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Article 1: Infections; General Surgery

Surgical site infection after primary closure of high-risk surgical wounds in emergency general surgery laparotomy and closed negative-pressure wound therapy. Hall C, Regner J, Abernathy S, et al. *J Am Coll Surg* 2019;228:393–399

Article 2: Gallbladder; General Surgery

Cholecystectomy during the third trimester of pregnancy: proceed or delay? Fong ZV, Pitt HA, Strasberg SM, et al. *J Am Coll Surg* 2019;228:494–503

Article 3: General Surgery

Preoperative frailty and surgical outcomes across diverse surgical subspecialties in a large health care system. Mrdutt MM, Papaconstantinou HT, Robinson BD, et al. *J Am Coll Surg* 2019;228:482–493

Article 4: Surgical Oncology

Should sentinel lymph node biopsy be performed for all T1b melanomas in the new 8th edition American Joint Committee on Cancer staging system? Egger ME, Stevenson M, Bhutiani N, et al. *J Am Coll Surg* 2019;228:466–473

Article 5: Infections; General Surgery

Multidisciplinary approach to *Clostridium difficile* infection in adult surgical patients. Turner MC, Behrens SL, Webster W, et al. *J Am Coll Surg* 2019;228:570–582

Objectives: After reading the featured articles published in this issue of the *Journal of the American College of Surgeons* (JACS), participants in this journal-based CME activity should be able to demonstrate increased understanding of the material specific to the article featured and be able to apply relevant information to clinical practice.

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ARTICLE 1

(Please consider how the content of this article may be applied to your practice.)

Surgical site infection after primary closure of high-risk surgical wounds in emergency general surgery laparotomies and closed negative-pressure wound therapy

Hall C, Regner J, Abernathy S, et al
J Am Coll Surg 2019;228:393–399

Learning Objectives: After study of this article, surgeons should recognize the benefits of skin closure with negative pressure wound therapy for high-risk wounds in emergency general surgery compared with other options for wound management.

Question 1

Negative pressure wound therapy:

- Can only be used in open wounds
- Should be applied in all wound categories to decrease wound complication
- Adds cost without benefit in high-risk wounds

- d) Decreases superficial surgical site infection in closed contaminated and dirty wounds in emergency general surgery patients
- e) Permits discontinuation of antibiotics after 24 hours in contaminated and dirty wounds

Critique: Negative pressure wound therapy can be used in open and closed wounds. It speeds wound healing in open wounds and has reduced surgical site infection in high-risk wounds after closure. The expense of the device is offset by the faster healing times. In this study, the median antibiotic therapy was 4 days.

Question 2

Surgical site infection after skin closure and negative pressure wound therapy for high-risk wounds:

- a) Did not occur in this series
- b) Was treated with antibiotics alone
- c) Required conversion to open wound management
- d) Resulted in fascial dehiscence in more than half of the patients
- e) Occurred only because of an enterocutaneous fistula

Critique: Surgical site infection of contaminated and dirty wounds after skin closure and negative pressure wound therapy occurred in 7.4% of patients. Monitoring of the wound by the surgical team is mandatory with this practice. This can necessitate removal of the wound sponge to inspect the wound. With early recognition and conversion to open wound management, there were no patients who experienced fascial dehiscence or who required operative wound debridement.

Question 3

Which of the following are clinical indications for skin closure with negative pressure wound therapy?

- a) Abdominal wall cellulitis secondary to infected mesh from a previous ventral hernia repair
- b) Enterocutaneous fistula with associated soft tissue infection
- c) Elective inguinal hernia repair
- d) Laparoscopic cholecystectomy for acute cholecystitis
- e) Perforated diverticulitis with feculent contamination

Critique: Negative pressure wound therapy (NPWT) is not indicated in clean wounds because surgical site infection occurs in less than 3% of patients. Likewise, the risk of surgical site infection in laparoscopic cases is low and does not benefit from NPWT. Active soft tissue infection of the abdominal wall increases the risk of postoperative wound complications and was

an exclusion criterion for this study. Contaminated and dirty wounds showed a reduction in surgical site infection with NPWT after skin closure.

Question 4

Skin closure with negative pressure wound therapy for colostomy wound sites:

- a) Produced no surgical site infection in this series and warrants further evaluation
- b) Should not be performed unless the patient has a bowel preparation
- c) Should only be done during laparoscopic colostomy reversal
- d) Produces slower return of bowel function
- e) Resulted in a higher number of anastomotic complications

Critique: Sixteen patients in this study represented ostomy site closures. The literature reports surgical site infection (SSI) occurring in up to 40% of colostomy site closures. Several techniques have been described to reduce the incidence of SSI of ostomy sites including delayed primary closure, purse string closure, loose closure with packing, and primary closure. In the current series, 16 of the wounds classified as clean contaminated represented ostomy wound closures, and none developed SSI. Negative pressure wound therapy for a closed wound shows promise in this subset of patients.

ARTICLE 2

(Please consider how the content of this article may be applied to your practice.)

