

# Percutaneous Management of an Unstable Pathological Fracture of L5 Using Vertical Presacral Screw Fixation and Cementoplasty

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**Dear editor,**

Vertebroplasty is effective to stabilize pathological fractures of the vertebral body, allowing to palliate pain and avoiding further vertebral body collapse. Stand-alone cement injection may, however, be insufficient to restore spinal function when the tumor extends beyond the limits of the vertebral body with infiltration of the posterior elements [1, 2]. In this situation, surgical fixation should be preferred. We report a case of a patient with a pathological fracture of L5 for which surgical stabilization was required but ultimately declined, and for whom percutaneous stabilization using screws and cement was alternatively offered.

A 68-year-old female patient with a metastatic rhabdomyosarcoma was referred for the management of a growing painful osteolytic lesion involving the vertebral bodies and the left pedicle/facet joint of L5 and S1 with collapse of L5. The patient was unable to stand due to mechanical pain. Maximal pain score was 9/10. The spinal instability neoplastic score (SINS) was 12/18, indicating a highly potentially unstable lesion warranting surgical stabilization (Fig. 1). Surgery was ultimately declined because of post-radiation skin changes in the operating field. Given the concerns about the result of stabilization with PMMA injection alone, an attempt of percutaneous lumbosacral arthrodesis with screws and cement was considered and accepted by the patient after informed consent.

The intervention was performed under general anesthesia in prone position using angio-CT guidance, using two cement-augmented screws that were inserted vertically from the S1-S2 junction to L4 with a presacral approach (Fig. 2). There was no complication related to the procedure. One month following the intervention, the pain score had dropped from 9 to 4 and the patient was able to stand up and walk with a stick. The clinical and radiological situation was then stable for 12 months until further tumor progression occurred, leading to new mechanical symptoms with impossibility to stand and a maximal pain score of 10/10. Imaging revealed growth of the osteolysis into L4 and extension in S1 with failure of the hardwares and anterior translation of the spine (Fig. 3). As the life expectancy was greater than 3 months, further percutaneous stabilization was considered. Two cement-augmented screws were inserted vertically from S5 to L3 using a vertical trans-sacral approach (Fig. 3). There was no complication related to the procedure. One week following

