Guideline Title: Wound Management Post Cardiothoracic Surgery

Summary: Wound management post cardiac surgery includes management of sternotomy sites, (opened and closed) and graft sites. This guideline will provide information to assist staff in promoting wound healing as well as management of wound complications such as sternal dehiscence and surgical wound infections.

Approved by: ICU Director
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Replaces Existing Guideline: Wound management following cardiac surgery

Background information:

Surgical wounds, sternotomy (open and closed) and graft sites
- Primary intention healing occurs in wounds where the edges are approximated shortly after the wound has been created such as a clean surgical incision. A clean and dry wound environment provides optimal healing and the best protection against infection.
- Most important factors in the prevention of surgical site infections are meticulous operative techniques and administration of effective pre and post operative antibiotics.
- Median sternotomy is the most commonly used incision for open cardiac surgery as it provides the best view of the heart. To access the mediastinum, the sternum is divided with a surgical saw longitudinally in the midline. At completion of the procedure the sternal edges are closed with sternal wires and the subcutaneous tissues with absorbable sutures.
- Mediastinitis and sternal dehiscence is an infrequent but serious complications post coronary bypass grafting surgery.
- Soft tissue dehiscence refers to separation of the superficial tissues (skin, subcutaneous fat and muscle) the sternum is stable to palpation.
- Sternal dehiscence refers to the separation of the edges of the sternum from one another and can occur in the absence of soft tissue dehiscence. Patients complain of painful chest motion and clicking and on physical examination the sternum will “click and rock”. Patients require surgical intervention as bone fragments and/or sternal wires may cause ventricular rupture.
- Deep wound infection also known as Mediastinitis can result from overlying soft tissue dehiscence or intra-operative contamination of the deeper tissues. Risk factors for developing mediastinitis include obesity, diabetes, COPD, prolonged ventilation, multiple chest openings, smoking history and peripheral vascular disease.
- Graft site skin closure is achieved using either sutures or staples. Complications post op include wound infection, dehiscence, dermatitis, cellulitis, saphenous neuropathy, chronic nonhealing ulcers and lymphocele.
1. **Introduction:**
The risk addressed by this policy:

| Patient Safety |

The Aims / Expected Outcome of this policy:

| Patients post cardiothoracic surgery will have their wounds managed effectively with a process that promotes wound healing. Complications such as infection, inflammation or dehiscence will be prevented and should they occur will be managed appropriately. |

Related Standards or Legislation

| NSQHS Standard 1 Governance |

Related Policies

- LH_PD2014_P15.12  Negative pressure therapy devices wound management
- (Includes Vacuum Assisted Closure – VAC). Corporate Policy Manual, Patient Care
- LH_PCP2015_P15.05 Wound Care Assessment Management and Product Guidelines

2. **Policy Statement:**

- All care provided within Liverpool Hospital will be in accordance with infection prevention/control, manual handling and minimisation and management of aggression guidelines.
- Registered nurses must follow wound management interventions as outlined in the cardiothoracic pathway
- Dressings applied in OT remain intact unless oozing
- Signs of infection or oozing must be reported to the ICU medical and Cardiothoracic surgical teams
- Wound status must be documented in clinical notes and/or wound chart
- IV antibiotics must be prescribed and administered
- Blood glucose levels must be done 2nd - 4th hourly
- Insulin infusion must be commenced if blood sugar level is greater than 10mmol/l
- Infection Control guidelines are to be followed
- Sternum must be supported at all times when patient is moving and coughing
- Bandages to graft sites must be removed Day 1
- Do NOT place the black foam for VAC dressing over exposed blood vessels or organs

3. **Principles / Guidelines**

Management of graft, chest drain and pacing wire sites and sternotomy wounds

**Equipment:**

- Personal protective equipment(PPE) gown, gloves, goggles
- 0.9% sodium chloride for irrigation
- Dressing pack
- Sterile gauze
- Hydrocolloid dressing (Comfeel), opsie post op visible
- Stitch cutter
Procedure:

