Quality care requires this type of system, and we should all be looking for ways to implement similar approaches at our institutions. (Reviewer-John A. Weigelt, MD).

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Keywords: Performance Improvement

Print Tag: Refer to original journal article
A multi-principled approach may be the best method to allocate scarce resources during a public health emergency.

**Background:** Patients who require life-sustaining treatments in the United States generally receive them, unless such therapy is withheld at the request of the patient or surrogate. However, in a public health emergency, it is likely that resources would be limited, requiring difficult decisions about resource allocation.

**Objective:** To describe the ethical principles that could (and should) guide allocation of scarce resources during a public health emergency. **Discussion:** The authors propose a case example. During an influenza epidemic, there is a critical shortage of ventilators. Which of the following patients should receive the one available ventilator? (1) A 32-year-old woman with severe primary pulmonary hypertension intubated after an accidental overdose of narcotics; her likelihood of survival is 90%. (2) A housebound 83-year-old man with inoperable coronary artery disease and peripheral vascular disease substantially limiting his long-term survival; his likelihood of survival to hospital discharge is 50%. (3) A 44-year-old man with sepsis and multi-organ failure without chronic disease who has a 30% survival to hospital discharge.

**Results:** The authors outline a multi-principle strategy to allocate ventilators, incorporating a strategy to save the most lives, save the most life-years, and prioritize those who have not had the chance to live through life's stages. Each principle is scored 1 to 4, with priority given to those with the lowest scores. Saving the most lives addresses the prognosis for short-term survival. The authors use the Sequential Organ Failure Assessment (SOFA) score, with 1 point assigned to a score <6 and 4 points assigned to a SOFA score >12. The prognosis for long-term survival addresses saving the most life-years, with points assigned for number and severity of comorbidities. The life-cycle principle addresses age, with age 12 to 40 years assigned a score of 1 and age >75 years assigned a score of 4. The authors suggest that allocation to patients’ age <12 years would need to be done differently as different ventilators are used.

**Conclusions:** The public should be engaged early in the process of choosing among ethically permissible strategies that allocate scarce resources during public health emergencies.

**Reviewer's Comments:** The authors outline the ethical principles underlying allocation of scarce resources. Their approach is much different than the green, yellow, red, and black tag approach taught as a part of mass casualty disaster management and planning. Although somewhat cumbersome to apply under emergency circumstances, the authors' approach would be possible in more urgent settings. It is certainly better to apply criteria that have been previously accepted and known by all involved, specifically the public. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Life Support

Print Tag: Refer to original journal article
CT Angiography Accurate in Diagnosing PAD

*Diagnostic Performance of Computed Tomography Angiography in Peripheral Arterial Disease: A Systematic Review and Meta-Analysis.*

Met R, Bipat S, et al:

*JAMA 2009; 301 (January 28): 415-424*

The accuracy of CT angiography is slightly lower in tibial compared to femoropopliteal and aortoiliac disease.

**Background:** CT angiography (CTA) is increasingly used to evaluate peripheral arterial disease (PAD). Although CTA does not have therapeutic capabilities, it provides diagnostic information with a decreased contrast load compared to standard digital subtraction angiography.

**Objective:** To perform a systematic review of current studies comparing CTA with digital subtraction angiography in patients with PAD.

**Methods:** A search was performed of MEDLINE and EMBASE databases for articles using CTA to diagnose patients with claudication (PAD) from January 1966 to August 2008. A quality assessment tool was applied to all included studies; results from trials with high quality were compared to those from studies with lower quality. The primary outcome of interest was the sensitivity and specificity of CTA. Ultimately, sensitivity and specificity to detect >50% stenosis in each of several arterial segments was reported.

