

A Comparison of Operative Time with Conventional Fluoroscopy Versus Spinal Neuronavigation in Instrumented Spinal Tumor Surgery

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Introduction

Spinal metastases are common, occurring in 30% of cancer patients (1-3). Instrumented spinal stabilization can preserve neurological function and reduce pain in select oncologic patients (4-6). Spinal neuronavigation improves screw placement accuracy (7,8); however its use in oncological operations remains relatively unstudied. Concern exists that utilizing spinal neuronavigation will prolong operative time (9,10).

Methods

Consecutive instrumented oncologic spinal operations were retrospectively reviewed. Patients were placed in two groups based on the method used for pedicle screw placement: 2-dimensional fluoroscopy versus spinal neuronavigation with 3-dimensional imaging. These groups were compared to examine age, number of pedicle screws placed, number of laminectomy levels, operative time, estimated blood loss, post-operative discharge day, and need for reoperation due to pedicle screw misplacement.

Results

There were 39 operations examined; 14 utilized 2D fluoroscopy and 25 utilized spinal neuronavigation. The mean ages of the patients were 64.71 ± 7.21 and 63.24 ± 6.95 ($p = 0.534$), mean number of pedicle screws placed was 8.07 ± 1.98 and 7.84 ± 1.34 ($p = 0.667$), mean number of laminectomy levels was 2.18 ± 1.25 and 1.60 ± 1.02 ($p = 0.126$) in the 2D fluoroscopy and spinal neuronavigation groups respectively. The mean operative time was 200.79 ± 34.99 minutes compared with 193.48 ± 43.77 minutes ($p = 0.596$), estimated blood loss was 790.00 ± 769.61 ml and 389.80 ± 551.43 ml ($p = 0.068$), and the mean number of days the patients were hospitalized following the operation prior to discharge was 7.64 ± 4.63 and 6.40 ± 3.23 ($p = 0.331$) in the 2D fluoroscopy and spinal neuronavigation groups respectively.

Conclusions

There was no significant difference in length of operative time when spinal neuronavigation was utilized as compared with standard 2D fluoroscopy for instrumented oncologic spinal surgery. There was a trend towards a significant decrease in estimated blood loss in the spinal neuronavigation cases. Concern over operative time should not be a barrier to using spinal

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Compare the expected length of OR time for instrumented oncologic spine surgery with 2-dimensional fluoroscopy versus spinal neuronavigation, 2) Describe the potential benefits of spinal neuronavigation in instrumented oncologic spine surgery.

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