Background: Negative pressure dressings have been used for approximately 10 years. Their use has become ubiquitous for many different types of wounds. Literature supporting their use is far from perfect, and whether we are using them correctly remains a concern.

Objective: To review current evidence regarding the mechanism of action for vacuum assisted closure (VAC) wound treatments.

Design: Literature review.

Participants: Expert panel of 7 physicians.

Methods: This study emphasized technology assessment data. Sources used included the Ontario Health Technology Advisory Committee, Agency for Healthcare Research and Quality, Centre for Clinical Excellence in Australia, National Health Service Quality Improvement in Scotland, and the Cochrane Review in the United Kingdom. The primary goal was to identify mechanisms of action for negative pressure dressings.

Results: 4 primary mechanisms were identified: contraction of the wound (macrodeformation), stabilization of the wound environment, removal of extracellular fluid, and microdeformation at the foam-wound interface.

Macrodeformation implies the wound edges are pulled together by the vacuum dressing. The use of a semiocclusive dressing supports the concept of keeping the cell function normal, but objective studies are needed to confirm this claim. Wound edema is reduced by the vacuum dressing, and this is best demonstrated by fasciotomy wounds that can be closed earlier when the VAC is used. Microdeformation is the result of applying tension to the wound, which induces cellular proliferation and angiogenesis. How microdeformation is best achieved based on sponge design and amount of pressure is still being evaluated.

Conclusions: VAC dressings represent a major advance in the management of complex wounds, although our knowledge is still incomplete regarding how best to apply the technology and which wounds will benefit the most.

Reviewer’s Comments: Most articles regarding negative pressure dressings are small and border on testimonials. This article tries to look at the data behind the claims. This review is timely, as VAC dressings are appearing everywhere in our hospital and their cost is becoming a major concern. We are even seeing them used on closed wounds in an attempt to prevent edema formation. The claims that are supported include wound contraction and removal of edema fluid, at least from open wounds. The benefit to the wound environment and ability to induce wound microdeformation is not as easy to document. Complex open wounds are ideal for a VAC dressing as long as the wound is not infected nor has the potential for increased blood loss. For minor wounds, its use is probably superfluous. A little common sense is important as we apply this new technology. Additionally, more information about which wounds benefit the most and how best to apply vacuum dressings is needed. In the meantime, I am sure we will continue to use this wound management technique. (Reviewer-John A. Weigelt, MD).
Laparoscopic irrigation, drainage, and antibiotics may be another alternative to treat perforated diverticulitis.

**Background:** Perforated diverticulitis still presents a profound clinical insult to the patient, with associated morbidity and mortality as well as a challenge to the surgeon. Removing the source of contamination and treating with broad-spectrum antibiotics is standard, but how many procedures are necessary and whether a diverting colostomy is needed are areas of strong debate.

**Objective:** To determine patient outcomes after laparoscopic irrigation of perforated diverticulitis.

**Design/Participants:** Literature review of 8 non-randomized studies with 213 patients.

**Methods:** The studies were reviewed for demographics, the indication for intervention, type of peritonitis, morbidity, and mortality. Data on follow-up were sought. All patients had laparoscopic drainage for perforated diverticulitis. All patients had antibiotics. Drains were placed by the inflamed colon, but no resection was done and no colostomy created.

**Results:** The mean patient age was 59 years. There were 43 cases of Hinchey stage 2, 162 cases of Hinchey stage 3, and 8 cases of Hinchey stage 4. Conversion to laparotomy occurred in 6 patients (3%). Conversion occurred immediately in 1 patient for failure of insufflation, and for treatment failure in the other 5 patients. Only 2 of 8 patients with Hinchey stage 4 disease failed. Morbidity ranged from 0% to 28%, with a mean of 10% for all 8 studies. Length of stay averaged 9 days. Mortality ranged from 0% to 3.0%, with a mean of 1.4%. The mean follow-up was 38 months and during this period, 78 patients had an elective colon resection (38%). Some of the studies did not offer elective resection to any patient, but based subsequent colon resection on symptoms.

**Conclusions:** Laparoscopic lavage and drainage for perforated diverticulitis may be an alternative to resection with or without ostomy.

**Reviewer’s Comments:** Laparoscopic irrigations for perforated diverticular disease have been appearing since 2000; all were small series. One was recently reviewed in PRGS, and all had fairly good results. Now we have a summary study of current literature that begins to frame this procedure and its results. Granted, we probably are viewing a selection bias, but the results appear to be fairly impressive to any of us who have dealt with patients with Hinchey stage 3 and 4 peritonitis. The results from resection and a Hartmann’s procedure should be so good. We have been using a damage control approach on these patients with fairly good results as well. We resect the perforated colon at the first operation. Resuscitate the patient for 24 to 48 hours and then return for a possible anastomosis or Hartmann’s. It is clear that our options are increasing for this condition. We will obviously need to wait for that comparative and hopefully randomized study to answer all our questions. However, this report should help all of us keep an open mind. (Reviewer-John A. Weigelt, MD).

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Keywords: Diverticulitis, Laparoscopic Irrigation, Outcomes

Print Tag: Refer to original journal article
Background: Screening for colon polyps is the current strategy to prevent colon cancer. Acceptance of endoscopic screening is poor, and other methods to detect colon polyps that might have better patient compliance are being sought.

Objective: To determine if capsule endoscopy could be used to detect colon polyps.

Design: Prospective multicenter trial.

Participants: 328 patients were enrolled and 320 patients completed the study and their results analyzed.

Methods: All patients had a bowel preparation. Patients swallowed the endoscopy capsule, and after excretion of the capsule or at least 10 hours later, colonoscopy was performed. Standard definitions for polyps, including advanced adenomas (≥1 cm or villous characteristics) and carcinoma were used. Video and colonoscopy assessments were made independently by different physicians. The primary outcome was comparing these assessments and calculating sensitivity and specificity for capsule endoscopy detection of polyps and cancer using colonoscopy as the standard. Safety and adequacy of colon preparation were also assessed. Overall, 69% of patients excreted the capsule in 6 hours and 93% in 10 hours. Mean time for transit was 2 hours. Colonoscopy was completed in all 320 patients.

Results: For polyps ≥6 mm, capsule endoscopy had a sensitivity of 64% and a specificity of 84%. In patients judged to have a good-to-excellent colon preparation, the sensitivity improved to 75% with no change in specificity. There were 19 cancers detected by colonoscopy, and capsule endoscopy detected 14 of these. Capsule endoscopy sensitivity and specificity for cancer were both 74%. Adverse events were related to the bowel preparation.

Conclusions: Sensitivity and specificity of capsule endoscopy for detecting colon polyps and cancer are not adequate to use as a screening tool.

Reviewer's Comments: This is a technology assessment report demonstrating that a new use for a diagnostic tool is not appropriate. This type of report, which we should see more of, will hopefully reduce the number of healthcare resources we use that add no value. This study is well done. What would have been interesting is if the sensitivity and specificity were adequate for screening. The test still requires good colon prep for the best results, and the colon prep is not a favorite with most patients. The videos would have to be read, and if positive, the patient would need colonoscopy for tissue removal and diagnosis. Mean reading time was 45 minutes. Logistically, I believe we can see that, as a screening strategy, we now have some problems. Maybe 24-hour screening programs could be designed to accommodate the down times that might accrue. In short, I think we can say that capsule endoscopy is not ready for prime time as a colon screening technique. (Reviewer-John A. Weigelt, MD).

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Keywords: Colon Polyp Detection, Capsule Endoscopy

Print Tag: Refer to original journal article
Super obese trauma patients have significantly higher morbidity and mortality rates after damage control laparotomy than obese and non-obese patients.

