

CASE REPORT

Contribution of Surgery in Solitary Plasmacytoma of Spine; A Case Report

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Abstract

Solitary plasmacytoma of bone is a rare malignant tumor mostly involving the axial skeleton. The tumor occurs in middle-aged or elderly people (mean age: 55 years) and has a high risk of progression to multiple myeloma. Radiotherapy is the preferred treatment for this disease. We report a case of recurrent solitary plasmacytoma of the fourth lumbar vertebra in a 35-year-old male. The patient suffered from intractable pain due to a pathologic fracture and instability. We performed two-stage posterior and anterior surgical procedures on him. Our method was useful for immediate pain relief and early return to activity, spinal decompression and biomechanical stabilization of the involved vertebra. Afterward, the patient underwent radiotherapy as the adjuvant therapy. The patient is asymptomatic without any recurrence after a one-year follow up. We recommend surgery as an appropriate option for patients with intractable pain as a result of pathologic fracture, vertebral instability, neurological compromise, failure of radiotherapy or a combination of these disorders.

Key words: Radiotherapy, Solitary plasmacytoma, Spinal tumors, Surgery

Introduction

Solitary plasmacytoma of bone (SPB) is a rare plasma cell tumor that mainly involves the axial skeleton which can progress to multiple myeloma. As a treatment method of choice, radiotherapy has been suggested; however, surgery can also be another option, but there are only a few studies in this regard. We report a patient with recurrent solitary plasmacytoma of the fourth lumbar vertebra. The patient suffered from intractable pain due to a pathologic fracture and instability. He had a good response to surgical treatment. In our report, we discuss surgical recommendations including indications and methods of surgery for the treatment of SPB.

Case report

A 35 year-old male who had a known case of spinal plasmacytoma presented with progressive low back pain that began two weeks prior to being evaluated. Despite use of multiple analgesic agents, he suffered from severe pain, numbness and a tingling sensation that led to the inability to stand or do any other activity.

The patient reported experiencing initial low back pain

fifteen months ago. A radiologic evaluation showed an expansile, irregular osteolytic lesion in the fourth lumbar vertebral body. Hence, a tumor work-up was performed. Ultimately the diagnosis of solitary plasmacytoma was given on the basis of a computerized tomography (CT) guided biopsy from the lesion. Radiotherapy for the patient was initiated and back pain was relieved. The patient was symptom free for about 15 months afterwards. Later on, he returned with progressive low back pain that started about two weeks earlier and it was more severe than the previous time; the patient had no history of trauma.

In his examination, the patient had severe point tenderness in the lower lumbar vertebra. Another examination including sensory-motor neurologic tests and deep tendon reflexes were normal. Laboratory tests showed anemia (Hb=9.1 g/l). Renal function test and urine protein were normal. Serum immunoglobulins, protein electrophoresis did not reveal any abnormality. However, X-ray and a CT scan showed a pathologic unstable fracture in the L4 vertebra with anterior, middle and posterior columns involvement (Figure 1 and Figure 2). The tumor involved nearly all elements

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Figure 1. Solitary plasmacytoma of bone in L4 vertebra. A) Antero-posterior radiograph. B) Lateral radiograph showing a pathologic fracture with significant collapse.

of the L4 vertebra including body, pedicles, articular and transverse processes. Moreover, there was significant collapse of vertebral body with mild canal compromise especially on the left side. Magnetic resonance imaging

(MRI) revealed a heterogeneous mass in the L4 vertebra. The mass extended around the vertebra anteriorly and posteriorly with significant bulging posteriorly (Figure 3).

Due to intractable pain and imaging findings, we decided to perform a two-stage surgery to stabilize the spinal column, tumor resection and decompression of the spinal cord followed by adjuvant therapy.

The major problem leading to intractable pain was instability, which was confirmed by imaging. The neurologic examination was intact without any signs of neurologic deficit. Therefore, the main goal was stabilization and the other goal was decompression and tumor excision. In the first stage, we used the posterior approach in the prone position from L2 to S1 to gain relative vertebral column stabilization. Due to the tumoral lesion as a pathology of instability and significant osteoporosis, we decided to perform a long fusion and insert pedicle screws in two levels above and two levels below (L2, L3, L5, S1) the involved vertebra. We put the rod unilaterally at the right side and then a laminectomy was performed. The pathologic tissues were excised and sent for pathology assessment. Next, the contralateral rod was inserted and fusion with allograft was performed.

