The Use of Antimicrobial Gauze Dressing (AMD) After Orthopedic Surgery To Reduce Surgical Site Infections

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Abstract

Introduction: In April 2008 we conducted observational studies of post-op dressing technique used by residents and physician assistants. Dressings were done in the early mornings resulting in suboptimal aseptic technique. After sharing results with surgeons, a decision was made to let nurses do the primary and follow-up dressings, using an antimicrobial gauze that contains 0.2% PHMB (Polyhexamethylene Biguanides) ordered on a post-op dressing order form. The dressing would be affixed with a hypoallergenic self-adhesive fabric tape to prevent skin tears and blisters.

Objective: Standardize post-op dressing procedures by orthopedic nurses and compare surgical site infection rates after implementation.

0.2% PHMB (Polyhexamethylene Biguanides
Polyhexamethylene biguanide (PHMB), also known as polyhexanide and polyaminopropyl biguanide, is a commonly used antiseptic. Clinically, PHMB has been used as a perioperative cleansing agent, in mouth wash, in ophthalmology and as a topical wash. The most commonly used biguanide in healthcare is chlorhexidine. Although chlorhexidine is a very effective antimicrobial, it is too cytotoxic for use in wounds. A modified biguanide that is more biocompatible is polyhexamethylene biguanide (PHMB). FDA has cleared the use of PHMB as an antimicrobial component in wound dressings.

AMD Primary Bacterial Barrier
AMD works as a contact kill and maintains log counts in the wound without negative impact to wound healing.

AMD Secondary Layer
AMD works to limit cross-contamination by significantly reducing bacterial growth in the pooling layer.

AMD is effective against:

Staphylococcus aureus	Proteus mirabilis
Staphylococcus epidermidis	Serratia marcescens
Pseudomonas aeruginosa	Enterbacter cloacae
Escherichia coli	Klebsiella pneumoniae
Candida albicans	Enterococcus faecalis
Staphylococcus coagulase	

Methods: In October 2008 antimicrobial gauze dressings replaced traditional gauze dressings in the post-op dressing kits sued by all surgeons for inpatient and outpatient surgeries. Beginning in October 2009 the standardization program was developed and implemented. Nurses were trained in procedures to remove primary post-op dressings and to re-apply an antimicrobial gauze dressing. A train the trainer program was developed by the infection control manager and clinical nurse educators and included classes, a power point presentation, dressing procedures and patient education sheets. Surgeons, residents and physician assistants were informed at monthly staff meetings during the implementation process.

Results: In FY2009, an evaluation of 8890 orthopedic surgeries for signs of infection, as defined by the CDC, revealed 28 infections with an overall rate of 0.31%. In the prior fiscal year there were 36 infections in 8884 cases with a rate of 0.41%. Distribution of infections in surgical categories is detailed in Table 1. Overall there was a 24% reduction in surgical site infections after implementation of the standardized dressing procedures by nursing staff.

Conclusions: The standardization of post-op dressings provided a reduction in the surgical site infection rate by 24%. It reduced work-time of residents and physician assistants in the early hours before surgery, provided nurses with better assessment and care of post-op incisions, reduced exogenous contamination from suboptimal aseptic technique, provided antimicrobial protection of incisions in the early stages of wound healing and enhanced patient discharge education on the care of post-op incisions.

Standardization of Post-operative Dressings Procedure

Goal:

- Standardize the dressings for knee, hip, spine, and shoulder incisions
- Work with the nursing staff to assess the incisional sites and to inform the MD, PA, or NP with any incisional complications.

Procedure:

- **Initial Dressing Change**
  - Will be completed as specified on the orthopedic order sheet
    - Example: POD # 2 or POD # 3
    - Preferably dressing would be left in place until day of discharge
  - Exception: Significant strike through (post-op drainage)
    - Alert the MD, PA, or NP
    - Initially reinforce and change dressing in 24 hrs

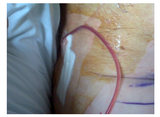
- **Subsequent Dressing Changes**
  - On the morning of discharge

- **Notify the Attending MD with the following:**
  - Evidence of wound dehiscence
  - Drainage
  - Sanguinous and Purulent drainage
  - Moderate or Copious amount of drainage
  - Incisional Complication
  - Erythema
  - Edema
  - Skin Tears
  - Warmth
  - Eccymosis
  - Incisional Breakdown

