



## A novel method for spinal level localisation in thoracic spine

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### INTRODUCTION

One of the major challenges in thoracic spine surgery is reliable vertebral level localisation. The need for multiple markers and multiple X-rays increases the probability of operative errors with potentially devastating consequences. We describe a technique that uses localisation wires normally used in lesion identification in breast surgery, to identify and mark the pedicle of the index level, that obviates the need for vertebral level counting and multiple intra-operative XRs.

### OBJECTIVE(S)

- To develop a technique that minimises the need for intraoperative XRs for thoracic spine level localisation, and does not interfere with the operative field.
- To describe the results from the use of this technique for a number of procedures in our institution

### METHOD(S)

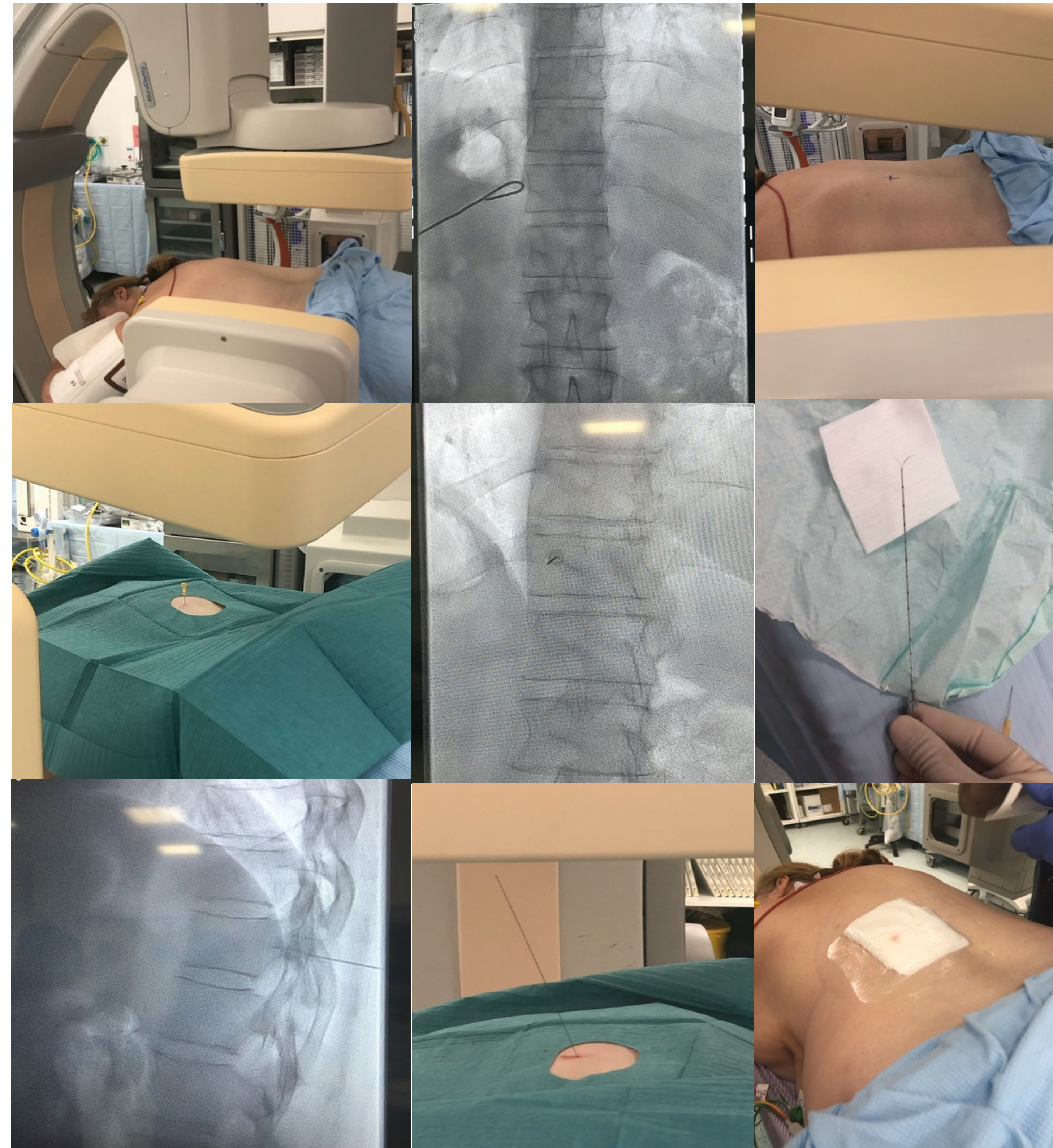
- We describe the technique through a case report of a 54 year old female who initially presented with worsening gait and bilateral lower limb sensory symptoms and was found to have an intradural extramedullary tumour at the T11 level on MRI
- The localisation marker that we use is the Dualok hookwire that is normally used in breast surgery to mark lesions that are challenging to identify intraoperatively
- We then describe our series of cases in our institution, 24 in total, where this technique was used for thoracic level localisation