**Results:** 1031 articles were initially identified; 122 were duplicated, and 868 were excluded as they did not meet primary inclusion criteria. Forty-one studies were selected for full-text review. Twelve trials were excluded because the primary data were not reported, 1 study included <10 patients, 3 used CTA for the diagnosis of aneurysm, 3 did not provide clear reasons for the use of CTA, and 2 used single-slice CTA. The 20 included studies covered 957 patients. Median study quality was 11 points (range, 6 to 15). The sensitivity for aortoiliac disease was 96% (91% to 99%) and the specificity was 98% (95% to 99%). For femoropopliteal arteries, the sensitivity was 97% (95% to 99%) and the specificity was 94% (85% to 99%). For tibial arteries, the sensitivity was 95% (85% to 99%) and the specificity was 91% (79% to 97%). The results did not differ between low- and high-quality studies.

**Conclusions:** CTA is an accurate modality to diagnose PAD.

**Reviewer's Comments:** This report confirms the practice that has become pervasive with respect to the use of CTA. It is important to remember that this still requires a contrast load, so it should be used only when absolutely necessary; many patients will require further contrast administration for catheter-based intervention. It is also important to remember that the accuracy applies only to PAD in detecting >50% stenosis; this is not generalizable to traumatic injury in which the intimal dissection may be much more difficult to detect.

(Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: CT Angiography

Print Tag: Refer to original journal article
Background: Incisional ventral hernia (IVH) is a frequent complication of laparotomy (4% to 13%); 4% of patients who undergo laparotomy require additional surgery to repair an IVH. Suture repair has high recurrence rates (12% to 54%); mesh repair recurrence rates are lower (2% to 36%).

Objective: To compare the outcome of laparoscopic versus open repair of IVH with respect to surgical time, length of stay (LOS), complications, wound pain, and recurrence rates.

Methods: Studies on laparoscopic and open IVH repair published between January 1993 and August 2007 were identified. Only randomized, controlled trials (RCTs) on IVH repair were included in the meta-analysis.

Results: 5 RCTs containing 366 patients qualified for analysis. Open IVH repair took longer than laparoscopic, but the difference did not reach statistical significance (P = 0.143). Two trials contributed to wound pain analysis, and no significant difference was shown. Open IVH repair had higher complication rates than laparoscopic (fixed P < 0.001, random effects P = 0.028). Laparoscopic IVH repair had significantly shorter LOS (random effects P = 0.01). There was no significant difference in recurrence rates between approaches. Laparoscopic IVH repair eliminates the need for extensive tissue dissection. Small surgical wounds reduce LOS, decrease wound complications, result in less pain, and promote early recovery. A prosthetic overlap > 3 cm from the hernia's edge and transabdominal nonabsorbable sutures for mesh fixation are necessary. No significant difference in surgical time was found, but the open approach trended toward longer times. Studies in this meta-analysis did not address the incidence of bowel injuries. Postoperative seromas commonly occur in the laparoscopic approach but are usually asymptomatic. Seromas are not considered a complication unless they are symptomatic or do not self-resolve after 4 to 6 weeks. Postoperative pain was less in the laparoscopic group, but can occur at the transfascial suture, especially if large bioprosthetics are used to replace the abdominal wall defect. LOS after a laparoscopic repair is less than with open repair. A low incidence of recurrence was noted with both approaches. Whether laparoscopic repair is less (Reviewer: I think something was left out of this sentence) remains unclear because of the limited number of studies, short follow-up, and trial heterogeneity.

Conclusions: Laparoscopic repair of IVH is safe, has fewer complications, shorter LOS, and possibly shorter surgical time; postoperative wound pain and recurrence rates are similar.

Reviewer's Comments: Results of this meta-analysis are questionable because: included studies were not double-blinded; confounding variables were not controlled (type and technique of mesh placement, hernia size, and patient comorbidities); and the weighted effect of these heterogeneous trials was variable (some trials accounted for > 50% of the data). Also, no major multicenter RCT was analyzed. While results of laparoscopic IVH are promising, conclusions await large, multicenter RCTs. (Reviewer-Kathleen Christians, MD).

