

Introduction

Osteoporosis is a prevalent and often debilitating condition, with potentially high morbidity. Osteoporotic fragility fractures can complicate the postoperative course following lumbar decompression and fusion. Sacral insufficiency fractures, compression fractures, and sacral metastases present unique challenges in terms of diagnosis and management. Sacroplasty is a well-established minimally invasive procedure, frequently used to treat painful sacral insufficiency fractures(2). This is a case report describing the management of complex spinal pathology in a 78-year-old woman with the failure of posterior instrumented fusion, debilitating pain with the loss of mobility in the setting of minor trauma and osteoporosis.

Case report

HPI: A 78-year-old woman, burdened with multiple comorbidities, previously underwent L5/S1 laminectomy for intradural tumor removal. Subsequently, she underwent posterior lumbar L5/S1 fusion for degenerative spondylolisthesis and spinal stenosis. Unfortunately, suboptimal bone quality and osteoporosis led to poor seating of the left S1 screw, causing its pullout and a significant bony defect in the S1 vertebral body. Bilateral L4/S1 fusion ensued, involving left-sided S1 screw removal and interbody spacer placement within the S1 vertebral body. Two weeks later, a fall on her back resulted in severe, intractable pain (10/10 VAS), revealing an acute insufficiency fracture of the S1 vertebral body and bilateral sacral ala. Consequently, she was admitted to the hospital.

Relevant PMH: Status post-MVR, on anticoagulation, hypertensive, with a history of osteoporosis and obesity.

Findings on admission: Neurological exam intact. Severe pain (10/10) in the lower back.

Conservative treatment: Initially, conservative management and physical therapy were pursued. However, despite these efforts, there was a progressive deterioration in the patient's condition, leading to the loss of ambulation.

Surgical treatment: Following multidisciplinary discussions, the decision was made to proceed with bilateral sacroplasty and cement augmentation of the S1 vertebral body.

Imaging



Figure 1. Preoperative CT.

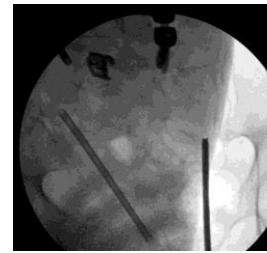
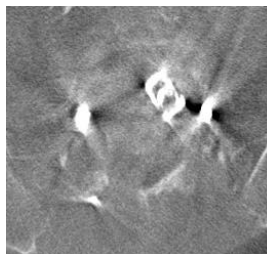


Figure 2. Intraoperative CT.

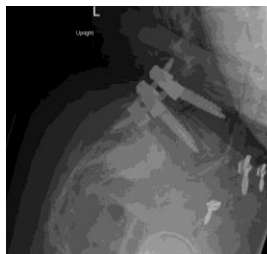


Figure 3. Postoperative X-ray.



Surgical Technique

Imaging: Utilized O-Arm and portable C-arm for real-time visualization.

Equipment: Employed Medtronic, Kyphon, diamond and beveled tip introducers, along with a curved cannula for S1 access and bone fillers.

Anesthesia: General endotracheal anesthesia (GETA). Case duration: 75 minutes. Estimated blood loss (EBL): 25 cc.

Procedures: Accessed the S1 vertebral body on the right side through the left pedicle. Introduced a bone-accessed cannula under intermittent anteroposterior (AP) and lateral X-ray guidance. Upon reaching the cage level, an intraoperative CT scan was performed, revealing a suboptimal position. The cannula entry was readjusted, and a second intraoperative CT confirmed proper placement. Utilized a curved cannula, projecting its tip just anterior to the S1 cage. Employed a standard long-axis approach for bilateral sacral ala augmentation. Total cement injection: 8 cc on the left side, 8 cc on the right side, and 6 cc in the S1 region.

Outcome

Immediate outcome : The procedure was uneventful and resulted in immediate pain relief, decrease from 10/10 to 3/10 VAS, and the patient was discharged home on postoperative day 2.

One-month follow-up: patient recovered completely in terms of back pain, was reporting low pain scores 2-3/10, consistent with her original chronic symptoms, was ambulating independently, discharged home from rehab facility.

Discussion

This case posed multiple challenges: pre-existing hardware obstructing the view in standard AP and lateral projections, extremely poor bony quality with unclear margins on intraoperative X-ray, and altered anatomy. Intraoperative CT with O-arm significantly facilitated the safe placement of introducers and bone fillers before cement injection. While the treatment provided immediate relief, the patient, due to the systemic nature of her disease, remains at a high risk for subsequent fractures. Aggressive and comprehensive medical therapy is imperative to rectify her compromised bone density.

Vertebral augmentation, a safe option(1), is often underutilized in patients with previously instrumented fusion. The incorporation of advanced intraoperative imaging, and potentially navigation, can enhance the safety of procedures, as exemplified in our case.