After two days, in the second stage of surgery, we performed an anterior retroperitoneal lumbar approach. The main goal of this surgery was vertebral column stabilization and spinal cord decompression. Anterior decompression and excision of the tumor were performed. Subsequently mesh cage and allograft was used for reconstruction and fusion (Figure 4).

After the two stage operation, his pain dramatically decreased and he was able to walk the day after his second operation. The pathology revealed plasma cell neoplasm compatible with plasmacytoma and so this confirmed the primary diagnosis. The patient underwent

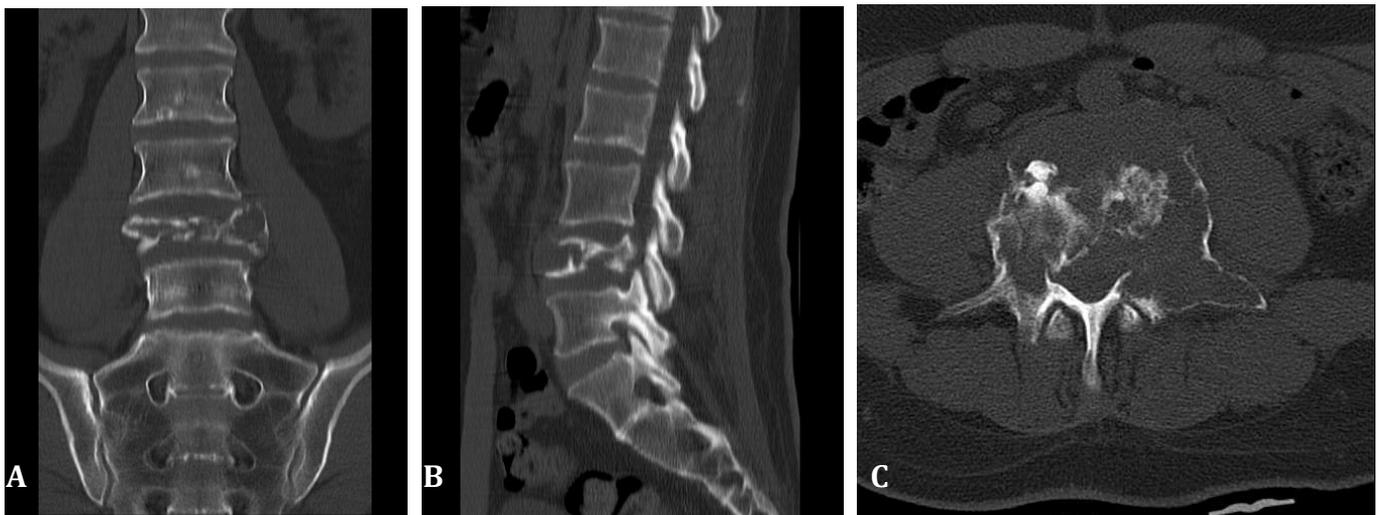


Figure 2. Computed tomography scan of solitary plasmacytoma of bone in L4 vertebra. A) Coronal imaging showing expansile, irregular osteolytic lesion. B) Sagittal imaging showing significant collapse and instability. C) Axial imaging showing anterior, middle and posterior element involvement and mild canal compromise, specially on the left side.

