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QUESTION 36: What is the role for vacuum-assisted incisional dressings (iVAC) in orthopaedic patients?

RECOMMENDATION: Prophylactic iVACs appear to be a reasonable option for improved wound healing and decreasing the infection rate in orthopaedic patients at risk for such complications. Prophylactic iVACs used routinely in uncomplicated cases do not appear to provide benefit and lead to increased costs. Lastly, evidence suggests that iVACs may also play a role in resolving some cases of early, benign postoperative drainage.

LEVEL OF EVIDENCE: Moderate

DELEGATE VOTE: Agree: 85%, Disagree: 11%, Abstain: 4% (Super Majority, Strong Consensus)

RATIONALE

Wound management through the application of negative pressure has been used for decades in multiple surgical disciplines, including plastic surgery, general surgery, trauma surgery, cardiothoracic surgery and orthopaedic surgery. It is thought to act through several mechanisms that result in wound contraction, stimulation of epithelial growth and prevention of fluid collection and wound drainage [1].

Within orthopaedic surgery, the use of iVACs has been investigated in studies spanning multiple sub-disciplinary areas, with moderate-strength evidence suggesting that iVACs may benefit wounds in at-risk patients. In retrospective studies, vacuum assisted incisional dressings were associated with fewer wound complications, deep infections and reoperation than standard surgical dressings following treatment of periprosthetic hip and knee fractures [2]. Similarly, incisional negative-pressure wound therapy (iNPWT) dressings were associated with improved wound healing and fewer surgical site infections following revision total hip or knee arthroplasty (THA/TKA), but there was no difference in wound dehiscence, deep infection or reoperation [3,4]. Similar results were observed when iNPWT was used following total ankle arthroplasty [5], long-segment thoracolumbar fusions [6] and high-risk musculoskeletal oncologic wounds [7]. Two prospective randomized controlled trials have also explored the use of iNPWT in high risk orthopaedic trauma wounds. In industry-funded research, Stannard et al. demonstrated a significant reduction in total infections when iNPWT was used after severe open tibia fractures [8] and high-risk lower extremity fractures (calcaneus, pilon and tibial plateau fractures) [9].

Additionally, evidence suggests that iNPWT decreases postoperative hematoma and seroma size and the time to a dry wound. Multiple prospective randomized controlled trials have further shown that iNPWT decreases hematoma/seroma size and the time to a closed dry wound following high-energy trauma [10], hemiarthroplasty [11], THA [12] and spine fracture care [13]. While there is strong evidence that iNPWT has a causal effect on known risk factors for infection (e.g., persistent hematoma or seroma, continued wound drainage), none of these trials were adequately powered to assess for differential infection rate in wounds treated with iNPWT versus standard surgical dressings.

iVACs, however, do not appear to provide a clinical benefit in routine cases. A retrospective study by Redfern et al. demonstrated no difference in superficial or deep infection rates with the use of iVACs in primary THA and TKA [14]. Three prospective randomized controlled trials have studied the use of iNPWT to prevent infection following standard closure in trauma or arthroplasty. Crist et al. found no difference in the rate of deep infection when iNPWT was used after open reduction internal fixation (ORIF) of uncomplicated acetabular fractures [15]. Similarly, there was no difference in wound healing or wound complications between iNPWT in standard surgical dressings after routine THA or TKA [16,17]. In addition, in routine cases, iVACs incur unnecessary additional cost and may cause iatrogenic problems such as skin blistering [18,19].

Lastly, evidence suggests that iVACs may also play a role in resolving some cases of early, benign postoperative drainage. In a retrospective study of the use of iVACs for 109 patients with benign early postoperative drainage after hip arthroplasty, Hansen et al. found that the intervention halted wound drainage without further surgery in most cases and did not find increased complications specific to the device [20].

In conclusion, the use of iVAC dressings are a reasonable option in orthopaedic patients at risk for wound healing complications and may decrease such complications in such patients. The use of iVACs in all cases is likely unnecessary. In addition, iVACs may also play a role in resolving some cases of early, benign postoperative drainage [11].

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