

## Case Report

## T2 vertebrectomy with combined anterior and posterior arthrodesis for treatment of a solitary plasmacytoma

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### Abstract

**Background:** Plasma cell neoplasmas are a heterogeneous group of neoplastic tumor lesions occurring secondary to disordered proliferation of cells from a monocyte lineage. Plasmacytoma is a rare lesion that accounts for 5% of all plasma cell neoplasms. The current recommended treatment for solitary plasmacytoma is moderate dose radiation therapy. For patients who are suffering from axial back pain, spinal instability, radiculopathy, or bowel/bladder dysfunction secondary to spinal cord compression, surgical intervention with spinal decompression and stabilization can be used as an adjuvant to radiation therapy.

**Case Description:** We report a patient who presented with worsening axial and bilateral upper extremity pain. He was found to have a locally aggressive tumor involving the vertebral body of T2. After a repeat magnetic resonance imaging (MRI) and a computed tomography (CT)-guided biopsy, the diagnosis of a solitary plasmacytoma was confirmed. It destroyed over 90% of the T2 vertebral body, resulted in 22° of local kyphosis, and caused spinal cord compression. The tumor was treated with a T2 vertebrectomy, posterior arthrodesis from C5–T4, and anterior arthrodesis from T1–3.

**Conclusions:** Solitary plasmacytomas of the vertebral bodies are difficult lesions to treat secondary to their location and risk of neurologic compromise. Surgical intervention with tumor resection and adjuvant chemotherapy or radiation is the recommended treatment option.

**Key Words:** Arthrodesis, solitary plasmacytoma, thoracic spine

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### INTRODUCTION

The most common primary tumor of the axial skeleton is a plasmacytoma. It comprises proliferation of monoclonal plasma cells derived from B cells in the bone marrow.<sup>[4]</sup> They account for 2–5% of all plasma cell neoplasms.<sup>[7,8]</sup> They can be classified as either solitary or extramedullary depending on their location and extent of tissue involvement. Solitary plasmacytomas most often occur in the vertebral bodies of the thoracic spine, followed by

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the lumbar, sacral, and cervical spine.<sup>[3]</sup> They are often asymptomatic, however, in some cases, symptoms may lead to axial back pain, radiculopathy, or bowel/bladder dysfunction if invasion of the spinal canal has occurred causing spinal cord compression. Treatment is aimed at symptomatic control and to stop the progression of the disease to multiple myeloma. The treatment of choice is moderate-dose radiation therapy to provide good local control of the tumors.<sup>[4]</sup> Surgical intervention is recommended as an adjuvant to radiation therapy, if clinically warranted.<sup>[6]</sup> The goal of the surgery is pain relief, restoration of spinal stability, and preservation and restoration of neurological function.<sup>[4]</sup> Here, we present a patient with a T2 thoracic vertebral body plasmacytoma that resulted in collapse of the vertebral body resulting in spinal instability and spinal cord compression.

## CASE DESCRIPTION

The patient is a 68-year-old male who presented with 6 months of progressively worsening interscapular back pain and bilateral arm pain. A CT-guided biopsy was negative for multiple myeloma. The patient's urine Serum Protein Electrophoresis (SPEP) displayed an M-spike of 0.4, however, free kappa and lambda light chains were normal. The patient did not display any signs of renal insufficiency or anemia. The magnetic resonance imaging (MRI) of the thoracic spine displayed a T2 pathologic fracture with 90% height loss, 22° of local kyphosis, and spinal cord compression. The fracture appeared to have high signal intensity on the T2-weighted image and low signal intensity on the T1-weighted image, consistent with an active tumor, most likely a plasmacytoma [Figure 1]. The patient underwent a T2 vertebrectomy, an anterior T1–3 arthrodesis, and a C5–T4 posterior arthrodesis utilizing a left lateral extracavitary approach [Figure 2]. Postoperatively, the patient reported



**Figure 1: Preoperative magnetic resonance imaging (MRI).** Preoperative MRI of the thoracic spine displays a lesion in the T2 vertebral body. The lesion on T1 (left) appears hypointense. The lesion on T2 (right) appears hyperintense

a 70% resolution of axial back and arm pain. He was discharged home on postoperative day number four.

The final pathology displaying sheets of small plasma cells overrunning normal tissues that were positive for CD138 which had aberrant expression of CD56, indicating plasma cells. The patient continued to have improvement of his symptoms at 3-month follow-up.

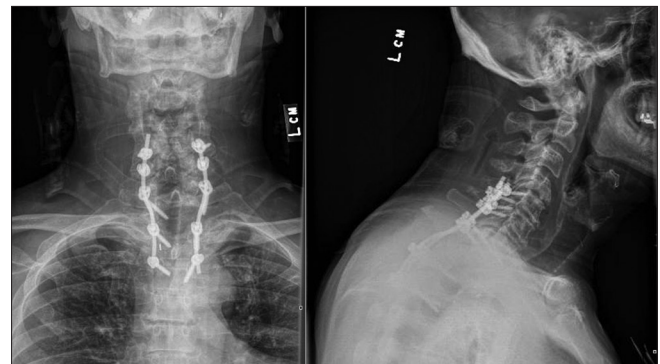
## DISCUSSION

Solitary plasmacytoma is a rare tumor that typically occurs in the thoracic spine. Patients can present without symptoms or with complaints of back pain, with or without signs of spinal cord compression.<sup>[2]</sup> The primary recommended treatment is for radiation therapy to avoid transformation to multiple myeloma, which occurs in 50% of the cases within 5 years.<sup>[7,8]</sup> Plasmacytomas have a significantly higher 5-year survival rate compared to multiple myeloma, which is 75% vs 32%, respectively.<sup>[1,7]</sup> Knobel *et al.* demonstrated that, in solitary tumors less than 5 cm in size, local control was attained with moderate dose radiation at a rate of 91%; 73% control rates were demonstrated in tumors greater than 5 cm.<sup>[5]</sup>

Spinal surgery can be an effective adjuvant to radiation therapy, but it is not always indicated as part of the treatment regimen. In asymptomatic patients who have no signs of spinal instability, radiation therapy alone can be effective. Dimopoulos *et al.* revealed that surgery with radiation therapy vs radiation therapy alone had no significant difference in 10-year probability of local control in multiple myeloma patients.<sup>[2]</sup> The goals of surgery in symptomatic patients include decompression of the spinal cord and spinal stabilization.

## CONCLUSION

Overall, spinal surgeries are not indicated for patients suffering from solitary plasmacytoma unless the disease has progressed to cause axial back pain, spinal instability,



**Figure 2: Postoperative X-rays of the cervicothoracic junction.** Lateral mass screws can be seen in C5 and C6 bilaterally. Pedicle screws can be seen in T1, T3, and T4 bilaterally

radiculopathy, or signs of spinal cord compression. Our patient, however, was a good surgical candidate as he met multiple operative indications. Postoperatively the patient had significant resolution of axial back pain, which continued to improve at 3-month follow up.

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### Conflicts of interest

There are no conflicts of interest.

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