

# Less invasive approach for total resection of paraspinous dumbbell shaped neurogenic neoplasms of the spine

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## Introduction & Objective

Dumbbell shaped spinal tumours pose a unique challenge to surgeons, as its excision requires expertise and anatomical knowledge of the spine as well as the posterior mediastinum and retroperitoneal space. Traditionally, these tumours are resected via an open laminectomy and facetectomy approach, and in occasions requiring complete facetectomy. However, recently, the use of mini-open surgical technique has been reported internationally. In this study, we describe a case of L2 ganglioneuroma and a case of T7/8 neurofibroma, both resected via a minimal access approach with tubular retractor system. Our aim is to develop a less invasive approach for resecting paraspinous masses with intraspinal canal component by minimizing the trauma of incision and soft tissue dissection for early recovery and mobilization.

## Method

This is a retrospective case series of an uncommon application of the recently available tubular retractor system, which had been designed and used in degenerative spinal conditions. The clinical course and outcome of a patient with L2 ganglioneuroma and another patient with a T7/8 neurofibroma resected via such system was described.

## Results

### Case 1

- 32-year-old lady with good past health
- Complained of low back pain and radiculopathy of lower limb
- No sphincter disturbance
- Plain MRI reviewed an expansile, dumbbell-shaped, neurogenic tumour at L2
- Hemilaminectomy and facetectomy with pedicle screw and rod reconstruction was performed using a tubular retractor system
- Total excision of the tumour was achieved, just via a 3cm incision
- Histological finding: ganglioneuroma
- Patient was able to ambulate the same evening and was discharged the next day without complication
- At three-year follow up, the patient is asymptomatic and has no residual or recurrent tumour

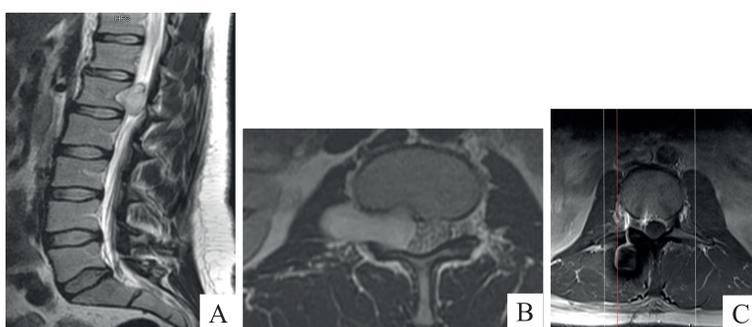


Figure 1. MRI (Plain) LS spine of patient 1 showed a neurogenic tumour at L2 level (A & B). It is of dumbbell shape, and belongs to Eden class 3 tumour. Post-operative MRI (plain) LS spine confirmed complete excision of the tumour (C).

### Case 2

- 44-year-old madam with good past health
- Complained of mid-thoracic pain
- No dyspnea, chest discomfort nor sphincter disturbance
- Brisk knee jerks bilaterally. Lower limb motor power and sensation normal.
- MRI: dumbbell tumour at T7/8 level
- Right T7/8 hemilaminotomy and costotransversectomy were performed with tubular retractor system
- Gross total resection was achieved, with a 4cm incision
- Histological finding: neurofibroma
- Symptoms improved, patient was ambulatory and discharged on post-operative day 2



Figure 2. only a 4cm incision is required to excise a T7/8 dumbbell tumour



Figure 3. Tubular retractor System used for minimally invasive surgery for spinal tumour