**Background:** Obesity is an independent predictor of increased morbidity and mortality in critically injured trauma patients.

**Objective:** To determine the impact of obesity on postoperative complications, outcomes, and length of stay (LOS) in adult trauma patients managed by damage control laparotomy (DCL).

**Design:** Retrospective review.

**Methods:** A trauma registry and chart review of all trauma patients admitted and who underwent DCL from January 2003 to December 2006 was conducted. Exclusions were: age < 18 years, ED death, death < 48 hours after ICU admit, and non-survivable head injuries. Patients were classified as non-obese (BMI ≤ 29 kg/m²), obese (BMI 30 to 39 kg/m²), and severely obese (BMI ≥ 40 kg/m²). Outcomes included infectious complications, ARDS, acute renal insufficiency (ARI), multiple system organ failure (MSOF), and failed primary abdominal wall fascial closure (PAWFC).

**Results:** Of 12,759 patients admitted, 1812 (14.2%) underwent laparotomy and 104 (5.7%) had DCLs. Infectious complications occurred more frequently in severely obese patients (80% vs 47% in obese and 43% in non-obese; *P* = 0.03). Severely obese and obese patients were 1.75 and 1.09 times, respectively, more likely to develop postoperative infectious complications than non-obese patients (*P* = 0.04). Surgical site infection (SSI) occurred in 53% of severely obese versus 11% of obese and 12% of non-obese patients. Intra-abdominal abscess was more prevalent, but not significant in severely obese and obese patients. ARDS was not different between groups. ARI was more prevalent in severely obese (47%) and obese (32%) versus non-obese patients (16%). Failed PAWFC was more common in severely obese (60%; *P* < 0.01) versus obese (29%) and non-obese (20%). Severely obese patients had a 3-fold increase in mortality (60%) after DCL compared to obese (21%) and non-obese patients (28%). Severely obese required more ventilator days and had greater LOS (*P* = 0.0001).

**Conclusions:** DCL improves survival in critically injured patients, but also creates significant risk for postoperative complications. Obesity increases mortality up to 8-fold in blunt trauma patients. Obesity and “metabolic syndrome” (dyslipidemia, hypertension, insulin resistance, prothrombotic states, and proinflammatory states) is associated with worse outcomes after severe injury. Severely obese patients needing DCL had significantly higher rates of morbidity, mortality, fascial closure failure, and healthcare utilization. Qualitative differences existed between severely obese and obese patients (elevated SSI). Severely obese and obese patients were more likely to develop MSOF than non-obese patients. These pathophysiologic differences need further study.

**Reviewer's Comments:** This study validates what most trauma surgeons have observed in clinical practice—the increased difficulty of caring for super obese patients. It doesn't address common problems such as DVT/PE rates, nor does it determine why specific complications may be more prevalent. The next step is to determine their variances in pathophysiology such that clinical practice changes to improve outcomes. (Reviewer-Kathleen Christians, MD).

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Keywords: Obesity, Trauma, Damage Control Laparotomy

Print Tag: Refer to original journal article
Incidental PET/CT lesions may be benign, metastatic, or a second primary and should be investigated. PET/CT should not be used instead of standard cancer screening.

**Background:** The use of PET/CT in cancer patients is increasing, with concomitant increase in incidental findings of unclear significance.

**Objective:** To determine the clinical impact of incidental lesions on treatment and outcome of the primary malignancy.

**Design:** Retrospective review.

**Methods:** Patients undergoing PET scans for a known malignancy between January 2005 and December 2008 were identified. Those with incidental findings concerning for a second primary were reviewed. Imaging was interpreted by nuclear radiologists.

**Results:** Of 2219 patients undergoing PET/CT, 272 (12%) had findings concerning for second primaries. Half (49%) underwent biopsy. Twenty-four (18%) required endoscopy (6 new cancers), 34 (26%) had percutaneous biopsies (4 new cancers), and 74 (56%) required surgical biopsy or resection (31 new cancers). Seventy-one had biopsy-proven malignancy (41 [15%] second primaries, 30 [11%] metastatic from the primary). Most common sites for second primaries were lung, breast, and colon. Overall positive predictive value for PET/CT to detect a second primary was 31%. Sixty-two (23%) had invasive work-ups revealing benign disease, and 45 (17%) were lost to follow-up. In total, 116 of 272 had benign findings (62 biopsy-confirmed, 54 radiologic resolution). Abnormal PETs altered treatment of the primary in 9 patients. Eight of 9 were interrupted for curative intent surgery. One had endoscopy and results altered the chemotherapeutic regimen. Seven of 9 required altered chemotherapy or radiation. At median follow-up (22 months), 9 of 41 with second primaries were dead of malignancy, 20 were alive with disease, and 12 had no evidence of disease.

**Discussion:** PET can upstage malignancy and alter treatment. Its specificity for malignancy is approximately 85%. Even when incidental findings are consistent with a second primary, outcome is typically related to stage of the primary. The chance of dying from an incidental second primary is small; however, lesions should be evaluated, as patients can be treated for second primaries. If the primary is advanced, the incidental finding should be observed unless a more aggressive second primary is suggested. If the primary tumor is stable with good prognosis, patients should continue normal screening, as there are no data that PET is an adequate substitute for tumor surveillance (high number of biopsy-proven false positives [FP] (n=62) and resolved radiologic findings (n=54)). PET is expensive and may lead to unnecessary tests and risk.

**Conclusions:** Incidental PET findings may be benign, metastatic, or a second primary, and rarely impact outcome of the primary. Despite high FP rates, incidental findings should be investigated if clinically appropriate, as results may impact treatment. Routine screening shouldn't be abandoned due to the risk of developing second malignancies.

**Reviewer's Comments:** This is a retrospective study without ability to evaluate thought processes surrounding the incidentaloma. There was no pathologic confirmation in 51%, leading to possible selection bias. The review nicely underscores the pitfalls of substituting PET scans for standard cancer screening. (Reviewer-Kathleen Christians, MD).

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Keywords: PET Scan, Cancer, Incidental Findings, Outcome

Print Tag: Refer to original journal article
Patients with carcinomatosis from colorectal cancer and low-volume hepatic metastases may derive benefit from cytoreductive surgery and intraperitoneal chemotherapy if all disease is treated.

**Background:** Cytoreductive surgery (CS) and intraperitoneal hyperthermic chemotherapy (IPHC) improves outcomes in select patients with peritoneal carcinomatosis (PC) from colorectal cancer (CR).

**Objective:** To compare outcomes and prognostic factors of CR cancer patients undergoing CS + IPHC for PC and hepatic metastases (HM) to those with PC alone.

**Design:** Retrospective study.

**Methods:** Patients with PC from CR cancer with abdominal disease only and normal organ function were included. Those with PC + HM were individually considered in a multidisciplinary context. Criteria included age, functional status, chemotherapy response, tumor biology, size and number of HM, and presence of distant metastases. CS removed all macroscopic disease. Tumor adherent to vital organs that couldn't be removed was cytoreduced with a CUSA. HM were resected or ablated. IPHC was performed with 40 mg of mitomycin C (MMC) for 120 minutes. Adjuvant chemotherapy was individually decided.