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### RESULT(S)

- Technique: Prior to general anaesthesia, the patient was placed prone on the angiography table (Figure I). The T11 pedicle was localised using fluoroscopy, and a point was marked 10cm from the midline at that level. Local anaesthetic was injected. Bard® Dualok® is a hookwire that is used in breast surgery to mark radiographic lesions for intraoperative localisation in tumour surgery. It has two hooks that can be manually deployed after placement of the wire to anchor the wire to the tissue where it was placed. This was placed percutaneously adjacent to the pedicle of T11, with a slightly inferior to superior trajectory to avoid theoretical damage to the neurovascular bundle that runs on the inferior side of the eleventh rib. A dressing was then placed over the redundant wire exiting the skin.



| N  | Age | Sex | Pathology                 | Level  | Operation                       | Complications          |
|----|-----|-----|---------------------------|--------|---------------------------------|------------------------|
| 1  | 66  | F   | Disc protrusion           | T10/11 | Thoracotomy                     | None                   |
| 2  | 43  | F   | Intramedullary cyst       | T3/4   | Laminectomy, cyst decompression | None                   |
| 3  | 52  | M   | Disc protrusion           | T9/10  | Thoracotomy/discectomy          | Neuropathic pain       |
| 4  | 34  | M   | Disc protrusion           | T11/12 | Thoracotomy/discectomy          | None                   |
| 5  | 81  | F   | Degenerative stenosis     | T10-12 | Laminectomy                     | None                   |
| 6  | 55  | F   | Meningioma                | T4/5   | Excision of tumour              | None                   |
| 7  | 23  | F   | Schwannoma                | T3     | Excision of tumour              | None                   |
| 8  | 62  | F   | Meningioma                | T5/6   | Excision of tumour              | None                   |
| 9  | 56  | F   | Disc protrusion           | T7/8   | Thoracotomy/discectomy          | None                   |
| 10 | 77  | F   | Disc protrusion           | T12/L1 | Thoracotomy/discectomy          | None                   |
| 11 | 85  | M   | Meningioma                | T3     | Excision of tumour              | None                   |
| 12 | 62  | F   | Intradural tumour         | T7/8   | Excision of tumour              | None                   |
| 13 | 75  | M   | Disc protrusion           | T7/8   | Thoracotomy/discectomy          | None                   |
| 14 | 78  | M   | Disc protrusion           | T10/11 | Costotransversectomy            | None                   |
| 15 | 47  | M   | Intramedullary cavernoma  | T4/5   | Excision of cavernoma           | Cannula site infection |
| 16 | 62  | M   | Adhesions/arachnoiditis   | T6-12  | Division of adhesions           | None                   |
| 17 | 61  | M   | Disc protrusion           | T10/11 | Thoracotomy/discectomy          | None                   |
| 18 | 76  | M   | Intradural arachnoid cyst | T7/8   | Excision of arachnoid cyst      | None                   |
| 19 | 51  | F   | Meningioma                | T5/6   | Excision of tumour              | None                   |
| 20 | 54  | F   | Meningioma                | T10/11 | Excision of tumour              | None                   |
| 21 | 63  | M   | Dural AV fistula          | T10/11 | Extirpation of fistula          | None                   |
| 22 | 42  | M   | Disc protrusion           | T9/10  | Thoracotomy/discectomy          | None                   |
| 23 | 54  | M   | Disc protrusion           | T7/8   | Thoracotomy/discectomy          | None                   |
| 24 | 78  | M   | Vertebral metastasis      | T4     | Decompression and fixation      | None                   |

- In addition to the illustrative case, we present a series of 24 cases from our institution where the technique was used for localisation (Table I). It can be seen that a series of pathologies have been treated at most levels of the thoracic spine with no incidence of wrong level surgery, and minimal complications. No complications were reported from the use of the hookwire itself.