- Explain procedure to patient
- **Graft site** and **sternotomy** wounds remain intact with Comfeel unless oozing until Day 4 post op
  - Bandages removed from graft sites Day 1
  - If wounds oozing haemoserous fluid or blood report to ICU team and Cardiothoracic surgeon
  - Clean with 0.9% sodium chloride irrigation and dress with Comfeel. If high amount of oozing use an absorbent hydrocolloid dressing or Zetavit with hyperfix and change it prn (Cardiothoracic ward)
  - Powders, creams should not be applied to suture lines
  - Observe wounds for redness, swelling, pain and exudates
- **Drain sites**
  - Clean with 0.9% sodium chloride and dressed with Opsite post op.
  - Drain site sutures to be removed Day 5-7
- **Pacing wire** site
  - Clean with 0.9% sodium chloride and wires wrapped in gauze if not in use. Pacing wires removed Day 3 if not in use and INR< 2
- Insulin infusion commenced if BGL > 10.0 mmol/l as control of BGL post op enhances wound healing
- IV antibiotics administered until drains removed
- Chest wound to be supported when patient moving, coughing. Patient not to use arms for support when sitting down, moving in bed
- Apply anti embolic stockings Day 1 after leg bandages are removed
- Documentation of the wound healing process in clinical notes

**Sternal wounds with Prevena device insitu:**
The Prevena device is a negative pressure product designed specifically for management of incisions at risk of postoperative complications.

The device:
- Holds incision edges together, which may reduce the likelihood of surgical dehiscence
- Stimulates perfusion
- Reduces lateral tension and oedema
- Protect the surgical site from external infectious sources
- The device is placed over the wound in OT
- It is left in place for 2-7 days
- Do not lift dressing
- If leak occurs check canister, dressing seal integrity, and patch dressing to improve seal if necessary

Prevena Incision Management System
Management of Sternal wound complications (open sternum)²³

N.B: *As a general rule if patients need sedation, it suggests a major wound and needs anaesthetic team/theatres.*

*Dressings in ICU are limited to simple changes and not requiring anaesthetic interventions*

Most patients suspected of having deep sternal wound infection on the basis of wound separation, wound drainage, sternal instability, systemic toxicity, CT findings or positive wound cultures are usually taken to OT for debridement and return to ICU with either the chest opened or closed. Until closure of the chest, application of regular sterile dressings is important to promote wound healing and protection from mechanical injury. The following guidelines will be for a simple open sternum with:

A. 0.9% Sodium chloride dressings and  
B. Negative pressure therapy.

A) 0.9% Sodium chloride Dressing

**Equipment:**
- Sterile gowns, gloves x3, eye protection, face mask, hair net
- Large sterile dressing pack
- Sterile suction tubing and yanker sucker
- Fenestrated drape and 2 large sterile drapes
- Warmed 1 litre 0.9% sodium chloride for irrigation
- 50 ml syringe, sterile kidney dish
- Raytec sterile gauze squares and packing gauze
- Barrier / paraffin dressing (e.g. jelonet) to protect beating heart
- Combines and large sterile opsite drapes x2

**Procedure:**
- Explain procedure to patient
- Administer analgesia and sedation as ordered by ICU medical officer
- Position patient in supine position
- Wash hands
- Clean dressing trolley then place sterile drape and equipment
- Apply sterile gloves
- Remove opsite, combines gently from patient
- Put on mask, hair net and perform surgical hand wash
- Gown and double glove
- Remove raytec gauze very gently, applying sterile 0.9% sodium chloride to soak the gauze prior to removal if it is difficult to remove
- Remove first pair of gloves
- Drape patient with sterile drapes
- Assess wound status for healing, colour, drainage, slough, odour
- Swab wound for culture and sensitivity
- Connect yanker sucker to sterile suction tubing
- With warmed 0.9% sodium chloride soaked gauze and 50ml syringe irrigate wound gently to remove slough, using yanker to suction out excess
- Place paraffin dressing over heart very gently
- Pack with warm soaked sterile raytec gauze
- Cover with combines and secure with large opsite
- Document wound status, including observations on healing, infection, swelling, redness, discharge, odour in clinical progress notes and on the wound care chart report any changes to ICU and Cardiothoracic teams
B) **Negative pressure therapy.**

Negative wound pressure therapy or vacuum assisted wound closure (VAC) is a dressing system that continuously or intermittently applies atmospheric pressure to the surface of a wound. It stabilises the chest wall, removes excess fluid and facilitates wound healing.

