Treatment strategies for deep surgical site infections (SSIs) after transforaminal lumbar interbody fusion (TLIF)

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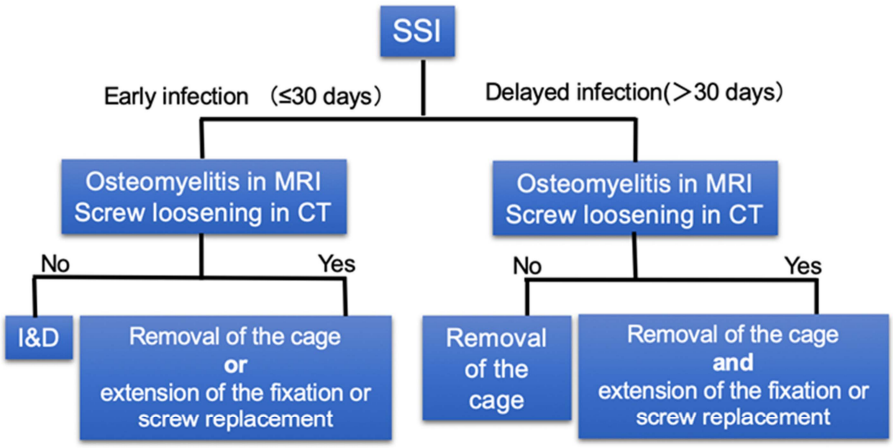
INTRODUCTION: Surgical site infection (SSI) continues to be a significant complication following spinal instrumentation surgery. The presence of SSI can make the decision on whether to remove the implant and the cage difficult after transforaminal lumbar interbody fusion (TLIF). The purpose of this study was to investigate the treatment strategies for deep SSI after TLIF.

METHODS: We performed mini-open TLIF between January 2014 and May 2021 on 687 patients, of which 19 patients (2.8%) developed SSI. The retrospective study cohort consisted of patients who required surgical intervention for SSI. The mean follow-up period was 6 months (6-58m). The patients comprised of 9 males and 10 females with a mean age of 73.4 years (55-84y) at the time of surgery. The patients were treated with aggressive surgical irrigation and debridement (I&D) which allowed the retention of implants in cases of early infection. In cases of loosening of the cage or screws or persistent infection, removal of the implants, extension of the fixation, and replacement of the implants was considered. Each treatment was reviewed in terms of type of surgery, management of implants, and additional procedures. Surgical outcomes were categorized into two groups: 1) The treatment success group, which was defined as succeeding in eradication of infection after I&D; and 2) The treatment failure group, which resulted in recurrent infection, implant removal, fixation extension, or reimplantation due to the cage or screws loosening in order to eradicate infection.

RESULTS: The median time from index surgery to initial treatment was 19.0 days (Range 5–320). SSI occurred within 30 days in 11 cases (58%) and within 30–90 days in 7 cases (37%). 1 case (5%) occurred after the index surgery. The treatment was successful in 8 of 19 (42%) cases. Of the 11 cases (58%) in the treatment failure group, 6 cases were treated with removal of the cage and extension of the fixation or replacement of the screws with iliac bone graft, 4 cases were treated with replacement of the screws without removal of the cage, and only 1 case required removal of the cage and screws with iliac bone graft. The average degree of correction loss was 5.4 ± 5.2°, and the fusion rate was 74% at final follow-up. There were no significant differences in terms of the time to diagnosis of SSI, the presence of osteomyelitis, operation time, and the estimated blood loss between the two groups. However, the time to diagnosis of SSI in the treatment success group tended to be shorter (13.8±23.5 days vs. 65.9±20.0 days, P =0.109) than the failure group, and a higher rate of treatment success was observed in cases with the absence of osteomyelitis (17% vs. 82%, P = 0.009) .

DISCUSSION AND CONCLUSION: Postoperative spine infections were treated with aggressive surgical irrigation and debridement in cases that showed early infection. Removal of the cage and extension of the fixation or reimplantation may be useful strategies in cases of osteomyelitis. Based on the above, our current treatment strategy for SSI after TLIF is shown in the flow diagram (Figure 1). An early diagnosis and evaluations using CT and MRI are important in the treatment of SSI. Furthermore, all cages should be removed in delayed infection and in cases of osteomyelitis. The treatment strategy for postoperative SSI after TLIF is determined by 1) the time to diagnosis of infection (early or delayed), 2) the presence of osteomyelitis or infection, and 3) screw loosening.



I&D: Irrigation + Debridement