**Results:** 142 patients underwent CS + IHPC between 1991 and 2007. Fourteen (9.9%) had concurrent HM. Median follow-up was 14.6 months. Median number and size of HM was 1 (1 to 7) and 3 cm (0.4 to 12.0). One lobectomy, 9 wedges or segmentectomies, and 6 ablations were performed. Median overall survival (OS) for patients with HM was 23 months. Two- and 4-year survivals were 43.4% and 14.4% for PC + HM, respectively, and 36.8% and 17.4% without HM ($P=0.39$). Mortality with HM was 7.1% (n=1) and morbidity was 57.1%, but compared to PC alone there was no significant difference ($P=0.62$ and $P=0.61$). OS was not different between the 2 groups ($P=0.97$). **Discussion:** Studies indicate median survival of 13 to 60 months and overall 2- and 5-year survival of 22% to 73%, and 11% to 32% for PC of colonic origin treated by CS + IPHC. The strongest predictor of survival is resection status. Other studies indicate that CS + IPHC + HM resection may confer a survival advantage in select patients. but standardization is lacking.

**Conclusions:** Patients with HM undergoing CS + IPHC for CR cancer had no significant difference in OS or morbidity compared to those without HM. Patients with PC from CR cancer and low-volume HM may derive benefit from CS+IPHC if all disease is resected. These patients should be referred to centers performing these procedures.

**Reviewer’s Comments:** This is a retrospective study with a small sample size, particularly for those with PC + HM (n=14). The patients undergoing CS + IPHC and hepatic metastasectomy/ablation were highly selected (low-volume disease). Despite this, 33% had positive margins and all ablated patients had CT recurrences (questions technique, alters survival). In addition, the effect of pre- and postoperative chemotherapy is unknown (with HM, 93% received chemotherapy pre- and 67% post, versus without HM, 72% received post-chemotherapy). While the logic behind complete cytoreduction is sound, adding any significant hepatic resection to an inherently morbid procedure based on these data should be cautioned. (Reviewer-Kathleen Christians, MD).

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**Keywords:** Cytoreductive Surgery, Intraperitoneal Chemotherapy, Liver Metastases

**Print Tag:** Refer to original journal article
Laparoscopic repair of ventral and incisional hernia is at least as effective as open repair and may be superior.

Objective: To perform a meta-analysis of randomized controlled trials comparing open and laparoscopic ventral and incisional hernia repair with mesh.

Design/Methods: A systematic review identified all randomized controlled trials comparing laparoscopic to open ventral hernia repair. The primary outcome of interest was hernia recurrence. Secondary outcomes included length of operation, length of hospital stay, time to return to work, seroma formation, bleeding, bowel injury, and wound infection.

Results: There were 237 studies identified by the search strategy, narrowed to 13 for further review. Of these, 8 were randomized controlled trials that were included in the meta-analysis. The quality of the studies ranged from fair to poor. The total number of patients in the 8 studies was 264 in the laparoscopic group and 253 in the open group, ranging from 11 to 85 patients per group in each individual study. The duration of follow-up was short, ranging from 6.0 to 40.6 months. There was no significant difference in risk of recurrence between laparoscopic and open repair (3.4% laparoscopic vs 3.6% open). Laparoscopic repair was faster in 2 studies, while 2 studies reported that open repair was quicker. Only 1 study reported return to work a median of 13 days after laparoscopic repair (range, 6 to 15 days), which is significantly shorter than the median of 25 days (range, 16 to 30 days) after open repair. There was no difference in seroma formation (11.7% laparoscopic repair vs 15.5% open repair). There was also no difference in bleeding complications (1.5% laparoscopic vs 5.9% open) or bowel injuries (laparoscopic 2.6% vs open 0.9%). Wound infections that did not require mesh removal occurred less frequently in the laparoscopic group (laparoscopic 1.5% vs open repair 10.1%), although those requiring mesh removal occurred with equal frequency between groups (laparoscopic 0.7% vs open 3.5%). Mean length of hospital stay was 5.7 days for the laparoscopic group and 10.0 days for the open group; the groups were too heterogeneous to combine for this particular outcome.

Conclusions: The authors conclude that laparoscopic repair of ventral and incisional hernia is at least as effective as open repair and may be superior.

Reviewer’s Comments: The lack of difference in recurrence may reflect short follow-up. It is still not clear whether one option is more durable than another. Although there is a suggestion that the laparoscopic approach might result in earlier return to work, it was an outcome in only 1 study. One additional important outcome is pain, which was not reported in any study and is not addressed in the meta-analysis. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Laparoscopic, Mesh, Hernia Repair

Print Tag: Refer to original journal article
This cost-effective approach for Graves' disease goes against current U.S. guidelines.

**Background:** 50% of patients do not respond to antithyroid medications for Graves' disease. For these patients, the options include continued antithyroid medication, radioactive iodine, and total thyroidectomy. There is no clear advantage to one treatment over the other in the majority of patients.

**Objective:** To use cost-effectiveness analysis to compare the 3 treatment options.

**Methods:** The base case assumes 18 months of antithyroid medication without response to treatment. The reference patient is a 30-year-old woman without a large goiter, ophthalmopathy, or palpable thyroid nodules. This is based on the epidemiology of Graves' disease, which most commonly affects women between the second and fourth decades. The decision tree was constructed with 3 options: antithyroid medication, radioactive iodine, and total thyroidectomy. Major complications, or branch points, were included; minor complications were not considered, as they did not lead to additional significant cost or require a change in treatment. Probabilities at each branch point were derived from published literature using a systematic literature search from 1980 to 2007. Average wholesale price and actual 2007 Medicare reimbursement rates were used for costs, and the healthcare system perspective was used.

**Results:** Total thyroidectomy was the most effective, providing 26.4 quality-adjusted life years compared to 25.08 for radioactive iodine. It was also the most cost-effective, with an incremental cost-effectiveness ratio of $7250/quality-adjusted life year, despite its greatest cost, $33,195. Radioactive iodine was the least costly option at $23,610, but due to lowest quality-adjusted life years it was not cost-effective. The continued medication strategy had an incremental cost-effectiveness ratio of $15,697/quality-adjusted life year over radioactive iodine. Sensitivity analysis revealed that the results were sensitive to the cost of total thyroidectomy. The baseline cost of total thyroidectomy (excluding complications) was $8800. When the cost of total thyroidectomy is less than $5500, total thyroidectomy dominates all strategies—the dominated strategies are less effective and more costly. When the cost is between $5500 and $19,300 (as in the baseline analysis), total thyroidectomy remains the best option through extended dominance—the dominated strategies are less effective and less efficient. When the cost of total thyroidectomy is greater than $19,300, ongoing antithyroid medication becomes the preferred strategy due to lower incremental cost-effectiveness ratios.

**Conclusions:** The authors conclude that total thyroidectomy is more cost-effective than radioactive iodine or lifelong antithyroid medication.

**Reviewer’s Comments:** Current U.S. guidelines recommend radioactive iodine as the treatment of choice after failure of 12 to 18 months of antithyroid medication for Graves' disease. Continued antithyroid medication is commonly used in much of the remainder of the world. There are 2 major limitations of this analysis: the utility assignments were taken from a single study, and the perspective was the healthcare system rather than society. Nonetheless, this suggests that cost-effectiveness considerations might have a place in guideline recommendations. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Graves' disease, Cost-Effectiveness, Treatment

Print Tag: Refer to original journal article

Riskin DJ, Tsai TC, et al:


After implementation of a MTP, mortality was significantly reduced, despite no difference in FFP:PRBC transfusion ratios. Time to first product was significantly reduced, suggesting that faster delivery is more important.

**Background:** Massive transfusion protocols (MTP) have been designed and implemented to decrease the high mortality rates associated with exsanguinating hemorrhage from trauma. The improvement in mortality is thought to be due to altering the fresh frozen plasma to packed red blood cell ratio (FFP:PRBC).

