

Sp62: What is the criteria or defect size which determines whether bone grafts alone or cage with bone grafts be used after debridement?

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Response/Recommendation: There is limited literature on this topic. Based on the available evidence, we suggest that non-structural bone grafts could be appropriate if the loss of vertebral height is under 50%. In cases where the loss exceeds 50%, involves multiple mobile units, or when the deformity is greater than 30°, the use of structural grafts or titanium mesh cages may be warranted. Nonetheless, additional large-scale prospective studies are needed to develop formal guidelines on this matter.

Level of Evidence: Low

Delegate Vote:

Rationale:

The general principles of surgical management for infective discitis of the spine include debridement of the infectious focus, stabilization of the spine, decompression of neural elements, and restoration of spinal balance through anterior column support¹. This can be achieved via anterior, posterior, or combined approaches. Regardless of the method, anterior column support is crucial for achieving bone fusion, stability, and preventing implant failure². Various grafts have demonstrated effectiveness in meeting this objective. They can be categorized into non-structural grafts (granular bone less than 5 mm), structural grafts, and titanium mesh cages. Studies have indicated that titanium cages outperform structural grafts such as tricortical iliac crest or fibular grafts due to reduced donor site morbidity and no risk of graft fracture^{3,4,5}. While both structural grafts like tricortical iliac crest grafts and titanium cages provide good fusion rates, effective deformity correction, and immediate biomechanical stability, non-structural grafts are associated with less blood loss, shorter bone fusion time, and lower donor site morbidity. Despite numerous studies comparing graft types and their efficacy, few have addressed the defect size that necessitates the use of appropriate grafts.

According to Xing Du et al⁶, non-structural bone grafts can be utilized for single-segment lumbar tuberculosis if the destruction is less than 50% of the vertebral height or if it exceeds 50% but does not involve serious cortical bone destruction, with the capability of implanting pedicle screws on at least one side of the affected vertebra. Their rationale is that maintenance of cortical continuity indicates preservation of the anterior column structure, and that pedicle screw instrumentation effectively maintains the stability of the anterior column. In another study, Xing Du et al⁷ compared granular bone grafts, titanium mesh cages, and iliac crest bone grafts, using granular bone grafts according to the criteria mentioned above. They concluded that the results were satisfactory with granular bone grafts in patients with less than 50% bony destruction. However, they did not specify the exact defect size for iliac crest bone grafts or titanium mesh cages.

Kalanjiam et al⁸ compared three different all-posterior surgical techniques in TB spine and found that when deformity is > 30°, posterior column shortening alone resulted in poor bone to bone contact and cord kinking and suggested anterior column reconstruction with titanium mesh cages. They also found that titanium cages resulted in better deformity correction than autologous bone grafting. Gan et al⁹ have recommended using autogenous iliac bone or local bone fragment grafts for vertebral bone defects of less than one motor unit of the spine, while suggesting that titanium cage bone grafts are appropriate for defects exceeding one motor unit. However, they cautioned against the use of titanium cages in osteoporotic patients due to increased risks of subsidence and displacement.

Although various studies have compared different approaches and types of graft materials for anterior column support, the literature remains limited regarding which graft type should be used based on defect size. Recent evidence indicates that non-structural bone grafts can be considered for vertebral height loss of less than 50%. In contrast, structural grafts or titanium mesh cages may be appropriate when the height loss exceeds 50%, involves multiple motor units, or when the deformity is greater than 30°. To create clear guidelines on this issue, future large-scale prospective studies are essential.

References:

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