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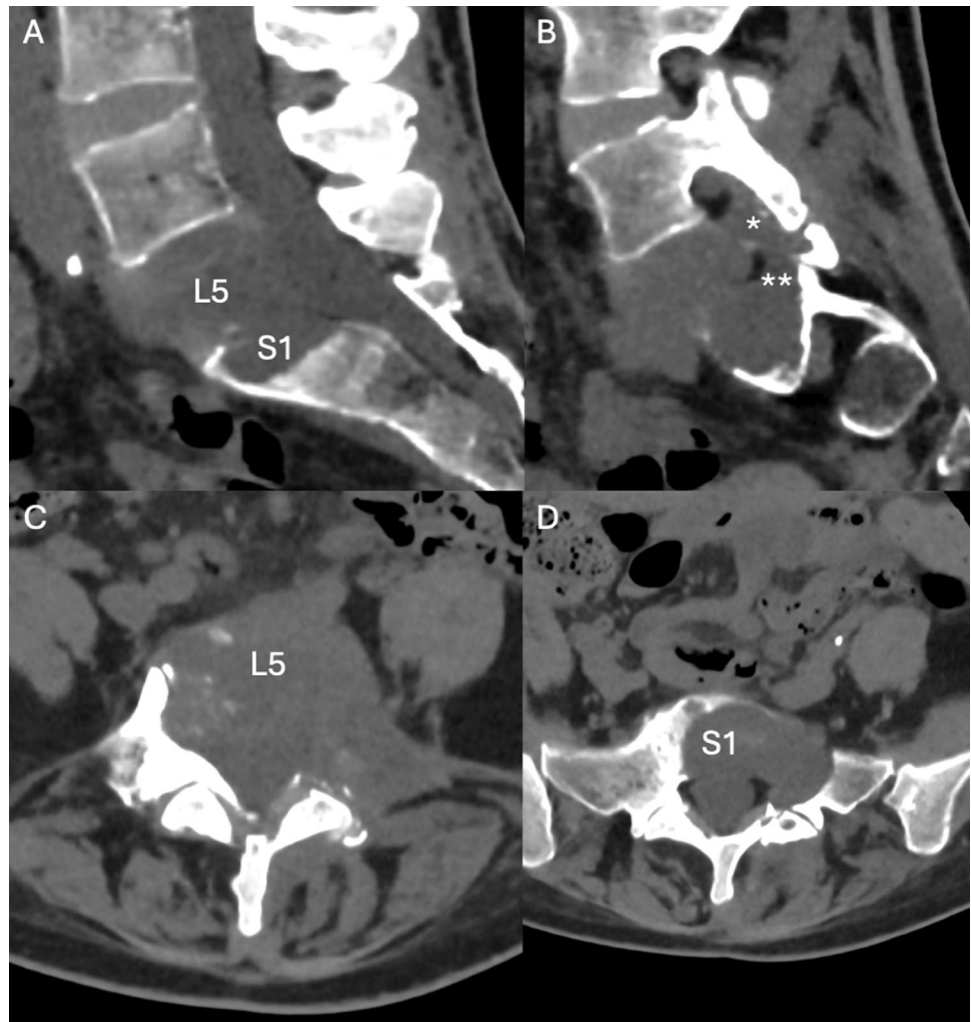
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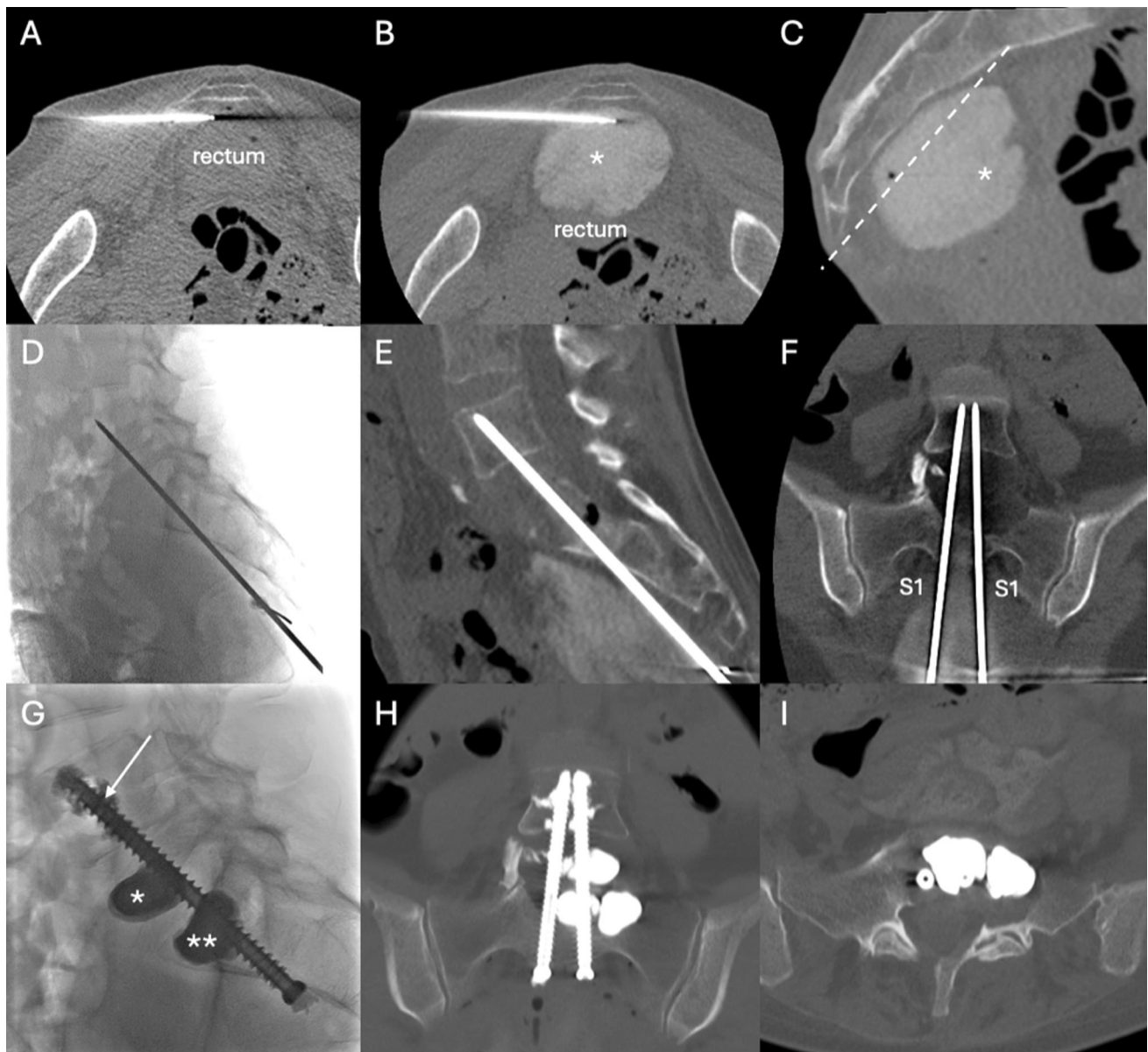
**Fig. 1** Baseline imaging. **A** Sagittal CT scan shows complete osteolysis of the vertebral body of L5 which is collapsed and osteolysis of the vertebral body of S1. **B** Left parasagittal CT scan shows extension of the osteolysis within the facet joint of L5 (asterisk) and S1 (double asterisks). Axial oblique CT scan of L5 **C** and S1 **D** demonstrating the extensive osteolysis with involvement of the posterior elements on the left side. There is only limited extension of the tumor within the epidural space (no neurological symptoms)