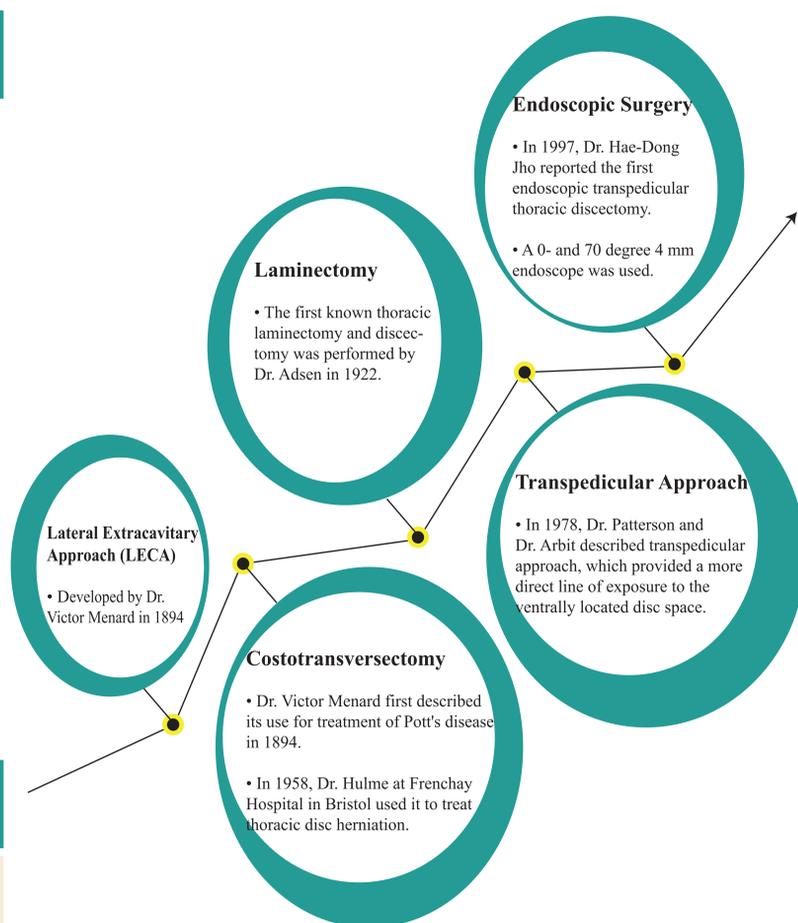


Figure 4. Historical aspect of posterior approaches for thoracolumbar spinal tumours

## Discussion

- Mainstay treatment of these lesions is gross-total resection.
- It is well recognized that the posterior approach allows the resection of the majority of lesions located in the spinal canal.<sup>1</sup>
- The classic surgical approach for these lesions involves a long midline skin incision, bilateral subperiosteal muscle stripping from the posterior spinous elements, and laminectomy extending to levels above and below the tumor.
- Traditionally, partial or radical facetectomy has been required on the side of the foraminal tumor that extends extraforaminally, especially in cases of giant tumors (Eden Grade 2 or 3). In the series by Ozawa et al., facetectomy was required in 55% of extradural foraminal/extraforaminal dumbbell tumours approached posteriorly.<sup>2</sup>
- Post-laminectomy instability and deformity is a major concern, and fusion surgery may be required.

### Advantages of Minimally invasive approach:

- Potential advantages include avoidance of fusion surgery; reduced blood loss, surgical time, postoperative pain and narcotic use, and length of stay; and quicker return to daily activities.
- Our experience concurred with the literature that minimally invasive approach is a safe and effective way to achieve total excision of thoracolumbar dumbbell tumours, as both patients described had had rapid post-operative recovery without any complication.
- Tubular retractor system is readily accessible, and beyond this, no sophisticated or costly additional equipment is necessary.
- Potential complications include lung parenchymal injury and pneumothorax, which can usually be dealt with simply by inserting a chest drain.
- Less common but potentially devastating complications such as injury of blood vessels and difficult hemostasis can also be tackled by converting to traditional open approach when necessary.

## Conclusion

► Tubular retractor system can be used for the resection of paraspinous neurogenic dumbbell shaped neoplasms with good result. Further development of this technique may improve the outcome of the surgical management of these lesions by minimizing the postoperative pain to encourage early mobilization and thereby shorten hospital stay and recovery.

### References:

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