**Objective:** To determine the effect of a newly initiated MTP on mortality and blood product use.

**Design:** Retrospective cohort-controlled study.

**Methods:** After July 2005, an MTP was initiated to optimize rapid blood product availability at a Level I trauma center. The protocol included a 1:1.5 FFP:PRBC ratio, improved communications, and enhanced systems flow. Two years of data were reviewed to determine the impact of the newly initiated MTP and were compared with the 2 years of non-MTP trauma patient management preceding implementation. Inclusion criteria were trauma patients directly admitted through the emergency department and requiring ≥10 units of PRBCs during the first 24 hours.

**Results:** Of the 4223 trauma activations prior to implementation and the 4414 occurring after MTP implementation, 40 and 37 patients, respectively, met the study inclusion criteria. There was no significant difference in patient demographics (age, M:F ratio, % blunt trauma, ISS, AIS, GCS) between the 2 groups. Comparing the 2 groups, there was no difference in FFP:PRBC ratios (1:1.8 vs 1:1.8; \( P = 0.97 \)). The mean number of transfused units (PRBCs, FFP, PLTs) was not significantly different between the 2 groups with the exception of the PLT:PRBC ratio, which increased after MTP (1:1.7 vs 1:1.3; \( P = 0.05 \)). Blood products were delivered faster and there was a decreased mean time to first product with the MTP compared to non-MTP managed patients. Cross-matched RBCs (71 vs 115 minutes; \( P = 0.02 \)), FFP (169 vs 254 minutes; \( P = 0.04 \)), and platelets (241 vs 418 minutes; \( P = 0.01 \)) were all delivered faster after initiation of the MTP. Mortality decreased with initiation of the MTP from 45% in the non-MTP managed patients to 19% after introduction of the MTP.

**Conclusions:** After implementation of an MTP for trauma patients, mortality was significantly reduced despite no difference in the FFP:PRBC transfusion ratios. Time to first product was significantly reduced by implementation of the MTP, which suggests that faster delivery of transfusion products is a more important factor than transfusion ratios in determining mortality.

**Reviewer’s Comments:** This is the first study to suggest that time to transfusion rather than transfusion ratios are responsible for the improved outcomes seen with initiation of MTP. Its limitations include its small sample size and retrospective design--it is not designed to examine the independent effect of time to first product on outcome. Still, it provides a compelling argument that others, while incessantly debating the merits of transfusion ratios, have largely ignored. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Transfusion, Protocol, Hemorrhage, Packed Red Blood Cell, Fresh Frozen Plasma, Ratio, FFP:PRBC, Trauma, Mortality

Print Tag: Refer to original journal article
In this study, cancer and chronic appendicitis pathology and a midline incision had the highest risk of SBO, while there was no difference between a McBurney incision and laparoscopic approach.

Background: Appendicitis treated by appendectomy is relatively common. The reported incidence of small bowel obstruction (SBO) after appendectomy ranges from 0.16% to 10.7%. The incidences of SBO for different operative approaches as well as the specific risk factors for SBO have not been well described.

Objective: To determine the rate of post-appendectomy SBO in an adult population, and to determine any difference in SBO rates between open versus laparoscopic appendectomies.

Design: Retrospective review of an administrative database.

Methods: This is a Canadian study where all adult patients who underwent appendectomy from 1999 to 2002 were identified using a discharge database and the pathology report reviewed. The operative technique, ie, whether a McBurney incision, midline laparotomy, or laparoscopic approach, was recorded. A subset of these patients who were admitted for SBO was identified. The medical charts were reviewed to confirm the diagnoses. Logistic regression and univariate analysis were performed to determine risk factors for developing SBO.

Results: 1777 patients were included in the analysis. The mean age at diagnosis of appendicitis was 38.3±15.1 years; 50.3% were male; 16.4% (n=291) had had previous abdominal surgery; 3.3% (n=58) were immunosuppressed. A McBurney incision was used in 54.5% (n=969), a midline laparotomy was used in 12.4% (n=220), and a laparoscopic approach was used in 33.1% (n=588). The appendix was described as normal in 14.6% (n=253), suppurative in 76.8% (n=1328), and perforated in 8.0% (n=138). With a mean follow-up of 4.1±1.3 years, 50 patients (2.8%) were identified who were admitted for SBO at a mean of 1.1 years following the index admission. Of those admitted with SBO, 39.1% had non-perforated appendicitis, 35.0% had perforated appendicitis, and 8.6% had other pathologies. Operative intervention was necessary in 1.1% (n=20) and involved lysis of adhesions without bowel resection in all cases. Risk factors for developing SBO following appendectomy were perforated appendicitis (odds ratio [OR], 3.1; 95% confidence interval [CI], 1.5 to 6.6) and midline incisions (OR, 5.4; 95% CI, 2.8 to 10.4). The highest risk of SBO was associated with pathology of cancer or chronic appendicitis (OR, 7.4; 95% CI, 2.7 to 20.3).

Conclusions: The rate of SBO following appendectomy in adults performed through a combination of surgical approaches was 2.8%. A midline incision was the surgical approach associated with the highest risk of SBO, while there was no difference between a McBurney incision and laparoscopic approach. Cancer and chronic appendicitis pathology were the diagnoses that conferred the highest risk of developing SBO after appendectomy.

Reviewer's Comments: The most interesting aspect of this study is the finding that the incidence of SBO after laparoscopic appendectomy is no different than a typical open approach (McBurney incision). However, this is a retrospective study not specifically powered to determine this difference. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Small Bowel Obstruction, Open vs Laparoscopic Appendectomy, Incidence, Prevalence

Print Tag: Refer to original journal article
Early ERCP in Severe ABP Provides No Benefit in Patients Without Cholestasis

Early Endoscopic Retrograde Cholangiopancreatography in Predicted Severe Acute Biliary Pancreatitis: A Prospective Multicenter Study.

van Santvoort HC, Besselink MG, et al:

Ann Surg 2009; 250 (July): 68-75

In predicted severe acute biliary pancreatitis, early ERCP is associated with fewer complications if cholestasis is present, while mortality is unchanged.

Background: There is no consensus for the role of early endoscopic retrograde cholangiopancreatography (ERCP) in acute biliary pancreatitis (ABP) when cholangitis is not present. Furthermore, previous studies are underpowered and the relative benefits in the presence and absence of cholestasis are unknown.

Objective: To determine whether early ERCP is associated with reduced morbidity and mortality in patients with predicted severe ABP without cholangitis.

Design: Retrospective observational multicenter trial.

Methods: This was a European multi-institutional trial. A subset analysis was performed on 153 patients with predicted severe ABP without cholangitis enrolled in a randomized multicenter trial of probiotic prophylaxis in acute pancreatitis. Patients with predicted severe ABP underwent either conservative management or early ERCP (ERCP within 72 hours of symptom onset). Patients with and without cholestasis (bilirubin > 2.3 mg/dL [40 μmol/L] and/or dilated CBD) were analyzed separately and compared. Primary end points were complications and mortality.

