G31: Is there a role for the use of antiseptic incise drapes in patients undergoing major orthopedic surgery?

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Response/Recommendation:
Possibly. The use of antiseptic incise drape may result in a reduction in postoperative infections in patients undergoing major orthopedic surgery.

Level of Evidence: Limited

Delegate Vote:

Rationale:

Surgical site infection (SSI) and periprosthetic joint infection (PJI) represent a devastating complication. Prevention is key to reducing their incidence and avoiding severe consequences that significantly affect both patients and the healthcare system.
Plastic adhesive skin drapes were introduced approximately three decades ago to serve as a lining for skin incisions. The aim was to reduce wound infection rates by preventing bacteria from the surrounding skin contaminating the exposed tissues during surgery. [1]
The use of incise draping has become popular among orthopedic surgeons. For example, in one study the members of the Belgian Society for Orthopedics were asked to complete an online questionnaire consisting of 28 questions regarding the use of surgical antimicrobial prophylaxis measures, A total of 228 practicing orthopedic surgeons participated, with 67.5% using impregnated drapes, 12.3% using unimpregnated drapes, and 20.3% reporting never using drapes. [2]

Surgical prevention involves proper asepsis and antisepsis, and meticulous attention to surgical principles that minimizes the potential for entry of microbes into the surgical site, including those from the patient's own skin flora. The use of plastic adhesive drapes, sterile stockings, and personal protective equipment has not clearly demonstrated a reduction in the risk of infection.[3]

The use of adhesive plastic drapes does not always result in a reduction of periprosthetic infection for example a study included a total of 2,266 patients, with 1,129 (49.8%) assigned to the adhesive drape groups and 1,137 (50.2%) to the control groups. A significant reduction in positive skin blade culture results was observed with the use of antimicrobial drapes compared to no adhesive drapes (3.81% versus 12.19%; $p = 0.031$). However, there was a more than twofold increase in skin contamination beneath the peeled-off drape prior to wound closure compared to the levels observed before the application of the adhesive drape (10% versus 4%; $p < 0.01$). Importantly, no significant difference in the risk of periprosthetic joint infection was identified between antimicrobial adhesive drapes and nonantimicrobial adhesive drapes (1.0% versus 1.2%; $p = 0.46$). [4] In other study, 12.0% of incisions with adhesive drapes and 27.4% without adhesive drapes were positive for bacterial colonization. It appears that the iodophor-impregnated adhesive draping significantly reduces bacterial colonization of the incision. [5] One study on 62,087 primary total knee arthroplasty patients, demonstrated an association between the use of antimicrobial adhesive drapes and a reduction in the risk of revision due to periprosthetic joint infection (PJI).[6]

The duration and the type of surgery also influence the rate of surgical site contamination and the role that incise draping may play in reducing such an event. On one study, when incise draping was not utilized, the rate of contamination was lower in patients undergoing total hip arthroplasty (THA) with a lower surgical time than total knee arthroplasty (TKA) with a higher contamination rate (OR 16.562, $p < 0.01$). The proper application of iodine-impregnated drapes (DR group) effectively reduced contamination risk ($p < 0.001$). Moreover, prolonged operative duration was identified as a contributing factor to bacterial contamination in TKA ($p < 0.01$) [7]

In order to address the question posed above, we conducted a comprehensive systematic review of the literature. Using the MeSH terms and search of databases, all potentially eligible studies were identified. After screening, studies that directly addressed the question of incise draping in orthopedic surgery were included. A total of 5,241 patients who received antimicrobial-impregnated drapes and 4,533 patients in whom no antiseptic drape was utilized were compared. The incidence of periprosthetic joint infection (PJI) was 1.14% for patients with antimicrobial drapes and 1.26% for those with non-impregnated drapes, indicating that the use of antimicrobial drapes does not reduce the incidence of PJI. [9] Preparing the surgical field is crucial and should be directly supervised by the surgeon to ensure a sufficiently large surface area for the incision drape, as well as proper placement of the liquid collection bag and its subsequent emptying. [10] The results suggest that the use of iodine-impregnated adhesive incision drapes can lower the bacterial contamination rate of scalpel blades used for skin incision, A significant difference was determined between positive skin blade culture results incision drape usage ($P = .031$). [11] However, after 79 minutes, the use of plastic or non-plastic drapes shows no significant difference, casting doubt on their effectiveness in preventing surgical site infections.[12] We recommend it is important to clean the skin again with antiseptics if the incise drape is removed by the surgeon. [13]

One of the issues related to the use of incise draping relates to the lift off of the drape from skin. Studies have shown that lift off of the drape, particularly with a separation of greater than 10-mm results in a considerably higher contamination rate (OR 3.54 [95% CI 1.64 to 11.05]; $p = 0.0013$). [8] There are various strategies that have been explored in reducing lift off of the drape. The use of preoperative degreasing agents such as 70% isopropyl alcohol, have been shown to reduce drape lifting in moist conditions.[14] Reapplication of antiseptic solutions before the final adhesive drape also significantly reduced the rate of superficial surgical site infection in elective TJA patients. [15] We believe that implementing all of these mitigation strategies concurrently will lead to a synergistic effect for infection control following lower extremity TJA. [16 17 19]

Conclusion:

There is a recognized role for the use of antiseptic incision drapes in preventing contamination of the surgical field. However, their effectiveness in reducing surgical site infections has not been definitively confirmed. After an exhaustive review of the information, we conclude that the proper use of adhesive drapes under the previously mentioned conditions helps reduce surgical wound contamination. However, it has not been proven to decrease the risk of periprosthetic infection. Moreover, improper use of these adhesives could, in some cases, further increase the risk of surgical infection.

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