G64: Which Surgical Dressing is Optimal for Reducing Surgical site infection After Major Orthopedic Surgery?

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Response/Recommendation: Active dressings, and particularly hydrofiber dressings, are superior to passive dressings in reducing surgical site infection after major orthopaedic surgery.

Level of Evidence: Limited

Delegate Vote:

Rationale:

Proper wound management after major orthopaedic surgery, including elective total joint replacement (TJA), is crucial to prevent superficial and deep surgical site infections (SSI).[1] This includes the use of the proper wound dressing post-operatively. There are numerous options available for wound coverage after surgical procedures. Dressings can be basic/passive (e.g. gauze or cotton absorbent) vs. advanced/active (e.g. hydrogels, hydrocolloids, films), occlusive vs. non-occlusive, hydrophilic vs. hydrophobic, include antimicrobial agents, or be composed of a 'glue-as-a-dressing' (usually made of cyanoacrylate).[2] The ideal dressing is likely one that absorbs exudate while maintaining a moist environment, can provide a barrier from contamination from surrounding skin and external environment an ideally include an antimicrobial agent that is broad-spectrum and does not lead to increased bacterial resistance.[3,4] Effective antimicrobial agents used in wound dressings include silver, polyhexamethylene biguanide (PHMB) and manuka honey. These agents have broad antimicrobial properties and have been shown to work against fungus and bacteria, even resistant organisms such as methicillin-resistant *Staphylococcus aureus* MRSA and vancomycin-resistant *Enterococcus* (VRE). [5–10] Dressings used in orthopaedic surgery should additionally be highly conforming and flexible to accommodate for movement especially at joints, like the knee, and should be cost-effective.

In a quest for the best post-operative dressing, Dumville et al. conducted a Cochrane database study encompassing 29 randomized controlled trials (RCTs), mostly involving non-orthopaedic procedures. [11] This extensive review found no clear superiority of one specific type of dressing in reducing SSI and concluded that available studies in the literature are of very low quality. In a systematic review and network meta-analysis more focused on TJA, Kuo et al. evaluated 21 studies utilizing 12 different types of dressing after 7,293 TJA procedures. [12] They found antimicrobial dressings to have the most efficacy for preventing PJI. Negative pressure wound therapy dressings had the highest rate of blister formation. Hydrofiber dressings were not found to offer a significantly reduced rate of infection compared to standard dressings. Yuan et al. conducted a meta-analysis comparing active dressings vs. passive dressings after hip or knee arthroplasty. [13] They included 16 prospective and retrospective studies involving 2,765 subjects. They found active dressings to have significantly lower wound complications and number of dressing changes.

Indeed, many orthopaedic centers have recently transitioned from basic dressings to advanced or active dressings after TJA. Hydrofiber dressings have particularly gained interest and have become the standard of care in many centers. These dressings are made of sodium carboxymethylcellulose (CMC), which forms a gel on contact with exudate and can hold up to 30 times its weight [2]. In order to better understand the role of hydrofiber dressings in reducing infection after major orthopaedic surgery, we conducted a comprehensive review of the literature. Using the MeSH terms created by the librarians we searched the Scopus and Medline databases to identify 4,718 potentially eligible studies. After initial screening by two independent reviewers, 15 studies were left for full review and data extraction, including 4 meta-analyses. [14–28]. We found two retrospective studies that identified a lower rate of PJI with the use of hydrofiber after TJA. Cai et al. demonstrated a significantly reduced rate of PJI with the use of hydrofiber dressings in a retrospective study of 1,778 patients undergoing TJA, with an odds ratio of 0.165 (95% confidence interval: 0.051–0.533) after multivariate analysis. [16] Similar findings were identified by Grosso et al. in another retrospective study of 1,173 patients undergoing TJA. [19] They also performed a multivariate analysis for risk of PJI and found that the use of hydrofiber dressing conferred a protective effect with an independent odds ratio of 0.092 (95% confidence interval 0.017-0.490). While several prospective studies have attempted to further evaluate the effect of hydrofiber dressings on outcomes after TJA, they were grossly unable to identify a significant difference in infection rates, mostly related to low numbers of study subjects coupled with the low incidence of infection. [14,15,18,20,22,24–26,28,29] Systematic reviews and meta-analyses thus attempted to compile the data and address this question. Chen et al. conducted a meta-analysis comparing hydrofiber dressing to standard dressing or absorbent dressings after TJA. [17] They included 5 studies with a total of 3,721 participants. They found lower infection rates with hydrofiber and absorbent dressings and lower blistering rates in hydrofiber dressings compared to the other 2 dressings. Sharma et al. in a broader meta-analysis including 12 RCTs found decreased wound complications after film dressings or hydrofiber dressings compared to passive dressings, without however demonstrating a significant effect on the rate of actual periprosthetic joint infection (PJI). [27] Finally, a recent meta-analysis by Mundi et al. included 5 RCTs comparing hydrofiber dressings to standard dressings. [23] They were not able to show any effect on PJI, however the studies had smaller number of patients, limited follow-up and overall poor methodology. All 3 of these meta-analyses showed a significantly reduced number of dressing changes with the hydrofiber dressing. This not a trivial benefit, as it minimizes skin trauma, avoids painful events, reduces the risk of wound contamination. Despite these advantages, the higher cost of hydrofiber dressings may pose challenges for widespread adoption, particularly in resource-limited settings. Nonetheless, potential savings from reduced hospital stays and fewer secondary interventions may offset initial expenses, particularly for high-risk patients. [2,15,26]

Conclusion:

In conclusion, advanced active dressings, particularly hydrofiber wound dressings, should be considered a preferred option for postoperative wound care in orthopedic surgeries. Their role in reducing infection, improving patient comfort, and enhancing healing makes them a valuable addition to surgical practice. While further high-quality studies are recommended to explore their

true efficacy in preventing deep infections, these advanced dressings align with evidence-based practices aimed at optimizing surgical outcomes and improving patient care standards.

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