Results: Of the 153 patients with severe predicted ABP without cholangitis, 78 (51%) had cholestasis and 75 (49%) did not. Of those patients with cholestasis, 52 (67%) underwent early ERCP, while 26 (33%) underwent conservative treatment. Of those patients without cholestasis, 29 (39%) underwent early ERCP and 46 (61%) underwent conservative treatment. Considering patients with cholestasis, baseline characteristics (age, gender, probiotics, BMI, ASA class, time from symptoms to admission, severity of disease, degree of cholestasis) were similar between the group undergoing early ERCP and the conservative group. In those without cholestasis, the conservative group had a higher ASA class (P = 0.016) and body temperature (37.5 ± 1.0 vs. 37.9 ± 0.7; P = 0.048). Patients with cholestasis undergoing early ERCP had fewer complications compared with the conservatively treated patients (25% vs 54%; P = 0.020; multivariate adjusted odds ratio [OR], 0.35; 95% confidence interval [CI], 0.13 to 0.99; P = 0.049), and fewer of these patients had >30% pancreatic necrosis (8% vs 31%; P = 0.010). Mortality was reduced in patients with cholestasis undergoing early ERCP, although this difference was not statistically significant (6% vs 15%; P = 0.213). Regarding patients without cholestasis who underwent early ERCP compared to those who did not, there was no difference in complications (45% vs 41%; P = 0.814; multivariate adjusted OR, 1.36; 95% CI, 0.49 to 3.76; P = 0.554) or mortality (14% vs 17%; P = 0.754; multivariate adjusted OR, 0.78; 95% CI, 0.19 to 3.12; P = 0.734).

Conclusions: In predicted severe ABP, early ERCP is associated with fewer complications if cholestasis is present, while mortality is unchanged. Early ERCP appears to provide no benefit in patients without cholestasis.

Reviewer's Comments: In practice, a consensus is lacking regarding the benefits of early ERCP in patients without cholangitis. This study is the largest prospective trial to date to consider the benefit of early ERCP in predicted severe ABP without cholangitis. Although limited due to lack of randomization, it sheds light on this issue. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Endoscopic Retrograde Cholangiopancreatography, Acute Biliary Pancreatitis, Complications, Morbidity, Mortality

Print Tag: Refer to original journal article
Accelerated partial breast irradiation with the MammoSite device has acceptable outcomes.

**Background:** Whole-breast irradiation reduces local recurrence after lumpectomy, but 19% of patients do not complete their radiation therapy. This is sometimes an access problem and other times a personal decision. For this reason, accelerated partial breast irradiation has gained favor.

**Objective:** To review a 4-year patient experience with accelerated partial breast irradiation delivered by the MammoSite device.

**Design:** Retrospective review.

**Participants:** 1440 patients with 1449 treated breasts.

**Methods:** Multicenter experience with the MammoSite device was reviewed. Entry criteria were similar across sites, and data were collected prospectively and analyzed centrally. An ipsilateral recurrence was defined as cancer in the treated breast without distant metastases. Regional recurrences were defined as axillary, supraclavicular and internal mammary. The primary outcome was recurrence rate. Cosmetic results were classified as excellent, good, or poor. Complications were also tabulated.

**Interventions:** The MammoSite device was used in all patients. Insertion was via an open technique in 653 applications and closed technique in 796.

**Results:** 25 patients developed an ipsilateral breast recurrence, and 3 had an axillary or supraclavicular recurrence. Ten patients were classified as true recurrences, and 18 were classified as a new tumor unrelated to the index lesion. The 3-year actuarial recurrence rate was 2%. The most common complication was seroma, which occurred in 27% of patients. Cosmetic results were excellent in 85% of patients at 12 months.

**Conclusions:** Accelerated partial breast irradiation with the MammoSite device has acceptable outcomes.

**Reviewer's Comments:** The concept is certainly valid and worthwhile. Since breast radiation reduces local recurrence after lumpectomy, any approach that will reduce the 19% incidence rate in patients who do not have radiation after a lumpectomy would be a benefit. The seroma problem is of some concern. It is more common with the open technique, and the ability to place the device with a closed technique reduces the seroma rate, requiring drainage by 50%. Our experience with the technique mirrors this report. A major randomized study continues to accrue patients. (Reviewer-John A. Weigelt, MD).

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**Keywords:** Breast, Brachytherapy

**Print Tag:** Refer to original journal article
Cardiopulmonary resuscitation rates are increasing, but survival rates are decreasing.

**Background:** Cardiopulmonary resuscitation (CPR) for cardiac arrest in hospitalized patients is the sine qua non approach. Rates of survival range from 7% to 26%, and whether survival is always functional is questionable. With advances in resuscitation techniques, improved CPR survival would be assumed.

**Objective:** To determine survival after in-hospital CPR from 1992 to 2005.

**Design:** Retrospective review of Medicare Provider Analysis and Review data from 1992 to 2005.

**Methods:** Records of 433,985 patients were examined for age, sex, race, co-existing conditions, zip code of residence, location of the patient before admission, and discharge destination. Race was recorded as black, white, or other. Comorbidity scores were used to rank into 4 categories. The primary outcome was survival to hospital discharge. Destination code was used as a surrogate for functional status. Univariate and multivariate analyses were done to identify significant findings.

**Results:** 18% of patients survived to discharge. There was no significant difference in survival over time. Based on Medicare admission rates over time, the rate of CPR per 1000 admissions also did not change over time. Patients with a diagnosis of myocardial infarction or congestive heart failure had a slightly higher survival rate. Among hospital deaths, the rate of CPR increased over time from 3.8% in 1992 to 5.2% in 2005. Discharge-to-home rates decreased over time, while discharge-to-hospice rates increased after 1997. Lower odds of survival included older age, male sex, and black or non-white race. No difference in survival was found for teaching hospitals. A survival benefit was discovered for non-metropolitan hospitals.

**Conclusions:** CPR rates have increased from 1992 to 2005, but survival-to-discharge rates have decreased.

**Reviewer’s Comments:** A sobering epidemiologic study regarding CPR. The statement that CPR is now ubiquitous in hospitalized patients having a cardiac arrest is very true. Advance directives might alter this process, but all too frequently, wishes of the patient are not clear at the time a cardiac arrest occurs. Our attempts to improve this flow of communication have not been universally accepted. These findings should make all of us pause and think how important it is for us to be realistic with our patients and with ourselves. Asking about advance directives and being clear on how they will be followed is a little step to potentially improving our outcome results for CPR. (Reviewer—John A. Weigelt, MD).

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Keywords: Cardiopulmonary Resuscitation, In-Hospital, Elderly

Print Tag: Refer to original journal article
Daptomycin is 1 of 3 drugs useful for methicillin-resistant *Staphylococcus aureus* infections of skin and soft tissue, including surgical site infections.

**Background:** Surgical site infection (SSI) is responsible for 20% of nosocomial infections outside the ICU environment. Methicillin-resistant *Staphylococcus aureus* (MRSA) continues to increase and has become dominant over methicillin-sensitive *S aureus* (MSSA) in some institutions.

**Objective:** To determine the efficacy and safety of daptomycin for treating patients who have an SSI, especially those caused by MRSA.

**Design:** Retrospective review using an antibiotic registry.

**Participants:** 962 patients were in a daptomycin registry, and 118 were treated for an SSI; 104 patients had evaluable data.

**Methods:** Demographics, infection site, depth of infection, culture results, antibiotic treatments, and outcomes were captured. A cure was defined as complete resolution of the infection without further antibiotics. Improvement was defined as partial resolution of symptoms or need for additional antibiotics. Failure was defined as no change in symptoms, worse symptoms, or recurrence of infection. Daptomycin dose, duration of therapy, and adverse events were also recorded.

**Interventions:** All patients received at least 1 dose of daptomycin to be included.

**Results:** A superficial SSI was present in 38 patients (37%), deep SSI in 38 (37%), and organ space in 28 (27%). Seventy-six patients (73%) had a gram-positive infection. *Staphylococcus* was identified in 61 patients (59%) and *Enterococcus* in 23 (22%). MRSA caused 61% of *S aureus* SSIs and accounted for 25 of 104 SSI patients (24%). Daptomycin had a success rate of 83% among these 24 patients with MRSA SSIs. Among patients who had vancomycin failure, daptomycin had a cure rate of 91%. The median daptomycin dose was 5.5 mg/kg, with a median duration of 14 days. The only factor associated with poor cure rates was isolation of vancomycin-resistant enterococci.