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Keywords: Incisional Ventral Hernia

Print Tag: Refer to original journal article
Hold Physicians Responsible for Diagnosing Inherited Cancer Syndromes

Identifying Lynch Syndrome: We Are All Responsible.
Sanchez JA, Vogel JD, et al:
Dis Colon Rectum 2008; 51 (December): 1750-1756

Familial risk assessment and standardized testing and reporting are critical to the identification of patients with inherited cancer syndromes.

Background: Lynch syndrome (LS), an autosomal dominant cancer syndrome caused by a germline mutation in the DNA mismatch repair (MMR) gene, accounts for 1% to 2% of colorectal cancers. Microsatellites are repeating DNA sequences prone to base pair mismatches. Defective DNA MMR mechanisms result in error accumulation causing microsatellite instability (MSI-H). MSI-H alone is not diagnostic for LS. Diagnosis relies on family history and cancer characteristics.

Objective: To evaluate the impact of MSI-H pathology findings on LS evaluation by clinicians.

Design: Retrospective review.

Methods: Microsatellite unstable tumors were identified from a tissue bank, and MLH1 methylation was determined. Tumors with ≥30% of the markers exhibiting instability were considered highly unstable (MSI-H). Clinical data and management recommendations from the pathologist and clinician were obtained from the medical record. An appropriate response to MSI-H histology included risk counseling, increased surveillance, testing, and obtaining a family history. Patients with known hereditary cancer were excluded.

Results: 51 of 251 tumors were MSI-H and included in the study. Thirty-one tumors (61%) tested positive for MLH1 promoter hypermethylation. Nine of 51 MSI-H tumors were identified by pathologists as suspicious for LS, 8 were investigated by the clinician, and 3 were diagnosed as LS. The clinician identified 5 patients as having a history of LS, and 2 were diagnosed with LS.; 37 patients with MSI-H were not identified by the pathologist or clinician, and 2 met Amsterdam criteria. When the pathologist tested for MSI-H or MMR protein loss and reported it, an appropriate LS investigation occurred 89% of the time, resulting in a 33% diagnosis rate of LS in pathologist-identified patients. If no testing occurred, only 12% were investigated for LS, and 10% were ultimately diagnosed with the condition. Discussion: If the pathologist failed to diagnose an MSI-H tumor, clinicians often failed to identify LS patients. The main reason for overlooking potential LS patients was an incomplete family history. When pathologists reflexively tested tumors, the LS diagnosis rate was 3 times higher. Surgical therapy was not influenced by MSI-H status. All patients with histology suspicious for MSI-H should be evaluated by the clinician for Amsterdam criteria regardless of the MLH1 methylation status. As practice patterns became more standardized, identification rates improved.

Conclusions: The results underscore the importance of familial risk assessment and standardized testing and reporting protocols when MSI-H is present in the identification of patients with LS.

Reviewer's Comments: This retrospective analysis is potentially influenced by the accuracy of the family history in the medical record. Nevertheless, it underscores the importance of pathologists and clinicians working together, of clinicians obtaining detailed family histories, and of standardized testing and reporting to increase capture rates in the diagnosis of LS. (Reviewer-Kathleen Christians, MD).

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Keywords: Lynch Syndrome

Print Tag: Refer to original journal article
Pancreatic fistulae have graded clinical severity and clear risk factors. Successful management requires a high index of suspicion and early detection.

