

The posterior approach for removal of all thoracic disc herniations: A single surgeon experience using the partial transpedicular approach with ultrasonic bone aspiration and ultrasound guidance in 108 consecutive patients

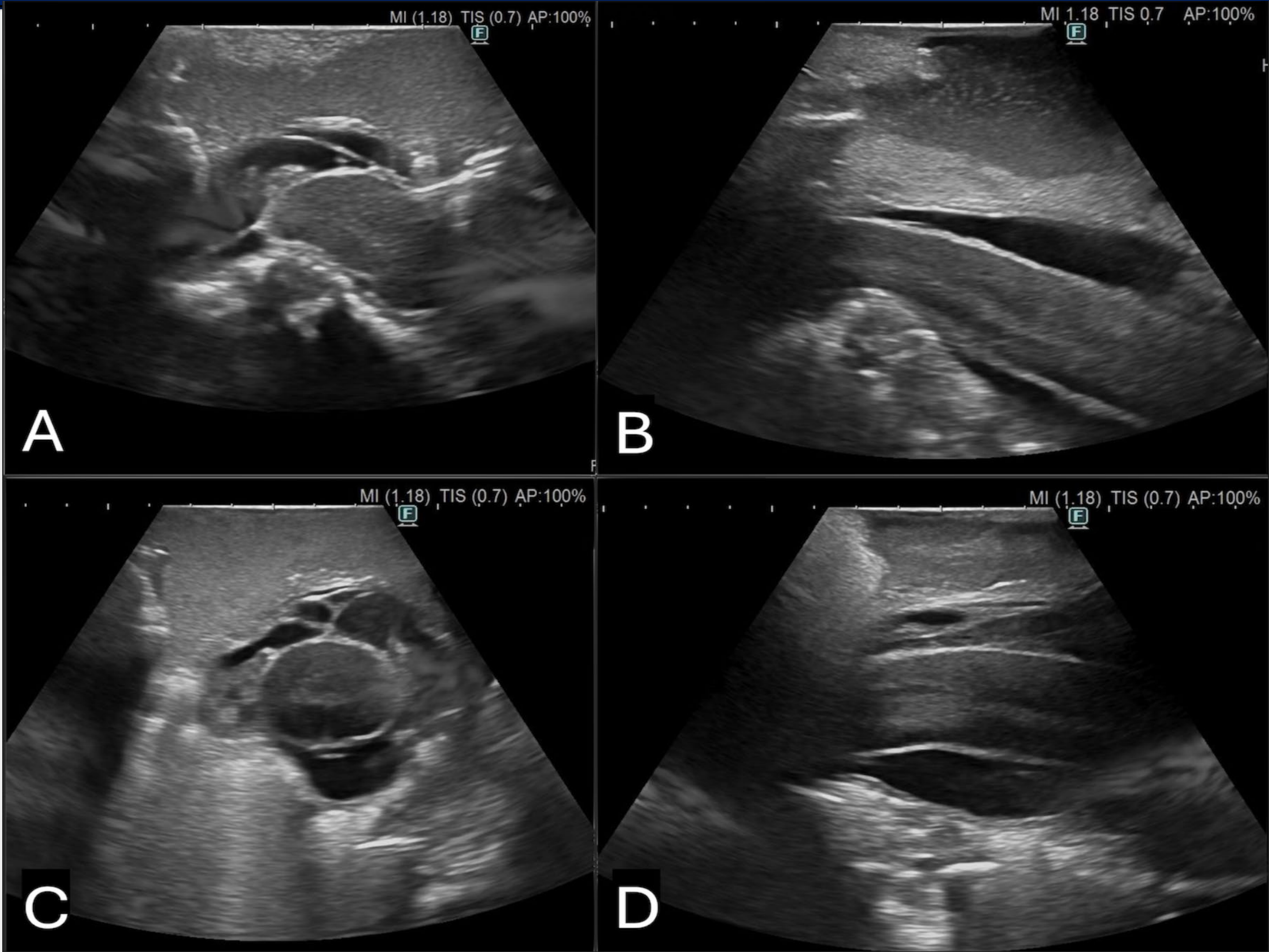
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Objectives