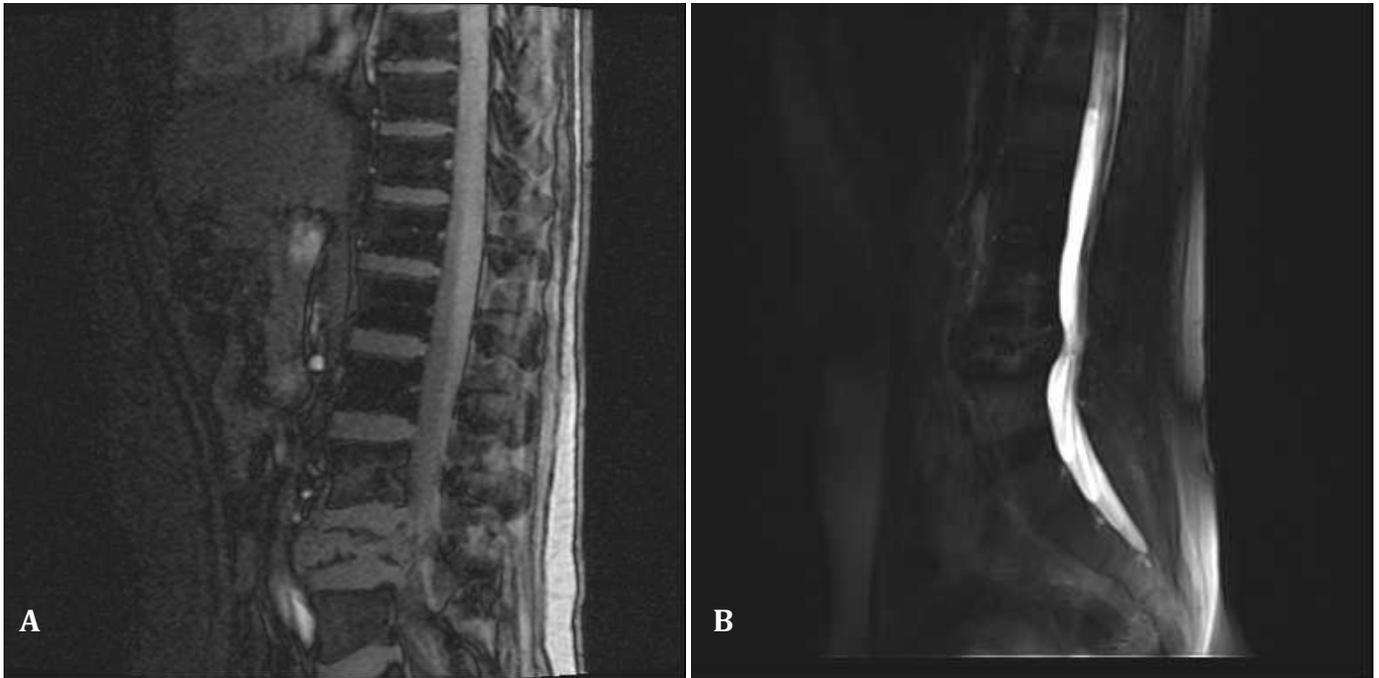


Figure 3. Magnetic resonance imaging of solitary plasmacytoma of bone in L4 vertebra. A) T1-weighted image showing a low to intermediate signal lesion with paravertebral extension. B) T2-weighted image showing a hyperintense lesion with significant bulging in the posterior of the body.

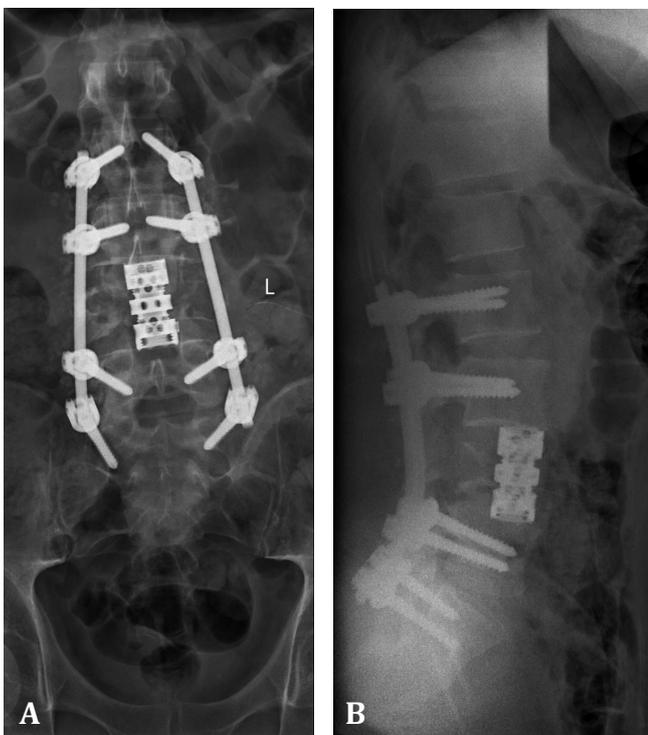


Figure 4. Lumbosacral radiograph after the second stage of surgery. A) Anteroposterior radiograph. B) Lateral radiograph.

radiotherapy as an adjuvant therapy. After one-year follow up, there is no progression to multiple myeloma. Moreover, the patient is active and satisfied without any significant pain.

