SUBJECT: Surgical Site Infection Reduction/Wound Closure Bundles

REVIEWED: N/A

RECOMMENDATION(S): Dr. J Margolick

APPROVAL: 5/6/2021

CONCURRENCE(S): Trauma Faculty

EFFECTIVE: 5/6/2021

PURPOSE:
- Reduce incidence of surgical site infection (SSI) in trauma and emergency general surgery patients
- Standardize abdominal fascia and wound closure for emergent laparotomies
- Stratify wound management based on intermediate, high and very high risk of SSI
- Record and analyze SSI incidence in the trauma and emergency general surgery patient populations

BACKGROUND:
Improvements in OR ventilation, antibiotic prophylaxis, surgical techniques and sterilization have reduced SSI recurrence over the past decade in the United States.1 Between 2015 and 2019, the Surgical Care Improvement Project (SCIP) reported a 9% reduction in the ratio of SSI –to-predicted SSI.2 However, SSI remains a substantial cause of morbidity, increased length of hospitalization and mortality. The CDC estimates an SSI associated mortality rate of 3% with 75% of those deaths attributed directly to the SSI.³

Several SSI reduction techniques have proven effective, including; smoking cessation, nutrition optimization, modified immunosuppressive therapy, colon prep, minimally invasive techniques and attention to intra-operative glycemic control. Unfortunately, it is not possible to optimize these factors for most trauma and emergency general surgery cases and these patients have a uniquely high risk of SSI. Potential SSI reduction interventions in emergency surgery patients include tension free wound closure, avoidance of intra-operative hyperglycemia, conservative transfusion strategies and avoidance of unnecessary traffic through the operating room.

Data supporting the use of negative pressure wound therapy (NPWT) as an adjunct for SSI reduction has been variable. A 2018 meta-analysis suggests NPWT substantially reduces SSI rates in the obstetric, orthopedic and colorectal patients.³ However, randomized clinical trials in the hepatobiliary population have demonstrated no significant difference in SSI rates with the use of NPWT.⁴ Randomized clinical trials of clean contaminated wounds after colorectal surgery have shown variable SSI reduction effects of NPWT. A 2018 meta-analysis suggests there is a substantial benefit to NPWT in reducing SSI after open general surgery and colorectal cases.⁵ Similarly, a recent RCT of 176 patients undergoing incisional hernia repair found a significant decrease of SSI (8% to 0%) with the use of prophylactic incisional wound VACs.⁶ Unfortunately, data specific to trauma and emergency laparotomies are largely limited to evaluating open abdomen management and the ubiquitous Abthera VAC system. Research in prophylactic NPWT is still in the early phases, however findings from obstetric, colorectal, vascular and hernia surgery have been extrapolated and NPWT has gained acceptance as an adjunct to SSI reduction after emergency laparotomies.

There is insufficient evidence to recommend primary skin closure (PSC) over delayed primary closure (DPC) in most contaminated or dirty wounds and systematic reviews document high study heterogeneity.⁷ A 2014 systematic review suggested there may be minimal decrease in SSI with DPC.⁸ However; a more recent, small RCT found that primary skin closure significantly reduced SSI in patients with hollow viscus perforation.⁹

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- Change gloves
- Fresh instruments

Clean contaminated wound + high risk patient
- Change gloves
- Fresh instruments
- Incisional VAC for 4 days

Contaminated wound, any patient
- Change gloves
- Fresh instruments
- Incisional VAC for 4 days

Dirty wound, any patient
- Change gloves
- Fresh instruments
- Wound VAC for 4 days or longer to facilitate secondary intention

Fascial Closure
- 0 non-looped PDS in a running fashion or surgeon discretion according to surgical characteristics and fascial integrity.

Documenting SSIs
- Please email JMargolick@uams.edu should a patient develop an SSI post laparotomy with the following information
  - Name, MRN, Date or OR, Procedure, whether or not the SSI reduction bundle was used or not

DEFINITIONS:

Clean wound: Clean operative field, no inflammation

Clean-contaminated wound: Respiratory, alimentary, genital or urinary tract organs are entered in a controlled fashion

Contaminated wound: Open, acute wounds, breaks in technique or gross spillage, necrotic

Dirty wound: Old traumatic wound, devitalized tissue, existing infection, wet gangrene, perforated or purulent abscesses, gross spillage.

Surgical Site infection: an infection related to an operative procedure that occurs at or near the surgical

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incision within 30 days of the operation, or 90 days if a prosthetic mesh is used.

**New instruments:** used only for closing fascia. Kept apart from the other instruments and covered with a sterile towel throughout case or opened at the time of closing

**Change of gloves:** New outer or single layer gloves. No need to re-scrub

**Incisional VAC:** Skin is closed with staples, Adaptic gauze is placed over the skin and a VAC is then placed to 100 mg Hg of negative suction

**Wound VAC:** Skin is left open, a VAC is placed into the wound. Skin is allowed to heal by secondary intention

**REFERENCES:**

10) Deerenberg EB, Harlaar DJ, Steyerberg EW et al., Small Bites versus Large Bites for Closure of Abdominal Midline Incisions (STITCH): A double-blind, multicentre, randomized controlled trial. The Lancet 2015, 386, 1254-1260

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