the intervention, the pain score had dropped from 10 to 5 and the patient was able to ambulate with a walking frame. Restaging imaging at 3 months did not demonstrate any mobilization of the screws but showed an insufficiency fracture of the sacral ala most likely secondary to tumor progression within the right sacral wing and modification of load transfer due to the construct. This was treated with additional screw fixation as mechanical symptoms were increasing again (supplementary material). The patient became paraplegic because of tumor progression 7 months after the last intervention (22 months after the 1st

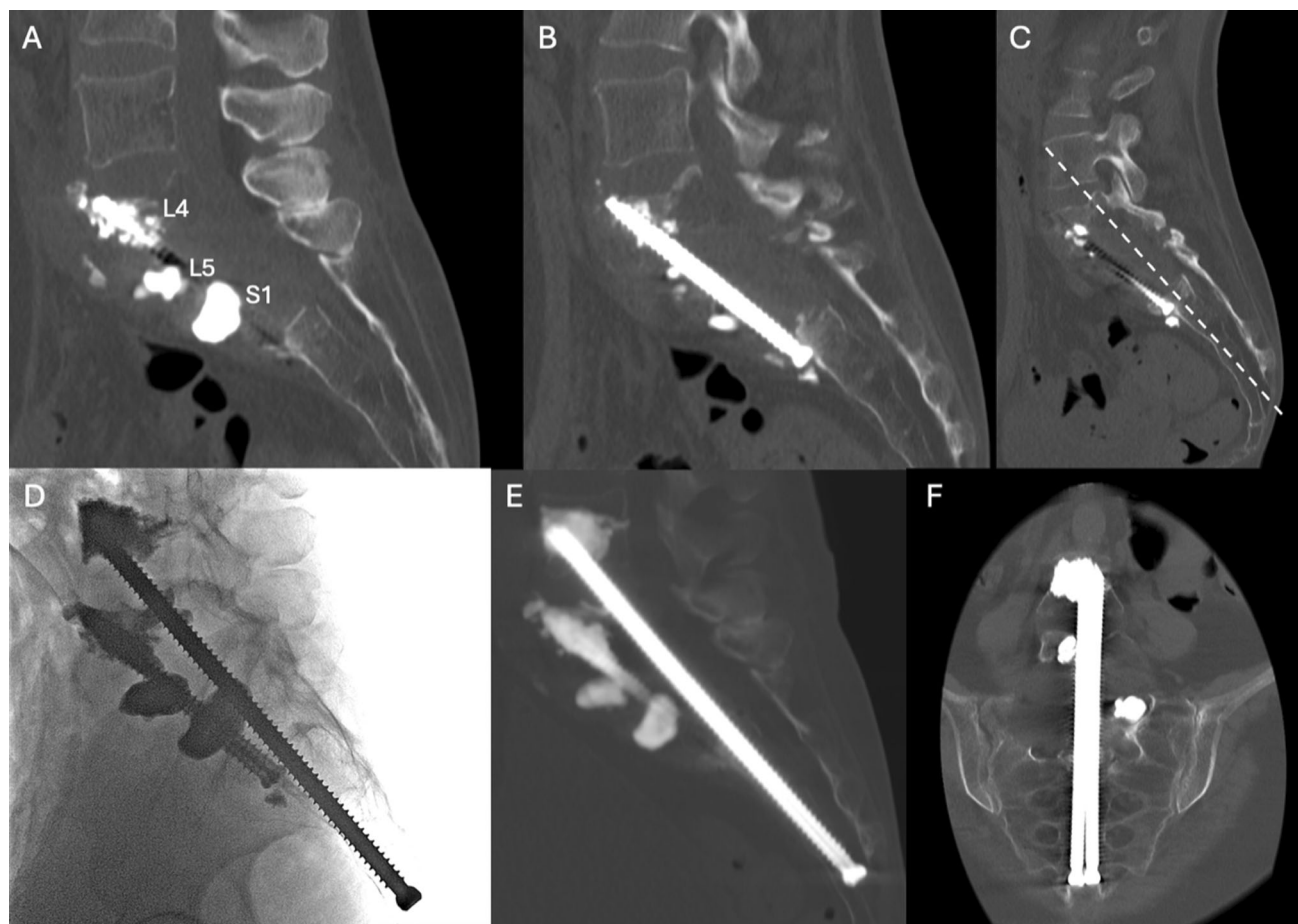
intervention) without further mobilization of the screws at last available follow-up (24 months after 1st intervention).

