



Safety and Accuracy of Freehand Versus Navigated Iliac Screws: Results from 222 Screw Placements

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Introduction

Iliac screw fixation is often used to augment lumbosacral reconstruction in advanced spine disease to increase the likelihood of successful arthrodesis. Iliac screws can be placed with image guidance, using either intraoperative fluoroscopy or computed tomography (CT) to guide navigation. However, these imaging modalities add radiation exposure and can disrupt workflow. The freehand technique is an alternative strategy that decreases radiation exposure and workflow disruption but may compromise safety and accuracy. This study compares the safety and accuracy of the freehand technique versus stereotactic navigation techniques for placement of iliac screws.

Methods

A retrospective review was performed for a consecutive series of adult patients with degenerative spine conditions who underwent posterior reconstruction with iliac screw placement between 2011 and 2016. Clinical and radiographic data were collected and analyzed. The accuracy of iliac screw placement was determined with either intraoperative/postoperative computed tomography (CT) imaging or anteroposterior/lateral radiography when CT was not performed.

Results

Bilateral iliac screws were placed in all 111 patients, for a total of 222 iliac screws. Eighty screws were placed with the freehand technique and 142 with the intraoperative navigation technique. CT imaging was used to assess placement accuracy of 124 screws (46 freehand [37%], 78 navigated [63%]). Accuracy was similar (P=.12) for the freehand group (89%, 41/46) and the navigated group (96%, 75/78). For patients without intraoperative/postoperative CT imaging, radiography was used to assess placement accuracy of 98 screws (34 freehand, 64 navigated) and the placement accuracy rate for the freehand group (100%, 34/34) was comparable to that for the navigated group (98%, 63/64) (P=.46). No complications attributable to iliac screw placement occurred in either group.

Conclusions

Overall, there was no difference in the safety and accuracy between the freehand and navigated techniques.

Learning Objectives

By conclusion of this session, participants should be able to: 1) Describe the technique for freehand and navigated placement of iliac screws. 2) Understand the risks associated with iliac screw placement. 3) Identify limitations associated with both techniques.

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