**Equipment:**
- Sterile gowns, gloves dressing pack
- Mask, hair net, goggles
- Sterile suction tubing, yanker sucker
- Fenestrated drape and medium drape for trolley
- 50ml syringe, sterile kidney dish
- Warmed 1litre 0.9% sodium chloride for irrigation
- Sterile scissors
- Non-adherent interposed dressing layer i.e. Mepetel /Mepilex
- Wound VAC dressing pack
- VAC canister and VAC machine

**Procedure:**
- Explain procedure to patient
- Administer analgesia and sedation as ordered by ICU medical officer
- Position patient in supine position
- Wash hands
- Clean dressing trolley then place sterile drape and equipment
- Place VAC machine on a level surface or footboard, if dressing insitu turn off VAC machine to release pressure
- Place a fenestrated drape and other sterile items on the trolley
- Gently remove adhesive dressing, leaving the VAC sponge for the moment
- Put on a hair net and mask, and then perform surgical hand wash, gown and double glove
- Irrigate around the foam with sterile 0.9% sodium chloride if the foam is adherent
- Remove old VAC foam and discard first pair of gloves
- Place a sterile fenestrated drape over the patient
- Assess wound status for healing, colour, drainage, odour, presence of slough tissue
- Connect yanker to suction and ask assistant to connect to high suction
- With sterile gloves or forceps use warm 0.9% sodium chloride soaked gauze to loosen and remove slough then irrigate the wound with warm 0.9% sodium chloride using a 50ml syringe or jug
- Use Yanker to suction any residue
- Take a wound swab for culture and sensitivity if indicated
- Measure wound and cut black foam to shape (a template can be created for future dressing of the same wound)
- Ensure that loose black particles from foam are brushed off before inserting into wound as they inhibit wound healing
- Do NOT place the black foam over exposed blood vessels or organs, if these underlying structures are visible, to ensure their protection, you must gently place a layer of a non-adherent interposed dressing i.e. Mepetel, covering the entire wound surface.
- Gently place foam dressing into wound cavity using two foam pieces if necessary making sure to cover the entire wound bed and tunnelling. Leave a 2cm margin over the surface of the skin to allow for volume reduction during vacuum
- Count the pieces of foam used and document this on the wound chart and in the patient’s clinical notes.
- Cover the entire foam dressing including a 2-5cm border with the clear adhesive VAC dressing, using more than one piece if necessary.
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- Create an opening in the adhesive dressing by lifting it with your thumb and forefinger and cutting a 1-2cm hole.
- Apply the VAC trac tubing directly over the hole, gently pressing this down to ensure adhesion.
- Connect VAC tubing to canister and place canister in the VAC machine
- Turn on machine and regulate suction usually 125mmHg (once initiated the foam dressing will compress, if it does not check for leaks in tubing or dressing)
- Following procedure reposition patient and ensure they are warm, pain free and comfortable
- Document in the wound chart and in the clinical notes wound status and notify ICU medical officer and CT team of any changes

Clinical Issues:
- Monitor patient for signs of infection, fever, discharge from wounds
- Wash hands before and after patient care and utilise PPE and comply with infection control guidelines
- Keep wounds dry and clean
- Monitor BGL 2nd - 4th hourly as diabetes and hyperglycaemia have been identified as risk factors for deep sternal site infection after CABG
- Ensure adequate PaO₂ as tissue hypoxia is a risk factor for wound infection
- Appropriate use of antibiotics; should be administered within one hour before surgical incision and ceased once ICC drains are removed

4. Performance Measures
All incidents are documented using the hospital electronic reporting system: IIMS and managed appropriately by the NUM and staff as directed.

5. References / Links
3. Royal Prince Alfred Hospital. Open Sternotomy Wound Dressing. RPAH_PD2010_059

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