

Closed Sternal Wound Care in Pediatric patients with CHD What the ICU Bedside Nurse Needs to Know

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Introduction of the problem:

Health care-associated infections (HAI) have resulted in an estimated 99,000 deaths annually.

- Surgical site infections (SSIs) account for one in five of HAIs (Galvin, P., 2009).
- Primary concern for infection is in relation to the patient's incision.
- Preventive measures can be taken throughout the perioperative course

Critical thinking points to consider when addressing the problem

- Predisposing conditions have been linked back to the occurrence of SSIs.
- Risk factors include
 - Young age
 - High complexity
 - Previous cardiothoracic surgery
 - Preoperative ventilator support
 - Duration of surgery & surgical conditions (greater degree of contamination)
 - Use of peripheral, central, and urinary catheters
 - Infection prior to surgery
- The leading cause of SSIs, however, is most often endogenous organisms on the patient's skin, mucous membranes, or within the hollow organs. It also has been noted that mediastinitis is greater
 - With the presence of a known or possible genetic syndrome
 - If the epicardial pacing wires are not removed after three days postoperatively

Diagnostic evaluation of the problem

Key Point:

- SSIs are often identified clinically with signs and symptoms of infection.
- Cultures are then done to clarify that the source of infection
 - Need to be done to ensure it is the incision
 - Depend on the severity of the incisional infections.
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- Superficial incisional infection
 - Includes the skin and subcutaneous tissue
 - There may be purulent drainage from the incision site, erythema, pain, or edema
 - A combination of these symptoms may occur at once
 - Deep incisional infections

- Involve the deep soft tissues.
- May be characterized by purulent drainage from the incision
- Abscess may be present.
- Organ–space infections
 - Involve an entire organ or body cavity
 - Purulent drainage may be seen but this time coming from an organ or within the body cavity
 - An abscess could develop.

Prevention and Treatment

Key Point:

Prevention of surgical site infection is a priority during the patient’s stay.

- Preoperatively
 - Patients should be given a Chlorhexidine (CHG) bath the night before surgery and right before surgery before being prepped in the OR if appropriate (See CHG considerations under “Special Considerations”).
 - Emphasis on the anterior thorax
 - Allow to dry before applying a clean gown.
 - Clippers must be utilized for older pediatric patients who may have chest hair between the two baths.
 - If not done on admission to the ICU, a screening of the nares for MRSA may be important in preventing infection.
- Antibiotics
 - Usually Cefazolin or Vancomycin
 - Given in the OR to patients 30-60 minutes prior to incision time.
 - Consideration for redosing for long procedures and excessive blood loss.
 - Antibiotic prophylaxis should be discontinued within 24 hours of surgery (with 48 hours being allowed for adult patients.
 - **See antibiotic stewardship section
- Perioperative normothermia has been identified as a surgical site infection prevention strategy in patients with anesthesia times > than 60 minutes.
- Postoperatively
 - Hand hygiene is inevitably a large part of preventing SSIs.
 - This includes using an alcohol based hand rub prior to any care and rubbing for 15 seconds each time
 - Must be done before any intervention for the surgical incision
 - The postoperative dressing remains in place after returning from the OR for 48 hours unless the dressing is visibly soiled.
 - After 48 hours and if this patient is extubated, the dressing may be removed and the incision can remain open to air.
 - If the patient remains intubated, has copious secretions, or is a neonate after the initial 48 hours, a “breathable” dressing may be placed. This can be a 4 x 4 gauze and paper tape dressing. This dressing must be changed daily.
 - All dressing changes must be done with sterile technique.

- **Sterile technique when performing dressing changes:**
 - Sterile technique begins with cleaning the work surface with a sanitizing agent and performing hand hygiene.
 - Don clean gloves and remove the old dressing along the incision to avoid tension.
 - Assess site for any signs of infection or purulent drainage. If infection is suspected, notify the MD/NP/PA and send a wound culture.
 - Make sure that all supplies are available in work space before performing hand hygiene and donning sterile gloves.
 - Cleanse around the wound area with sterile water or normal saline.
 - Be sure to remove all Betadine or Chlorhexidine residue from the OR.
 - Allow this to dry and apply appropriate dressing.
 - Avoid draping telemetry leads or any other equipment over the incision if leaving it open to air.
- Controlling glucoses postoperatively is recommended in adult cardiac surgery patients with a goal of Glucoses being < 180 mg/dl or lower by 6am on post-op days 1 and 2 (Anderson et al., 2014).
 - According to your facility, follow your blood glucose protocol and administer insulin per protocol if needed.
- Postoperative antibiotics will be discontinued within 48 hours of surgery.
- Optimizing tissue oxygenation, appropriate volume replacement, and normothermia can reduce risk (Anderson et al., 2014).
- If an ECHO is performed and the technician moves the sternal dressing during the wound healing process, a sterile probe cover and gel must be used.
- Treatment of surgical site infections will include antibiotics dependent on the organism.
- Additional surgeries and procedures may need to be done as well if a surgical site infection is detected.

Associated Complications

- Complications from sternal wound infections may include increased length of hospital stay, increased recovery time and wound healing, additional surgeries or procedures, sepsis, and even death.

Special Considerations specific to neonates and pediatric patients

- There are very few studies to support the best postoperative care of sternal wounds in the pediatric patient. There are, however, a lot of research studies done within the adult population. It is unclear whether the adult standards of care can be utilized successfully in the neonate and pediatric population.
- Chlorhexidine Gluconate 2% (CHG) may not be used in premature infants and should be avoided in neonates less than three months of age.
 - They are vulnerable to systemic absorption and skin irritation from the product. CHG baths are given twice before surgery.

- After surgery, they should be continued daily for those with central lines in place who are greater than three months of age.
 - If no central line, at least a soap and water bath must be given daily.
 - Please allow one hour after a soap and water bath before using CHG wipes on a patient if both are utilized.
 - It is important to allow the solution to dry before proceeding with applying a gown on the patient or any other equipment.
 - A povidone-iodine solution followed by isopropyl alcohol 70% may be substituted for CHG.
- Some cardiac surgical incisions are done as thoracic incisions. Care for those patients is the same but the dressing remains in place postoperatively until discharge.

References

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