**Conclusions:** Daptomycin is a legitimate alternative to vancomycin for an MRSA SSI.

**Reviewer’s Comments:** MRSA continues to be a problem. Daptomycin is 1 of 3 new drugs that are approved for treating MRSA infections in skin and soft tissues, including SSIs. These data demonstrate that MRSA is found in 24% of SSIs, and it is more common than MSSA as a causative bacterium. Daptomycin was effective in treating these infections. What this report and others do not tell us is the percentage of MRSA isolates that are community-acquired MRSA versus hospital-associated MRSA. Community-acquired MRSA infections can usually be treated without using any of the new MRSA drugs or vancomycin. I was surprised that this was not mentioned in the limitations of this study. It is not yet routine, but I suspect that, when an implant is in place and an SSI develops, initial coverage will include an MRSA drug. Cultures are taken commonly and, once these return, if a community-acquired MRSA is present, then clindamycin or doxycycline is often adequate therapy. (Reviewer-John A. Weigelt, MD).

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Keywords: Surgical Site Infections, Daptomycin, Methicillin-resistant *Staphylococcus aureus*

Print Tag: Refer to original journal article
The impact of extremes of risk-taking preference on surgical decision-making may be an important part of decreasing the incidence of adverse events during laparoscopic cholecystectomy.

**Background:** The influence an individual's risk-taking behavior and risk preference have on clinical decision-making is unknown.

**Objective:** To determine whether risk-taking preference has any bearing on clinical practice.

**Design:** Mailed survey.

**Methods:** A survey was sent to randomly selected American College of Surgeons members. It contained a shortened (6 questions) Jackson Personality Index (JPI) and risk-taking preferences. Surveys of retirees or those without laparoscopic cholecystectomy (LC) experience were excluded. Responses from self-identified common bile duct injury (CBDI) surgeons were compared to those of non-injuring surgeons.

**Results:** 4100 surveys were mailed, with a response rate of 44%; 1412 were analyzed. At least 1 CBDI was reported by 534 surgeons (37.8%). These surgeons were older (mean, 52.8 vs 51.3 years; *P* =0.004) and had practiced longer (20.8 vs 18.9 years; *P*<0.001). Surgeons in academics (7.9% vs 14.5%) or who worked with residents regularly (187% vs 25%) reported fewer CBDIs. Non-injuring surgeons were more likely trained in LC during residency (63.3% vs 55.4%). Injuring surgeons were more likely trained at a course (38.2% vs 29.8%). A lower proportion of low-volume (<20 LC/year, 6.6%) versus high-volume (>100 LC/year, 25.3%) surgeons reported CBDIs. One third of surgeons caused >1 injury. More injuring surgeons thought CBDIs occur with unclear anatomy (58% vs 49%; *P* =0.01). Intraoperative cholangiography (IOC) use was not different, and both groups misinterpreted an IOC (16% injuring, 18% non-injuring). Mean risk-taking preference score was not significant (*P* =0.23) between groups, and there was no difference in distribution of risk-taking preference scores. The relative risk (RR) of CBDI for surgeons in the upper 3 deciles was 17% greater (*P* =0.07) versus the lower 3 (contained greater proportion of non-injuring surgeons). A greater proportion of surgeons with low risk scores were more likely to think the IOC demonstrated a CBDI and converted to an open procedure.

**Discussion:** Surgeons trained in LC during residency had lower learning curves and fewer CBDIs. Lower-volume academic surgeons had fewer CBDIs, reflecting either volume or a "second set of eyes." A high proportion of both groups misinterpreted the IOC. IOCs require proper performance and correct interpretation to avoid faulty cognitive interpretation of familiar visual clues.

**Conclusions:** More years performing LC and practice characteristics were associated with increased CBDI rates. The impact of extremes of risk-taking preference on surgical decision-making can be an important part of decreasing LC adverse events and should be evaluated.

**Reviewer's Comments:** Study limitations include non-response bias (<60% responded), potential normative responses, missing data, and a yet-to-be validated "mini" JPI. If personality is proven to play a role in surgical decisions, changes in training may help mitigate problems related to higher risk tolerance and may improve quality. (Reviewer-Kathleen Christians, MD).

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Keywords: Risk Tolerance, Bile Duct Injury, Surgeons

Print Tag: Refer to original journal article
Are MELD-Based Indices Better Mortality Predictors in Cirrhotics?

**Value of MELD and MELD-Based Indices in Surgical Risk Evaluation of Cirrhotic Patients: Retrospective Analysis of 190 Cases.**

Costa BP, Sousa FC, et al:


The integrated MELD (Model for End-Stage Liver Disease) is a useful predictive parameter of operative mortality for cirrhotic patients undergoing elective surgery.

**Background:** The Model for End-Stage Liver Disease (MELD) may be an alternative to Child-Turcotte-Pugh (CTP) as predictive of operative mortality and morbidity.

**Objective:** To evaluate the value of MELD and MELD-based indices in quantification of surgical risk for cirrhotics and to compare their prognostic value with that of CTP-derived classifications.

**Design:** Retrospective study.

**Participants/Methods:** Adult cirrhotics operated on between 1993 and 2008 were identified. Patients with insufficient data, chronic renal failure/dialysis, or on anticoagulants were excluded. Procedure type, anesthesia, ASA class, age-comorbidity index, and Surgical Risk Scale score were calculated as were CTP, CTP-modified, MELD, integrated MELD (iMELD), MELD with sodium, MELD-to-sodium ratio, and MELD without international normalized ratio.

**Results:** 190 patients were studied with alcoholic cirrhosis noted in 87%. ASA class III covered 48%. Mean Charlson's age-comorbidity index was 6.5; 43% were CTP class A with a mean MELD of 12. Surgery was elective in 60%, major in 77%, and digestive in 73%. Mean Surgical Risk Scale score was 8.9. Operative mortality and morbidity were 13% and 24%, respectively, with a mean length of stay of 12.9 days. Mean MELD was higher in operative death cases (17 ± 7 vs 11.5 ± 4; P=0.00001). Patients with MELD ≥15 (26%) had higher mortality rates (31.4% vs 9.2%; P=0.0001). Mean CTP score was higher in operative deaths (9.2 ± 2.5 vs 7.4 ± 2; P=0.0001). CTP class C (19%) had a higher mortality rate (31.4% vs 9.2%; P=0.0001). iMELD demonstrated the highest prognostic capacity (area under the receiver operating characteristic curve, 77%; P=0.0001), and its mean value was higher in cases of operative death (42 ± 8.5 vs 34.6 ± 6.1; P=0.0001). Patients with an iMELD ≥40 (28%) had higher mortality rates (29.8% vs 6.6%; P=0.0001; odds ratio, 4.5). For mortality after elective surgery, iMELD was a good predictor of operative mortality (P=0.044), with better predictive potential than MELD (P=0.0226) and the 3 CPT-derived indices. iMELD was superior for predicting mortality (40.1 ± 7.3 vs 33 ± 5.6; P=0.016). In elective procedures, operative death probability was 0.7% for <30, 3.2% for 30 to 40, and 17.2% when >40. Correlations between MELD and iMELD compared with CTP were significant (P=0.0001). **Discussion:** 57% were CTP class B and C, and 34% had MELDs >12. MELD and MELD-based indices were significant predictive parameters of operative mortality in cirrhotics and were similar to CPT-derived scores. iMELD had the highest prognostic capacity.