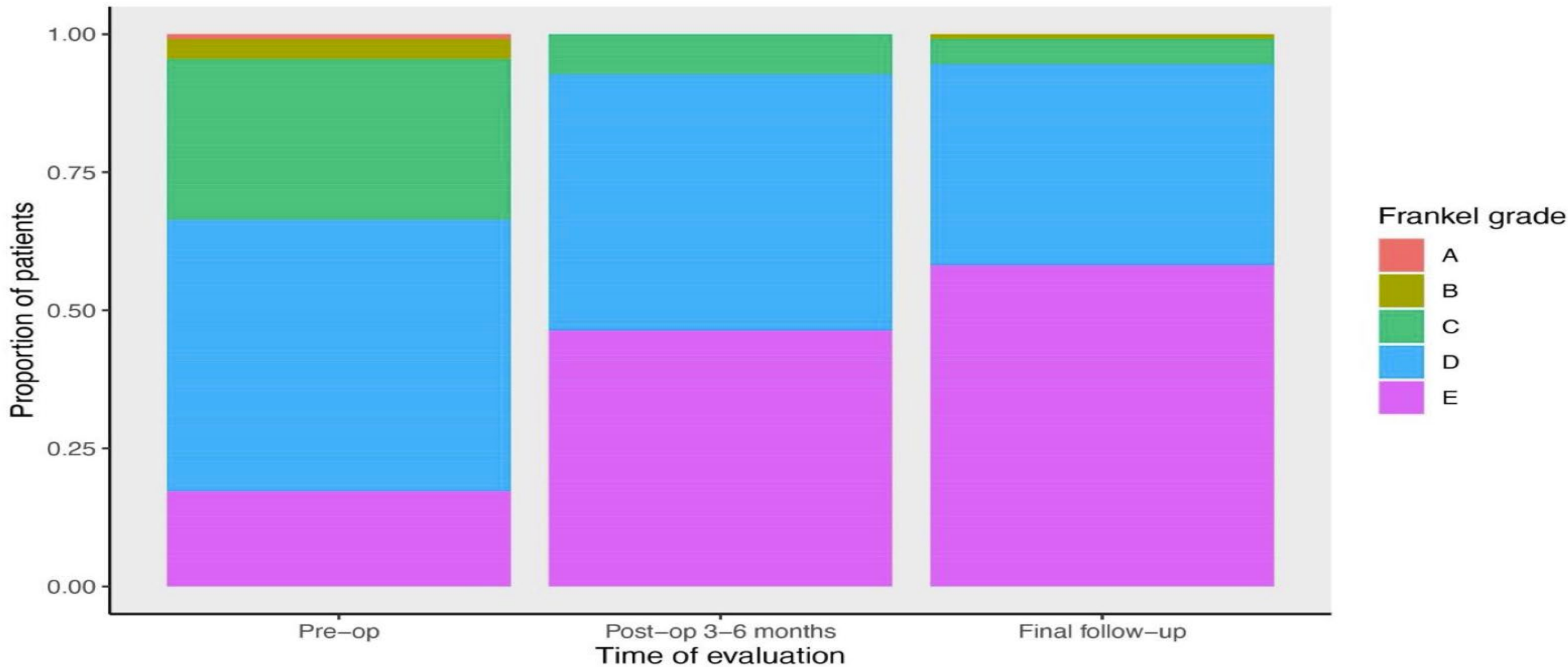
Thoracic disc herniations (TDHs) pose a unique surgical challenge due to their ventral location, frequent calcification, and high risk of neurological injury. This study aimed to evaluate the safety, efficacy, and versatility of a posterior partial transpedicular approach augmented by intraoperative ultrasound (IOUS) and ultrasonic aspiration (UA) for the treatment of symptomatic TDHs.

Methods

A retrospective review was conducted of **108 consecutive patients (137 TDHs)** treated by a single surgeon (2012–2024) using a posterior partial transpedicular approach with IOUS and UA. Clinical, radiographic, and operative data were analyzed. Neurological function was graded by the **Frankel scale** preoperatively, at 3–6 months, and at final follow-up. Multivariate regression identified predictors of neurological improvement.



Intraoperative ultrasound (IOUS) is a valuable tool that can allow for safe and accurate thoracic discectomy. Once the laminectomy is complete, IOUS can be used to locate the location and orientation of the thoracic disc herniation in an axial (**A**) and sagittal (**B**) plane. Once the discectomy is believed to be completed, IOUS can be used to confirm complete discectomy and spinal cord decompression in an axial (**C**) and sagittal (**D**) plane.



Results

- **Mean age:** 58.6 years; **54.7% female**
- **Presentation:** Myelopathy in 86.1%; **giant herniations (>40% stenosis)** in 68.6%
- **Neurological outcomes:** Mean Frankel grade improved from **3.77 → 4.54 (p < 0.001)**
- **61.1%** improved ≥ 1 Frankel grade
- **Complication requiring reoperation:** 9.3%
- Diabetes, obesity, and cardiac disease were independently associated with less improvement (**p < 0.05**)
- IOUS and UA enabled complete decompression in all cases with no postoperative CSF leaks

Conclusion

The posterior partial transpedicular approach enhanced with IOUS and UA is a **safe, effective, and generalizable technique** for thoracic disc herniations, including large and calcified lesions. It provides **significant neurological recovery with low morbidity** and can be readily adopted by general spine surgeons as a reliable alternative to anterior or thoracoscopic approaches.