**Background:** Pancreatic fistulae (PF) occur in 5% to 30% of cases and linked to increased costs and death. **Objective:** To explore the clinical effects of PF and identify preventive methods. **Methods:** Key citations between January 1990 and November 2007 were reviewed. **Results:** The International Study Group on Pancreatic Fistula (ISGPF) defined PF as any volume of drain output on or after postoperative day (POD) 3, with amylase >3 times the upper normal serum value. Grade A fistulae are transient, asymptomatic, and evident only by elevated drain amylase ("biochemical"). Grade B are symptomatic and managed by antibiotics, nutrition, somatostatin analogs, and percutaneous drainage. Grade C are severe, require interventions (potentially surgery), and may cause sepsis, organ dysfunction, or death. Grades B and C are "clinically relevant." Risk factors include soft pancreas, ≤3 mm pancreatic duct, and pathology (ampullary or duodenal carcinoma, distal cholangiocarcinoma, and/or intraductal papillary mucinous neoplasia, cystadenomas, islet tumors, or duodenal adenomas). Patient factors include age, gender, coronary artery disease, jaundice, creatinine clearance, neoadjuvant therapy, and blood loss >1500 mL. Distal versus central pancreatectomy conferred 5% versus 20% to 63% fistula rates, respectively. Pancreatectoduodenectomy with pancreaticojejunostomy conferred a 2% to 19% fistula rate, and pancreaticogastrostomy offered no advantage. Duct-to-mucosa anastomosis yielded a lower fistula rate. Data regarding stents across the pancreatic anastomosis are inconclusive. Ductal ligation, stapling versus suturing, and fibrin sealants confer no advantages. Selective administration of octreotide for high-risk glands reduces the ratio of clinically relevant fistulae to biochemical fistulae except in distal pancreatectomy. Success relies on early diagnosis based on drain amylase. Daily volumes >200 mL on or after POD 4 indicate clinically relevant PF. CT is indicated for fever, leukocytosis, or sinister drain effluents. Intravenous fluid, nutritional support, and antibiotics may be necessary. Image-guided drainage is performed for large fluid collections unresponsive to conservative therapies. Surgical exploration is indicated for anastomotic dehiscence and clinical deterioration. **Conclusions:** The ISGPF established a consensus definition of PF and grades of severity. Risk factors were delineated. Technical and anastomotic modifications and prophylactic octreotide are used in high-risk patients. Success depends on early detection. Drain analysis is the principal diagnostic tool with CT as an adjunct. Nonoperative management includes maintaining fluid balance, nutrition, and antibiotics or octreotide as indicated. Percutaneous drainage or surgical exploration is indicated for large fluid collections or clinical deterioration. **Reviewer's Comments:** The authors summarize the definition of pancreatic fistula, provide clinical severity grades, delineate risk factors, and tackle controversial technical and management issues of PF based on the published literature. While many issues remain widely debated, standardized definitions and care plans will pave the way for randomized, controlled trials and an evidence-based approach to prevention of PF. (Reviewer-Kathleen Christians, MD).

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Keywords: Pancreatic Fistula

Print Tag: Refer to original journal article
Acellular Dermal Matrix Associated With High Complication Rates

Use of Human Acellular Dermal Matrix for Abdominal Wall Reconstructions.
Maurice SM, Skeete DA:


ADM fascial repairs are associated with high rates of complication and recurrence. Implant size, implantation technique, and postoperative infection are associated with more recurrences.

Background: Acellular dermal matrix (ADM; aka, AllodermTM) is a fascial substitute for repairing abdominal wall defects, particularly in situations of contamination or infection. Despite increasing popularity, its use has not been well scrutinized.

Objective: To determine risk factors for recurrence and wound complications associated with use of ADM.

Design: Retrospective review.

Methods: Patients ≥18 years of age who had abdominal wall reconstructions with ADM during 2004 to 2006 were identified. Patient demographics and clinical, surgical, and technical factors were determined by medical records review. Outcomes assessed included recurrences and infectious and noninfectious complications. Risk factors for recurrences and infectious wound complications were determined using univariate and multivariate regression analyses.