- **Dressing Treatments while patient in the hospital:**
  - **Knee Incisions**
    - Anti-microbial Dressing (AMD) directly over incision
    - 6 inch Ace wrap dressing
    - Applied distal to proximal and should extend to mid-thigh level
    - If Dermabond is used then the original dressing will stay on for weeks
    - Notify MD, PA, or NP with significant drainage

- **Hip Incisions**
  - AMD gauze
  - Bordered with Mefix tape

- **Spine Incisions**
  - AMD Island dressing left on until discharge



- **Shoulder Incisions**
  - If Dermabond is being used, an AMD gauze covered with tegaderm or an AMD Island dressing is being placed and can be left on until discharge

- With incisions with moderate to copious amounts of drainage, alternative dressings may be required such as Aquacel or Aquacel Ag. Consult with a wound care specialist or the MD, PA, or NP.

Dressing Treatments upon discharge from the hospital:

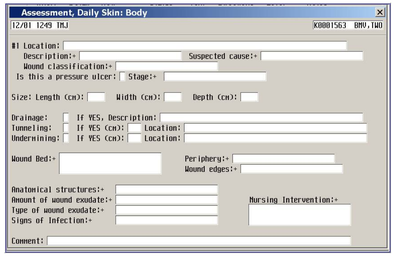
- **Knee Incisions, Hip Incisions, Spine Incisions, and Shoulder Incisions**

- **Patient Instructions:**
  - **Wounds <u>without</u> drainage**
    - The patient should be instructed to remove the dressing after 2 days. It can them be left open to air.
    - Patients may shower but should be instructed not to use a washcloth or scrub the incision with any soap.
  - **Wounds with drainage**
    - VNA services required at home
    - Dressings may vary depending on the amount of drainage
  - **Wounds with sutures or staples**
    - Any incisions with sutures or staples should be kept covered until the sutures or staples are removed

Documentation:

Daily Skin Assessment in Meditech (lab system)

Location
Description
Drainage
Periphery
Wound Edges
Amount of Exudate
Type of Exudate
Nursing Intervention
Comment: Incisional Complication



Progress Notes for any complications

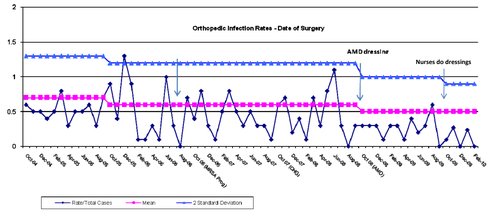
- Specify who was notified and when
- Specify treatment and plan for any incisional complications

Cost Savings

- **Discharge Supplies**
  - **Patients with Sutures and Staples**
    - Supply patient with 2 additional dressing changes at home
    - Shower drapes for patients with sutures or staples - 2 per patient
    - They can be cut in half
  - **Patients with Steri Strips and Dermabond:**
    Unless draining do not need any supplies for home
    - Instruct patient to avoid showering for 2 days when at home until the dressing can be removed

Results

	2008	2009
Overall Rate	0.4%	0.3%
Total Hips	0.3	0.5
Total Knees	0.6	0.4
Laminectomy	0.5	0
Spine Fusion	0.4	0.3
Other Cases	0.3	0.2
Total Shoulder	1.6	0



Discussion

The standardization of post-op dressings was a major undertaking at our facility. The first year focus was on getting the AMD gauze in all the post-op dressing kits, working with residents and physician assistants to transition the responsibility to nursing and identify and photograph wound issues common in the orthopedic population. Skin tears, blisters, local reaction to antiseptics and hematomas were identified as some of the problems nurses might encounter. During FY08 we noticed an increase in post-op hematomas in total hip patients and a case/control study is underway to evaluate possible causes or risk factors. That is the only category between FY08-FY09 that increased slightly after the implementation of standardized dressings. Since our infection rates are so low it was not possible to calculate statistical significance.

The standardization protocol was received by the nurses, residents, physician assistants and surgeons as a better approach to post-op incision care.

Conclusions

The standardization of post-op dressings provided a reduction in the surgical site infection rate by 24%. It reduced work-time of residents and physician assistants in the early hours before surgery, provided nurses with better assessment and care of post-op incisions, reduced exogenous contamination from suboptimal aseptic technique, provided antimicrobial protection of incisions in the early stages of wound healing and enhanced patient discharge education on the care of post-op incisions.

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