

Risk for Infection After Anterior Cervical Fusion: Prevention With Iodophor-Impregnated Incision Drapes

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Abstract

Cervical spine infections can have disastrous consequences, but techniques for minimizing infections should be evidence based. In this article, we report the incidence of spine infections in a large cohort of consecutive patients who underwent anterior cervical fusions without iodophor-impregnated incision drapes (3M Ioban; 3M Health Care, St. Paul, Minn) covering the surgical site. We reviewed the records of 581 consecutive patients (294 men, 287 women) who underwent 616 anterior cervical fusions without such drapes over the incision site and who were followed for 1 to 21 years after surgery. Mean age at the time of surgery was 52 years (range, 17-83 years). There was 0% incidence of cervical spinal infections in the group. Need for iodophor-impregnated incision drapes during anterior cervical fusion was not demonstrated. These drapes added unnecessary cost and may decrease skin mobility, making adequate exposure more difficult.

Use of iodophor-impregnated incision drapes (3M Ioban; 3M Health Care, St. Paul, Minn) has become standard practice in many orthopedic and nonorthopedic surgeries. These drapes are often used with standard antiseptic skin preparation to

lower surgical site infections (SSIs), but their efficacy remains unclear. Several studies have shown decreases in SSIs with use of these drapes, whereas others have shown no difference in infection rates with or without their use.¹⁻⁶

Despite lack of clear supporting evidence, use of these drapes has become virtually standard practice in spine procedures. The reasons for using them in anterior cervical spine surgery are unclear, but we can speculate that some surgeons use them to prevent spinal infections, which can have devastating consequences, and others may simply consider use of these drapes the standard of care. A contrary speculation is that using these drapes over the incision site limits skin mobility and therefore makes exposure of the cervical spine slightly more difficult. It is also possible that, for some surgeons, these drapes obscure the visual and palpable anatomic landmarks needed for localizing incisions.

From a standard-of-care perspective, in today's climate of rising health care costs and increasing frequency of malpractice litigation, there is a strong interest in reducing costs and developing evidence-based practices while decreasing exposure to potential lawsuits.⁷⁻¹² It can thus be argued that, if these drapes are the standard of care, surgeons who do not use them may place themselves at increased risk for being sued should a patient develop a postoperative infection after an anterior cervical procedure.

Our aim in the study reported here was to document the incidence of postoperative spine infections after anterior cervical fusion without use of iodophor-impregnated incision drapes. We hypothesized that cervical spine infections are exceedingly rare and that these drapes are not necessary for infection prevention.

MATERIALS AND METHODS

We reviewed the records of 581 consecutive patients (294 men, 287 women) who underwent a total of 616 anterior cervical fusions performed by 2 spine surgeons (Drs. Chin and Bohlman). Mean patient age was 52 years (range, 17-83 years). All patients underwent elective procedures using a modification of the surgical technique described by Smith and Robinson for anterior cervical spine fusion.¹³ Of the 616 procedures, 416 were 1-level or multilevel anterior cervical discectomies with fusions, 67 were 1-level corpectomies with fusions, 89 were 2-level corpectomies with fusions, 41 were 3-level corpectomies

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Figure. One surgeon used part of an iodophor-impregnated incision drape (3M Ioban; 3M Health Care, St. Paul, Minn) to cover the iliac crest but left the incision site uncovered.

with fusions, and 3 were 4-level corpectomies with fusions. Autogenous iliac-crest graft was used in 170 of the 200 corpectomies, and autogenous fibular graft was used in the other 30. Patients were followed for 1 to 21 years after surgery.

All surgical wounds were classified as clean. In all cases, the incision site received standard preoperative antiseptic preparation (scrubbing and painting with povidone-iodine [Betadine]). Staples were used to secure the edges of iodophor-impregnated incision draping over the site. Dr. Chin cut one half of this draping into 4 strips, each approximately 2 inches in width, and used these strips at the 4 edges of the surgical field to hold the sterile draping against the skin and prevent the draping from moving, out of concern over field contamination from underneath the draping (Figure). The other half of the draping was used to cover the iliac crest site for bone graft harvest. This technique was used in only 38 cases. For all patients, nothing was draped on the neck skin where the surgical incision was to be made. All patients received 1 gram of cefazolin intravenously before the skin incision was made and surgery performed.

A patient was considered to have a postoperative surgical wound infection when there was purulent discharge from the surgical wound, serous discharge from the surgical wound with positive bacterial culture, or a deep or superficial surgical wound abscess with or without positive bacterial culture.

RESULTS

In our series of 616 consecutive anterior cervical spine fusions performed without iodophor-impregnated incision drapes over the surgical incision, there were no spinal infections. Given that one of our institutions is charged \$8.37 for a 23x23-inch Ioban drape, use of this draping in our study population represented an unnecessary cost of approximately \$5155.

DISCUSSION

Malpractice litigation is approaching crisis levels in United States health care. In states such as West Virginia, there is 1 lawsuit for every 2 practicing physicians, and 70% of physicians in the Rio Grande Valley of Texas have a medical liability claim outstanding.¹⁰⁻¹² Infections rank among the top reasons that lawsuits are brought against hospitals and physicians.⁷ Lack of evidence-based medicine supporting a medical practice leads to lack of standards, which further increases risk for a lawsuit, and it was the lack of evidence supporting use of iodophor-impregnated incision drapes in anterior cervical fusion that prompted this investigation.

As a group, elective spinal surgical procedures have a low rate of SSIs (0.5%-4.1%).¹⁴ Within this group, the rate is even lower for infections after anterior cervical procedures (0%-3%).^{13,15-18} Fusions have a higher infection rate.^{19,20} Although their incidence is low, cervical spine infections can be devastating and thus may prompt use of drapes, especially for fusions. Yet, there is no evidence supporting use of drapes to prevent spinal infections after anterior cervical fusion.

In this context, we examined our sterile draping technique for anterior cervical fusion—which did not include use of iodophor-impregnated incision drapes over the surgical incision site—and found no SSIs. According to its manufacturer, Ioban prevents surgical site contamination in 2 ways: Iodophor provides continuous antimicrobial activity against skin flora, and the adhesive drape sticks to wound edges and forms a barrier that prevents skin flora from entering the incision.

Our finding that SSIs are uncommon in cervical spine fusion is consistent with findings in other case series,^{13,17,18} though the reason for the low rate of SSIs is unclear. Although this area requires further study, we propose several possible reasons for this low incidence. First, in an anterior approach to the cervical spine, the tissue planes are very well defined, and dissection down to the vertebrae can be achieved with minimal trauma to soft tissues. Second, the anterior neck is a region of very high vascularity and easy venous drainage through the carotid arteries, their many branches to the face and neck, and internal and external jugular veins.

An arguable limitation of this study was lack of a control group of cervical cases using iodophor-impregnated incision drapes. Given the rare incidence of anterior spinal surgery, we would have needed several hundred cases in each group to show a difference, and in this case the negative results occurred in a large group of patients, obviating the need for a control group.

In our series of 616 anterior cervical fusions, we found no SSIs, even without use of drapes—evidence that, in anterior cervical approaches, use of iodophor-impregnated incision drapes may not be necessary for infection prevention or reduction. Therefore, we recommend forgoing use of these drapes over the incision site, as they may actually hinder the surgeon's mobilization of the skin during multilevel cervical fusions and obscure visible and palpable

landmarks for localizing incisions. Strips of draping were not necessary to hold the drapes in place (in most cases in this series, drapes were placed without strips along their edges).

AUTHORS' DISCLOSURE STATEMENT

The authors report no actual or potential conflict of interest in relation to this article.

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