Discussion

Solitary plasmacytoma of bone (SPB) is a malignant tumor and an independent subtype of plasmacytoma (1- 2). Current acceptable criteria to identify SPB are as follows:

Single area of bone destruction due to clonal plasma cells; bone marrow plasma cell infiltration not exceeding 5% of all cells; absence of other bone or tissue involvement (no evidence of myeloma), absence of anemia, hypercalcemia or renal impairment attributable to myeloma; low, if present, concentrations of serum or urine monoclonal protein; and preserved levels of uninvolved immunoglobulins (3- 4).

In addition, SPB has a high risk of progression to multiple myeloma (MM). Yang et al reported a case of SBP in lumbar vertebra that progressed to MM less than two months after the initial diagnosis of solitary plasmacytoma (5). In MRI examinations, at least 25% of patients with an apparent solitary lesion have evidence of disease elsewhere and these tumors occur in the spine twice as often as other bony sites (5-7).

The male/female ratio of SPB is about 2:1 with a mean age of 55 years (3). If there is spinal involvement, pain and instability of the vertebra could be seen, but a fracture is rare. CT or MRI can detect the lesions and

describe the tumor extent at its earlier stage. MRI has an important role in the description of the residual tumor, local relapse and tumor progression to MM after treatment.

Moreover, biopsy and histopathology play an important role in diagnosis of this disease and radiotherapy is considered the treatment of choice for SPB (4).

Although high local control rates of 83% to 96% are achieved with moderate doses of radiotherapy, the progression to multiple myeloma is considerably common (5-7).

Surgery is not the first choice to treat SPB; however, it remains a reliable option for patients with intractable pain as a result of vertebral involvement and instability, neurological compromise, or a combination of these disorders (2, 3, 8-11). Tsutsumi et al reported seven cases of solitary spinal extradural plasmocytoma. Four of five patients who underwent decompressive surgical maneuver and tumor resection showed neurological improvement. They concluded that surgery can be effective method for symptomatic relief in SBP (2). Total en bloc spondylectomy or resection is ideal for lesions in the lumbar spine and extra spinal involvements (12-14).

Given to the probability of long-term survival in patients with this disease, it is recommended that reconstruction of the involved spine be performed (2, 9). Moreover, if surgery is required, radiotherapy must be performed as well. However, surgery should be carried out before radiotherapy because surgery may be more difficult in patients with preoperative radiotherapy (2, 9-11).

We performed two-stage surgical procedures on a patient with recurrent SPB, who also suffered from a pathologic fracture, instability and intractable pain. In our patient, anterior, middle and posterior elements of the fourth lumbar vertebra were involved. We stabilized the vertebral column through anterior and posterior approaches. Our method was successful and we achieved immediate pain relief, biomechanical stabilization of the vertebral column and spinal decompression. Our patient was younger than the normal age for this tumor and so he was in his active and reproductive term in life. The patient was able to ambulate the day after his final

surgery and pain dramatically decreased.

Although the optimal treatment for plasmacytoma of bone is still controversial, surgery is needed in some patients. We advice surgery in these situations:

Pathologic fracture with instability where surgery is the only way to stabilize the spine; spinal cord compression due to direct compression by intraspinal bony fragments or malignancy which can be diminished by surgery; existing or impending motor dysfunction or progressive neurologic symptoms for which immediate decompression is required; and/or resistance to radiotherapy, disease progression or radiotherapy intolerance.

The surgical approach should be selected on the basis of surgical indication. If there are signs of spinal cord compression, the main goal is surgical decompression to restore neurological function. SPB usually arises from the vertebral body, which can collapse leading to instability and subsequently compress the spinal cord from the anterior. Laminectomy is ineffective in these patients and direct anterior decompression through the anterior approach or posterolateral decompression through the posterior approach is needed. If the major problem is instability without any sign of spinal cord compression, the main goal is vertebral column stabilization.

The patient is under follow-up by hematologic and orthopaedic services due to the probability of progression to multiple myeloma in which early detection is vital.

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