**Reviewer's Comments:** This is a relatively small group of patients undergoing a heterogeneous set of surgical procedures that are subject to selection bias. MELD scores are fluid scores taken at a single point in time, thus it is unknown how therapeutic maneuvers influenced these parameters. iMELD scores are objective and reproducible, and they may have an advantage over CPT-derived scores. (Reviewer-Kathleen Christians, MD).

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Keywords: End-Stage Liver Disease, Outcome Prediction, MELD, Child-Turcotte-Pugh, Cirrhosis

Print Tag: Refer to original journal article
Surveillance Needs for Patients With High-, Low-Risk Adenomas

Using the Results of a Baseline and a Surveillance Colonoscopy to Predict Recurrent Adenomas With High-Risk Characteristics.

Robertson DJ, Burke CA, et al:


Information from 2 previous colonoscopies may identify low-risk populations that benefit little from intense surveillance.

**Background:** Recommendations on when to perform follow-up colonoscopy in patients with previous polyps or cancer involve using only the findings of the most recent colonoscopy.

**Objective:** To use the results of 2 prior colonoscopies to predict adenomas with a high risk of recurrence.

**Methods:** This study is a secondary analysis of data generated from the Aspirin/Folate Polyp Prevention Study. At study entry, all patients had at least 1 adenoma and a complete colonoscopy; follow-up colonoscopy occurred 3 years later. After the second scope, a repeat colonoscopy was performed in another 3 to 5 years. The group of interest for this analysis was patients who had an initial adenoma with high-risk characteristics. High risk was defined as ≥3 adenomas, or ≥1 adenoma of ≥1 cm, with tubulovillous or villous features or high-grade dysplasia. Patients with high-risk findings on the third examination were stratified by findings from the previous 2 colonoscopies.

**Results:** 4 patients had high-risk findings on the second colonoscopy, and 58 had high-risk findings on the third colonoscopy. These patients did not differ from those without high-risk adenomas by demographic characteristics, smoking status, or family history of colorectal cancer. For patients with high-risk adenomas at baseline, if they had high-risk adenomas at the second colonoscopy, their absolute risk for advanced or multiple adenomas at the third colonoscopy was 18.2 (95% CI, 8.2 to 32.7). If findings on the second colonoscopy were low-risk adenomas, the absolute risk on the third colonoscopy was 13.6 (95% CI, 6 to 25). If there were no adenomas on the second colonoscopy, the absolute risk was 12.3 (95% CI, 7.0 to 19.5). If there were low-risk findings at baseline but high-risk findings at the second colonoscopy, the absolute risk for advanced or multiple adenomas at the time of third colonoscopy was 20 (95% CI, 9.0 to 35.6). If there were low-risk findings at the time of the second scope, the absolute risk dropped to 9.5 (95% CI, 4.4 to 17.2), and if there were no adenomas at the time of the second scope, the absolute risk at the time of the third scope fell further to 4.9 (95% CI, 2.4 to 8.8).

**Conclusions:** Information from 2 previous colonoscopies may identify low-risk populations that benefit little from intense surveillance.

**Reviewer's Comments:** The most notable finding is that patients with initial low-risk adenomas may develop high-risk adenomas 6 to 8 years later, with a risk profile that is no different than that of patients with initial high-risk adenomas. The difference is the result of the intervening colonoscopy--those with low-risk or no adenomas at that time may be able to have more relaxed surveillance. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Adenomas, Recurrence, Surveillance Colonoscopy

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Etomidate Increases Risks for ARDS, Organ Failure

Single-Dose Etomidate for Rapid Sequence Intubation May Impact Outcome After Severe Injury.
Warner KJ, Cuschieri J, et al:
J Trauma 2009; 67 (July): 45-50

Etomidate use may increase the risk for development of acute respiratory distress syndrome and organ dysfunction.

**Background:** Effects of etomidate include inhibition of 11 beta-hydroxylase, which may decrease adrenocortical function up to 12 hours after a single dose.

**Objective:** To analyze whether use of etomidate in trauma patients is associated with poor outcome.

**Methods:** This is a secondary analysis of data collected from a prospective trial evaluating hypertonic saline as a resuscitative fluid in trauma patients. Inclusion criteria for the original trial required a systolic blood pressure <90 mm Hg with transport immediately to the trauma center. Inclusion criteria for this analysis required need for prehospital rapid sequence intubation. Patients were stratified into 2 groups: those receiving etomidate and those not receiving etomidate. Data abstracted included age, gender, mechanism of injury, fluid administered, vital signs, Injury Severity Score, and body region injured. The primary outcome of both this analysis and the initial study was development of acute respiratory distress syndrome (ARDS). Secondary outcomes included development of organ dysfunction, ICU and hospital lengths of stay, duration of mechanical ventilation, and ventilator-free days.

**Results:** 261 patients were hypotensive in the field during the 22 months of the initial trial, and 209 were enrolled. Of these patients, 107 were intubated with rapid sequence intubation; 23 died (no difference between groups). Of the remaining 94 patients, 35 received etomidate and 59 received other benzodiazepines for sedation. There were no differences in demographic, injury, or physiologic variables between groups. Of patients, 40% in the etomidate group and 20% in the no-etomidate group developed ARDS (P =0.06). Also, 46% of patients in the etomidate group and 25% in the no-etomidate group developed organ dysfunction (P =0.07). In multivariate analysis, etomidate use, an APACHE II score >20, and receiving ≥10 units of packed red blood cells were all significantly associated with both ARDS and organ failure. There were no differences in infection, acute lung injury, and lengths of stay between groups. In multivariate analysis, the etomidate group had a 3-day longer length of stay, 3 days longer on the ventilator, and 3 more days in the ICU.

**Conclusions:** Etomidate use is associated with increased risks for development of ARDS and multiple organ dysfunction.

**Reviewer's Comments:** There are several studies that have now called use of etomidate for rapid sequence intubation into question, with speculation that adverse outcomes are due to suppression of cortisol. In this study, the unadjusted association between etomidate and ARDS or organ dysfunction was not significant, although the point estimate was quite large after adjustment. The question remains as to whether there was some other factor that caused etomidate patients to receive that particular drug instead of benzodiazepines, which are used for the majority of transported patients. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Etomidate, Rapid Sequence Intubation, Severe Injury, Outcome

Print Tag: Refer to original journal article
Antibiotics should be given within 30 minutes of surgical incision, not after the incision.

**Background:** Optimal timing of antimicrobial prophylaxis reduces surgical site infections (SSIs).

**Objective:** To prospectively record perioperative data including SSIs.

**Design:** Multicenter study.

**Methods:** This study is part of a larger study involving 44 hospitals that was designed to evaluate interventions to improve antibiotic prophylaxis; 29 hospitals voluntarily participated in this secondary study. Data collected on randomly selected cases included type of operation; incision time; time, route, dose, and type of antibiotic given; time of closure; and postoperative antibiotics given. These data were matched with SSI data obtained by hospital infection control personnel as part of their standard surveillance practices. Relationship between timing of antibiotic administration and infection risk was assessed.