The present case report highlights the feasibility of a percutaneous approach to stabilize an unstable pathological fracture of the L5 vertebral body. The presacral access that was used for the 1st intervention has been sporadically described in the surgical literature (without dissection) as an add-on to obtain arthrodesis for degenerative L5-S1 disease [3, 4]. As the amount of load transfer is huge in the lumbosacral area, failure of the construct may occur in case of tumor progression (which happened in the present case)



**Fig. 2** Percutaneous fixation of L4L5 and L5S1. **A** A 17G blunt-tip side-holed needle (Hydroguard, Apriomed, Sweden) is inserted between the sacrum and the rectum, allowing for anterior displacement of the rectum **B** after injection of 250 ml of a mixture of saline and contrast (asterisk in **B**) with a 20:1 ratio. **C** Hydrodissection (asterisk) opens a corridor (dotted line) from the sacrococcygeal junction to the sacral promontory on the parasagittal view. Two 3-mm Kirchner wires are inserted vertically through the previously dissected space entering bone at the S1-S2 junction up to the vertebral body of

L4 as seen on lateral fluoroscopy **D** and sagittal **E** and oblique coronal **F** CT scan. Care is taken to stay medial to the S1 nerve roots. Final appearance on lateral fluoroscopy **G** after insertion of two 7.2-mm-diameter fully threaded cannulated hollowed screws (hollowed screws, Koenigsee, Germany) whose heads were augmented with PMMA (arrow in **G**). Additional cementoplasty of the vertebral bodies of L5 (asterisk) and S1 (double asterisks). Same findings on oblique coronal **H** and oblique axial CT scan at the S1 level **I**



**Fig. 3** Percutaneous stabilization from L3 to S5. **A** Sagittal CT scan demonstrates growth of the osteolysis into L4 and extension in S1. There is anterior subluxation of the spine relative to the sacrum. **B** Parasagittal CT scan shows failure of the screws which are displaced anteriorly. **C** Widened parasagittal imaging shows a possible corridor to bridge the area of osteolysis, thereby connecting

the whole lower sacrum to L3. Final appearance on lateral fluoroscopy **D** and sagittal **E** and oblique coronal **F** CT scan following insertion of two 8-mm-diameter–17-cm-long fully threaded cannulated screws (Asnis 8 mm, Stryker, USA) augmented with PMMA in L3

or possibly in case of poor bone quality (e.g., secondary to osteoporosis or radiation). Hence, regular radiological assessment should be performed to detect any failure of the construct. Such intervention is not as resistant and not as long-standing as a surgical stabilization; it should therefore be reserved for true non-surgical candidates.

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**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethics Approval** Approved by trust review committee.

**Consent for Publication** Written consent was obtained from the patient.

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