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Do Different Wound Dressings After Total Joint Arthroplasty Make a Difference?

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Wound Dressings and Periprosthetic Joint Infection

Total joint arthroplasty (TJA) has excellent outcomes in the majority of patients. However, periprosthetic joint infection (PJI) remains one of the most frequent and devastating complications. To minimize this risk, orthopaedic surgeons have implemented a host of prophylactic modalities including high flow ventilation systems, perioperative antibiotics, and intraoperative antiseptic agents, all with varying degrees of success.[1] Acute infections occurring within three months of surgery are of particular concern as these infections are believed to be acquired during the index procedure and may therefore be preventable.[2] In an effort to better address these early infections, orthopaedic surgeons have investigated the role of different types of wound dressing in the setting of TJA.

Wound Dressings—what makes them special?

Conventional surgical dressings consist of a soft protective material, usually cotton, which form a physical barrier preventing wound saturation and limiting contamination. While it has been demonstrated that a moist environment promotes wound healing, it must also be balanced against the increased risk for infection. Furthermore, impractical or bulky wound dressings may pose as an obstacle to rapid recovery by impeding activities of daily living and rehabilitation.

More recently, manufactures have developed products designed to provide a protective barrier, while optimizing the surgical wound healing environment (Table 1)

Table 1. Wound dressing material, application instruction, advantages/disadvantages, and retail cost

Dressing Name	Material	Application Instruction	Advantages	Disadvantages	Retail Cost
Standard Dressing	Cotton and paper tape	Apply over dry skin—remove and replace as dressing becomes saturated	✓ Cheap ✓ Easy to apply	Non-sterile Replace often	Negligible
Aquacel[6]	Sodium carboxymethylcellulose	Apply over dry sterile skin—remove after 10-14 days	✓ Sterile ✓ Easy to apply ✓ No need to replace ✓ Absorbent	Expensive	$50 USD
Mepore[7]	Polyester fabric coated with a layer of acrylic adhesive	Apply over dry sterile skin—remove after 10-14 days	✓ Sterile ✓ ✓ No need to replace	Moderately absorbent	$2 USD
Primapore[8]	Polyester and low allergy adhesive	Apply over dry sterile skin—remove after 10-14 days	✓ Sterile ✓ Easy to apply ✓ No need to replace ✓ Absorbent	Moderately Expensive	$20 USD
Aquacel Ag[6]	Sodium carboxymethylcellulose and impregnated silver	Apply over dry sterile skin—remove after 10-14 days	✓ Sterile ✓ Easy to apply ✓ No need to replace ✓ May have bactericidal effect	Expensive	$75 USD

In response, investigators have assessed outcomes within the TJA population in an effort to elucidate the clinical effectiveness and utility of modern-day, advanced wound dressings. Chen and colleagues[3] comparatively assessed the clinical effectiveness of three common dressings: standard, absorbent (e.g. Mepore; Molnlycke; Norcross, Georgia), and hydrofiber (e.g. Aquacel; ConvaTec Corporation; Bridgewater, NJ) dressings. Their analysis suggested that hydrofiber dressings reduce the likelihood for infection and skin blistering, but reported that very few randomized control trials have comparatively evaluated postoperative outcomes using the different dressing types. In addition, at the 2013 International Consensus Meeting on Periprosthetic Joint Infection[4] a weak consensus was reached on the optimal wound dressing following TJA. According to available scientific literature, the delegates agreed that hydrofiber dressings had a slight advantage when it came to reducing the rate of skin blisters and frequency of dressing changes.[4,5] It was also noted, that silver-impregnated dressings were not shown to conclusively reduce the rate of infection following TJA. Thus, hydrofiber dressings may have a slight clinical advantage among patients undergoing TJA. However, it should be recognized that many of the studies assessing the different types of wound dressings often evaluate a heterogeneous patient population (e.g. different comorbidity status, different procedures, etc.) limiting the clinical generalizability of the analysis.

Although the clinical impact of the different types of advanced wound dressings have been described, there are additional advantages, which are often overlooked. Compared to traditional dressings, hydrofiber wound dressings are lower profile, absorbent, easy to apply and may reduce the incidence of epidermal blistering. As these advanced wound dressings are sterile, they may be applied immediately after closure, providing a theoretically sealed and aseptic environment. Furthermore, the hyper-absorbent material used in these dressings reduces the need for dressing changes, minimizing exposure and extends the duration of wound sterility. Finally, the impregnation of ionized silver in select hydrofiber dressing products are thought to prolong sterility, although the clinical superiority of these dressings has not been demonstrated.

However, the cost associated with these advanced wound dressings can be substantial, particularly if multiple dressings are applied during the patients' hospitalization. Future multi-center randomized clinical trials investigating the effectiveness of these advanced wound dressings are warranted to better define the clinical role of these advanced surgical wound dressings.

Recommendations

Currently, there is insufficient literature to mandate the use of advanced wound dressings. However, as the cost associated with these surgical dressings continues to decrease, low profile, hyper-absorbent dressings may at the very least enhance patient comfort, mobility, and hygiene within the perioperative period. Hence, at our institution we regularly use advanced wound dressings on all primary TJA recipients.

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