Results: 63 patients were included in the analysis. Mean body mass index was 38 kg/m2 (range, 19 to 70). Comorbidities included diabetes (44%), COPD/chronic cough (19%), use of immunosuppressive medications (25%), and smoking history (32%). Recurrent hernia was present in 38 patients (60%). Wounds were classified as clean (59%), clean-contaminated (13%), contaminated (6%), or dirty (22%). The average number of ADM sheets was 3 (range, 1 to 16), the average size of the ADM implant was 242 cm² (range, 16 to 1044), and 11 cases were emergent. Polypropylene sutures were used in 54 cases (86%). Primary skin closure was used in 53 patients and a subcutaneous drain in 46 patients. A running suture was used to secure the ADM in 39 cases (62%). Repairs were as follows: ADM below the fascia with overlap (65%); ADM directly approximated to the fascial edge (29%); or ADM above the fascia with overlap (6%). Perioperative antibiotics were used in every case. No patient required ADM removal. The incidence of postoperative wound infections, noninfectious wound complications, and recurrences was 35%, 44%, and 41%, respectively. Long surgical times (≥300 min; $P = 0.02$), implants ≥100 cm² ($P = 0.02$), and repairs using >2 ADM sheets were associated with development of postoperative wound infection ($P = 0.02$). Independent risk factors for hernia recurrence were implant size of ≥100 cm² ($P = 0.01$), approximation of ADM directly to the fascial edge ($P = 0.02$), long surgical time ($P < 0.01$), and the presence of a postoperative wound infection ($P = 0.02$).

Conclusions: ADM fascial repairs are associated with high rates of complications and recurrences without necessitating ADM removal. Implant size, implantation technique, and postoperative infection are associated with more recurrences.

Reviewer’s Comments: Bioprosthetic mesh is big business, with a new type or brand introduced every other month. Surgeons are always looking for a better option when faced with difficult abdominal wall defect scenarios. Unfortunately, good data on these products are hard to find. This study contributes to what is known about ADM. However, without a comparative group, it is difficult to draw firm conclusions. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Acellular Dermal Matrix

Print Tag: Refer to original journal article
Most small hospitals in need of a general surgeon do not generally hire locum tenens surgeons to provide ongoing surgical care.

**Background:** A shortage of general surgeons in the U.S. exists, and particularly affects rural areas. Hospitals in these areas must find alternative strategies to provide surgical services to their populace. **Objective:** To determine the degree to which small rural hospitals are using locum tenens surgeons to provide surgical services. **Methods:** Identification of rural hospitals was made using rural-urban commuting area codes (RUCA). The most rural communities were considered for this project. Administrators from 129 rural hospital administrations were contacted by telephone, and a 6-item survey was administered comprised of questions inquiring whether the hospital had, over the past 5 years, provided surgical services, recruited or attempted to recruit a general surgeon, or used locum tenens surgeons (and if so, for what role). **Results:** Hospitals located in the most isolated small rural areas accounted for 52% of those surveyed; 76% of surveyed rural hospitals had offered surgical services within the past 5 years. Of the surveyed hospital administrators, 56% of those providing surgical care had recruited a surgeon at some time during the past 5 years; 37% of these administrators stated that it took >12 months to recruit a surgeon. Of those unsuccessful at recruiting a surgeon, 30% said they had considered using a locum tenens surgeon, and 20% of them had actually done so. Of those hiring locum tenens surgeons, 50% used them to fill in for a short absence by the local surgeon or to provide ongoing surgical care (42%). The median length of time that a short-term locum tenens surgeon practiced was 4 weeks, and those providing ongoing surgical care practiced for a median of 26 weeks. **Conclusions:** The shortage of general surgeons in the U.S. has made staffing hospitals in rural America more difficult. Consequently, alternative strategies should be considered for delivering high-quality surgical services in rural hospitals that cannot recruit or retain a surgeon. Hiring locum tenens surgeons is one such strategy; however, the quality of surgical care could be compromised by this approach. Moreover, most small hospitals do not generally use this option to provide ongoing surgical care. **Reviewer’s Comments:** The authors suggest that using locum tenens surgeons could compromise surgical care. Although they may be correct, they offer no data to support this conclusion. Such criticism seems a bit unfair given that, in many communities, there are few superior alternatives to locum tenens surgeons, and surgical care is certainly compromised by not having any surgeon at all. If I had a vote, I would make medical education and surgical training more affordable and compensation more reasonable so that there is less pressure to specialize. (Reviewer-Todd A. Kellogg, MD).