Percutaneous versus Open Management of Thoracic and Lumbar Hyperostotic Fractures: A Case Control Study

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INTRODUCTION:

Hyperostotic spine fractures are associated with hyperextension fracture patterns and displacement. These fractures are often associated with neurological deficits and can affect multiple segments of the spine. There has been increased interest in percutaneous instrumentation for the management of these fractures due to the hyperostotic phenotype which can lend itself to auto fuse after placement of instrumentation. Our objective is to compare surgical outcomes and complications following percutaneous versus open management of hyperostotic spine fractures.

METHODS:

This is a retrospective study of patients with hyperostotic spine fractures of the thoracic and thoracolumbar spine undergoing surgical intervention at a level 1 tertiary academic medical center. Fifteen patients undergoing percutaneous (Perc) instrumentation from 2013-2022 were age/sex matched to patients undergoing open management from 2002-2018. The following variables were recorded, age, sex, race/ethnicity, level of fracture, number of levels instrumented, intraop and postop complications (infections, implant revision, epidural hematoma and neurologic complication).

RESULTS:

The 15 patients undergoing Perc instrumentation consisted of 3 females and 12 males with an average age of 75.3yrs (51-86). Fourteen patients were White, 1 was Black. Ten had diffuse idiopathic skeletal hyperostosis (DISH) and 5 had ankylosing spondylitis (AS).

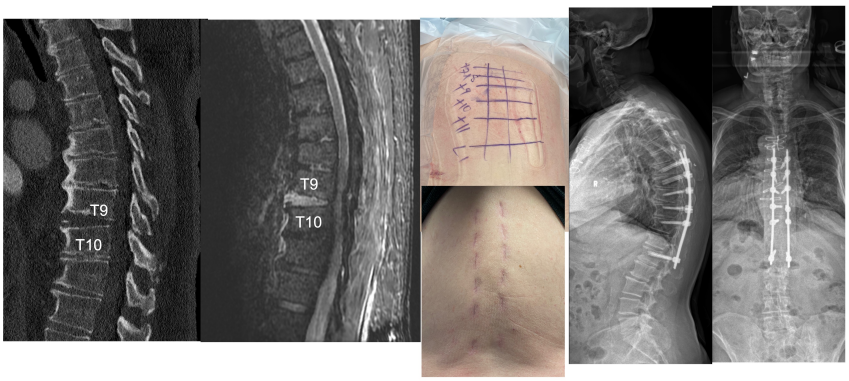
The 15 patients undergoing open management consisted of 4 females and 11 males with an average age of 75.2yrs (49-90). There was no significant difference in age between the two groups, p=0.48. Two patients were Black, 12 patients were White, 1 patient was Native American. Eleven had DISH and 4 had AS.

For the Perc group, fracture distribution was [T7-T8 n=3; T9-T10 n= 4; 1 each at T5, T8, T9, T10, T10-T11, T11, T11-T12, L1-L2]. The open group fracture distribution was [T6 n=2; T9 n= 2; T11 n=2; 1 each at T5, T6-T7, T7-T8, T9-T10; T10; T10-T11, T11]. One patient in the Perc and two patients in the open groups also had surgery for cervical spine fractures.

EBL was significantly less for the Perc group (95 ml; range 50-150) as compared to the open group (590ml; range 100 – 1400), $p<0.001$. The Perc group did not have statistically significant difference in levels instrumented (5.07) as compared to the open group (5.93), p=0.07. There was one intraop complication in the Perc group, cardiac arrest secondary to mucous plug and the patient was successfully resuscitated. Postop operative infection rates were not significantly different between the two groups, p=0.1 (1 infection in the Perc group, 1 in the open group). Two cases of wound complications occurred within 90-day postop in the Perc group and were addressed nonop. In the open group, postop DVT occurred in 2 patients, and 2 postop neurologic complications (1 foot drop, 1 neurogenic bowel/bladder with subsequent return to baseline). No patients had postoperative epidural hematomas or needed implant revision in either group.

DISCUSSION AND CONCLUSION:

The percutaneous approach for the management of hyperostotic spine fractures was associated with significantly less EBL and no difference in levels of instrumentation as compared to the open approach. There was no significant difference in intraop or postop complications between the two groups.



72y/o M with DISH T9-T10 hyperextension fracture as seen on CT and MRI. He was managed with percutaneous T7-L1 Instrumentation as seen on the AP/Lat xrays. Intra-op picture of the skin markings and outpatient picture of the incisions at 6 months post-op are shown.