**Results:** Data were collected on 4472 patients; 3405 received antibiotics designated by the Surgical Care Improvement Program (SCIP) to be administered within 60 minutes of incision, 575 received vancomycin in addition to a cephalosporin, 218 received vancomycin only, 240 received quinolones with or without other antibiotics, and 34 did not receive any documented antibiotic. The antibiotic administered was compliant with SCIP guidelines in 90% of cases. There were 113 infections in 109 patients; only 31 of these were detected during the index hospital admission, and 6 were diagnosed >30 days after the index operation. Of infections, 63 were superficial, 32 were organ space infections, and 14 were deep incisional. Bacteria cultured were relatively evenly divided between methicillin-sensitive Staphylococcus aureus (15.6%), methicillin-resistant S aureus (15.6%), coagulase-negative staphylococci (15.6%), and gram-negative bacteria (14.7%). Excluding patients who received antibiotics requiring long infusion times, the infection risk increased as the interval of time between infusion and incision increased. Infection risk also increased when the antibiotic was administered after incision. For operations lasting >4 hours, redosing antibiotics reduced SSIs but only if the initial antibiotic was administered correctly.

**Conclusions:** There is a consistent relationship between timing of antibiotic administration and risk of SSI.

**Reviewer’s Comments:** This large, multicenter prospective trial provides a large amount of data to investigate the relationship between timing of antibiotic administration and SSIs, and it corroborates previous data linking timing of antibiotic administration to SSIs. Unfortunately, the ascertainment of SSIs was not part of the research protocol, but was taken from infection control data at participating hospitals. These data are more rigorous than retrospective chart review for determining infection, but they are not research-quality data. The authors report a difference between the risk of SSIs when the antibiotic was administered within 30 minutes versus from 31 to 60 minutes, although this difference is not statistically significant. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Antibiotics, Prophylaxis, Surgical Site Infection

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Preoperative Risk Can Be Stratified in Colorectal Surgery

*Preoperative Risk Stratification for Mortality and Major Morbidity in Major Colorectal Surgery.*
Ragg JL, Watters DA, Guest GD:

Dis Colon Rectum 2009; 52 (July): 1296-1303

Preoperative risk factors for major colorectal surgery mortality and major morbidity can be stratified to obtain a preoperative estimated risk of mortality and major morbidity and can be incorporated into clinical practice.

**Background:** Major colorectal surgery is associated with significant morbidity and mortality. Risk stratification has typically incorporated preoperative, intraoperative, and postoperative factors - an approach that provides a retrospective view and allows only post hoc analysis. Risk stratification using preoperative factors only would potentially allow preoperative modification and consequently reduced risk.

**Objective:** To stratify morbidity and mortality risk of major colorectal surgery by use of preoperative risk factors only.

**Design:** Single-institutional, prospective observational study.

**Participants/Methods:** Consecutive patients undergoing major colorectal surgery over a 6-year period (2002 to 2007) were identified from a prospectively maintained mandatory clinical database at a single institution in Australia. Outcome measures were mortality and major morbidity (Clavien grades III, IV, V). Risk assessment measures included ASA score, case urgency, Acute Physiologic Score (APS), comorbidities, and surgeon case volume. A comparison with other models was made for validation. Univariate logistic regression analysis was performed, as well as stepwise multivariate analysis.

**Results:** A total of 887 major colorectal procedures were included in the analysis. Independent risk factors for mortality were ASA stage III to V, age, multiple comorbidities, and low surgeon case volume. Independent risk factors for major morbidity were ASA stage III to V, urgent operation, and operation to excise the rectum. The mortality rate was 4.51%, and the major morbidity rate was 19.6%. Estimated risks of mortality and major morbidity were stratified by risk factor profile from 0.12% (95% CI, 0.02 to 0.93) to 42.4% (95% CI, 23.5 to 63.9) for mortality and from 7.22% (95% CI, 4.82 to 10.7) to 49.2% (95% CI, 34.2 to 64.4) for major morbidity. Compared with other models, there was greater discrimination in mortality and major morbidity risk assessment.

**Conclusions:** Preoperative risk factors for major colorectal surgery mortality and major morbidity can be stratified to obtain a preoperative estimated risk of mortality and major morbidity that has comparable efficacy with those models using preoperative, intraoperative, and postoperative risk factors. However, because these risk factors are readily available preoperatively, this model can be incorporated into clinical practice.

**Reviewer's Comments:** The concept of stratifying perioperative risk preoperatively and modifying risk factors to improve outcomes is attractive and was attempted in this study. Unfortunately, the majority of identified independent risk factors for mortality and morbidity proved not to be modifiable (eg, age, ASA status, comorbidity, and case urgency). However, this type of risk stratification will provide informed decision-making capability preoperatively. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Major Colorectal Surgery, Risk Stratification, Mortality, Morbidity

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Plastic Stents Heal Esophageal Leaks

Treatment of Oesophageal Anastomotic Leaks by Temporary Stenting With Self-Expanding Plastic Stents.

Dai YY, Gretschel S, et al:


Use of self-expanding plastic stents coupled with adequate drainage is a feasible approach to treatment of esophageal anastomotic leaks and may reduce leak-related morbidity and mortality.

**Background:** Intrathoracic esophageal anastomotic leakage after esophageal resection for cancer is associated with considerable morbidity and mortality and is thought to be responsible for 30% to 40% of all postoperative deaths. Although outcomes for this procedure have improved overall, the most effective management of anastomotic leaks remains controversial.

**Objective:** To determine the effectiveness and safety of temporary self-expanding plastic stents (SEPS [Polyflex®]) to treat postoperative esophageal leaks.

**Design:** Retrospective review of a prospectively maintained database.

**Participants/Methods:** Patients were included in the study who, between 2001 and 2007, underwent abdominophrenic esophagectomy, developed esophageal anastomotic leakage (diagnosed by esophagogastroscopy and esophagram), and were then treated by endoscopic insertion of a SEPS. Stents were removed every 7 to 14 days to prevent pressure necrosis and to assess healing. If there was continued leakage, the stent was replaced and the process repeated. Clinical data were recorded that included the number of stents required, time to oral intake, need for ventilatory support, duration of ICU stay, hospital length of stay, and complications of stent placement (migration, obstruction, bleeding). Patients were followed at 3-month intervals after stent removal. Outcomes analyzed included healing of the leak, morbidity, and mortality.

**Results:** A total of 22 anastomotic leaks were identified in 18 men and 4 women. Mean age was 63 years (range, 50 to 75 years). All patients had a diagnosis of cancer: adenocarcinoma (n=16), squamous cell (n=5), and gastrointestinal stromal tumor (n=1); with locations in the esophagus (n=12), gastroesophageal junction (n=6), or stomach (n=4). Leaks were diagnosed a mean of 6.5 days (range, 1 to 13 days) postoperatively and placed a mean of 2.7 days (range, 0 to 14 days) after diagnosis. There were no procedure-related complications. Nine patients required only 1 stent, 6 required 2 stents, 4 required 3 stents, and 3 required >3 stents. The stent migrated requiring intervention in 5 patients (23%). Non-ventilated patients received oral nutrition a mean of 4 days (range, 0 to 19 days) after stent placement. Combined treatment with stenting and drainage resulted in resolution of the leak in 21 of 22 patients. Mean leak closure time was 23 days (range, 7 to 62 days), at which time the stent was removed. Intraoperative stent placement via redo thoracotomy was necessary in 1 patient with an esophago-colonic anastomosis. One patient died in the hospital.

**Conclusions:** Use of SEPSs coupled with adequate drainage is a feasible approach to treatment of esophageal anastomotic leaks and may reduce leak-related morbidity and mortality.

**Reviewer's Comments:** With the rising popularity of removable stents for repair of gastrointestinal leaks, it's good that there are studies like this to help validate clinical practice. Still, the numbers are very small, so one should interpret these results with caution. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Esophagectomy, Anastomotic Leaks, Temporary Stenting, Plastic Stents

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