Cholecystectomy during the third trimester of pregnancy: proceed or delay?

Fong ZV, Pitt HA, Strasberg S, et al
J Am Coll Surg 2019;228:494–503

Learning Objectives: After study of this article, practitioners should be able to compare cholecystectomy-related and maternal delivery outcomes between women receiving the operation during the third trimester of pregnancy and those receiving the operation in the early postpartum period. Surgeons and obstetricians should be able to use this information when advising pregnant women.

Question 1

When compared with the general population, pregnant women who undergo a cholecystectomy are:

- a) Younger, more likely to be Caucasians, and have the cholecystectomy performed on an outpatient basis
- b) Older, more likely to be Hispanics and have the cholecystectomy performed on an inpatient basis
- c) Younger, more likely to be Hispanics and have the cholecystectomy performed on an outpatient basis
- d) Older, more likely to be Caucasians and have the cholecystectomy performed as an outpatient
- e) Younger, more likely to be Hispanics and have the cholecystectomy performed on an inpatient basis

Critique: When reviewing the demographics of the pregnant women and the setting of the cholecystectomies, some qualitative differences existed when compared with the general California population undergoing cholecystectomy from previous reports. The postpartum population was younger than the overall population (median 25 vs 47 years old) having a cholecystectomy. They were also more likely to be Hispanics (60% vs 37% in the general population), which may be due to the fact that more Hispanic women were of child-bearing age. Cholecystectomies were also less likely to be performed on an outpatient basis for the postpartum population (37% vs 53% for general population), but more likely to be performed in a primary teaching hospital (19% vs 5%).

Question 2

When compared with women who undergo cholecystectomy for benign biliary disease in the third trimester, those who undergo the procedure in the postpartum period have:

- a) Higher bile duct injury rate, longer hospital stay, and higher cost.
- b) Lower bile duct injury rate, shorter hospital stay, and lower cost.
- c) No difference in bile duct injury rate, length of hospital stay, and cost.
- d) No difference in bile duct injury rates, longer hospital stay, and higher cost.
- e) Lower bile duct injury rate, longer hospital stay, and higher cost.

Critique: Fortunately, no differences were observed in the rates of bile leaks and bile duct injuries when comparing the third trimester and the postpartum women. However, the incidences of both injuries were very low, and the analysis may be underpowered to detect a difference between groups. But the overall length of hospital stay was longer and cost was higher for women in the third trimester group vs the postpartum group on univariate, adjusted, and sensitivity

analyses. These observations may be explained by a combination of the need for added surveillance (fetal heart tracing) of the baby and more conservative approaches by health care providers surrounding pregnant women.

Question 3

When assessing maternal delivery outcomes, pregnant women who undergo cholecystectomy during the third trimester have:

- a) Two-fold increase in the risk of preterm delivery when compared with the postpartum group.
- b) Four-fold increase in the risk of preterm delivery when compared with the postpartum group.
- c) Two-fold decrease in the risk of preterm delivery when compared with the postpartum group.
- d) Four-fold decrease in the risk of preterm delivery when compared with the postpartum group.
- e) No difference in the risk of preterm delivery when compared with the postpartum group.

Critique: Women who underwent cholecystectomy in the third trimester demonstrated a 2-fold increase in the risk of preterm delivery when compared with the 0 to 3 months postpartum group. This finding is consistent with a Swedish Health Registry study that analyzed 2,181 laparoscopic procedures and reported a 2- to 3-fold increase in preterm delivery when compared with the general Swedish population. This finding is significant, since the brain, lungs, and liver need the final weeks of pregnancy to fully develop. As such, preterm delivery has been associated with increased risks of cerebral palsy, bronchopulmonary dysplasia, retinopathy of prematurity, and several other long-term issues such as respiratory problems and learning disabilities. Importantly, preterm delivery also leads to higher perinatal mortality, accounting for 85% of early neonatal deaths not due to lethal congenital deformities.

Question 4

Jane Doe is a 29-year-old G1P0 female who is currently 36 weeks pregnant, presenting to the emergency room with biliary colic. What is the most appropriate management strategy?

- a) Consult obstetrics and proceed to the operating room for cholecystectomy for definitive treatment.
- b) Terminate pregnancy and proceed to the operating room for cholecystectomy.
- c) Manage nonoperatively, as her symptoms are likely related to hormonal changes during pregnancy and should resolve after delivery.

- d) Manage nonoperatively, but schedule her for cholecystectomy during the early postpartum period given the high recurrence risk of her symptoms.
- e) Manage nonoperatively, and recommend cholecystectomy only if her symptoms recur after delivery.

Critique: Based on the findings of an increased incidence of both cholecystectomy- and delivery-related outcomes in the third trimester, pregnant women

presenting with biliary disease in the third trimester should be delayed until the postpartum period. Studies have shown that in women with complicated gallstone disease initially presenting during pregnancy, with surgery delayed to the post-partum period, 35% recurred within 1 month, and 82% within 3 months of delivery. As such, early intervention in the postpartum period is warranted when cholecystectomy has been delayed.

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