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Case Report

Solitary plasmacytoma of the sacrum treated with microwave ablation in conjunction with high dose of dexamethasone: A case report and review of the literature

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ABSTRACT

Background: Plasma cell neoplasms are characterized by the neoplastic proliferation of a single clone of plasma cells. Solitary plasmacytomas most often occur in bone, but they can also be found in soft tissues.

Case Description: A 53-year-old male presented with localized sacral pain and urinary incontinence. His radiographic studies showed a solitary sacral plasmacytoma (i.e., involving the bone). He was successfully managed with high-dose dexamethasone and microwave ablation (MWA).

Conclusion: Plasmacytomas of bone can be occasionally successfully managed with MWA, adjuvant cytoreduction therapy, and high doses of dexamethasone.

Keywords: Dexamethasone cytoreduction, Microwave ablation, Plasmacytoma, Sacral plasmacytoma, Sacral tumor

INTRODUCTION

Plasma cell neoplasms are characterized by the neoplastic proliferation of a single clone of plasma cells. They may present as single (solitary plasmacytoma) or as multiple lesions multiple myeloma (MM). Solitary plasmacytomas most often occur in bone, but can also be found in soft tissues (i.e., extramedullary plasmacytoma). Sacral bony lesions add to the complexity of managing these tumors due to their attendant intrinsic/extrinsic structural, neural, and/or vascular concerns. Here, a 53-year-old male with a L5–S1–S2 plasmacytoma successfully underwent microwave ablation (MWA) and high dose of dexamethasone treatment.

CASE STUDY

A 53-year-old male presented with lumbosacral pain for approximately 6 months' duration, followed by the acute onset of a cauda equina syndrome (i.e., hypoesthesia in the genitals, paraparesis,

and urinary incontinence). Both computed tomography and magnetic resonance imaging studies documented an erosive lytic L5–S1–S2 lesion that appeared to infiltrate and extension into the presacral space. On axial studies, tumor extended along the pelvic trajectory of the upper gluteal vessels and left iliac artery and vein. On the lateral images, it involved the first two sacral vertebrae, (S1–S2). There appeared to be no metastases [Figure 1]. Due to the patient's acute cauda equina syndrome, we initially planned a posterior decompression. However, due significant intraoperative bleeding, only a 10% partial resection/decompression was achieved [Figure 2]. Next, under fluoroscopic and ultrasound guidance, we utilized MWA (i.e., five different sites attempting to cover the entire tumor volume with five different vectors, with 2 min of ablation in each vector). This required 10 min of total ablation time of (i.e., temperature of 95–100°C, and ablation mode of 28 Watts) [Figure 3].

Pathology

The histopathology revealed a proliferation of plasma cells suggestive of a plasmacytic plasmacytoma. This was further supported by special immunohistochemical studies; positive CD138 and CD45 membranes in neoplastic cells with negative CD20.

Postoperative course

Following the ablation, the patient was managed with high-dose dexamethasone (i.e., 3 cycles of 4 days of 40 mg/day with a 4-day break between cycles). He was also referred to oncology/hematology for further multidisciplinary management [Figure 2]. Despite refusing further treatment, at 6 postoperative months, the patient exhibited a 90% remission of pain, and radiculopathy, and exhibited full

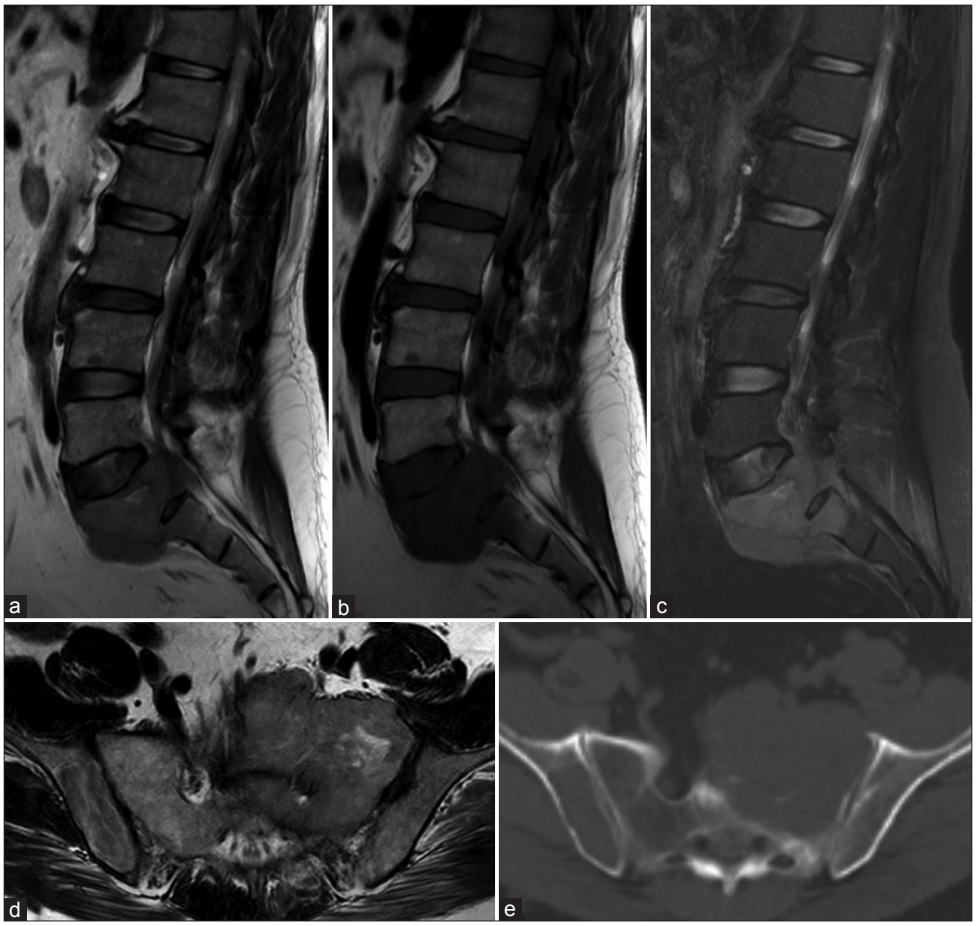

Figure 1: Preoperative sagittal magnetic resonance images (MRI) enhanced in T2 (a), T1 (b) and short-tau inversion recovery (STIR) (c); axial image displayed in T2 (d); and axial tomography image with a bone window image (e), where an infiltrative lesion is visualized in the S1 and S2 vertebrae as an expansive lytic bone lesion that is hypointense on T1 and T2 and hyperintense on STIR; the MRI presents an extraosseous soft-tissue component projected in the spinal canal and presacral space, encompassing and noticeably affecting the left L5 and S1 roots (d); note the characteristic absence of periosteal reaction in the tomography images (e).

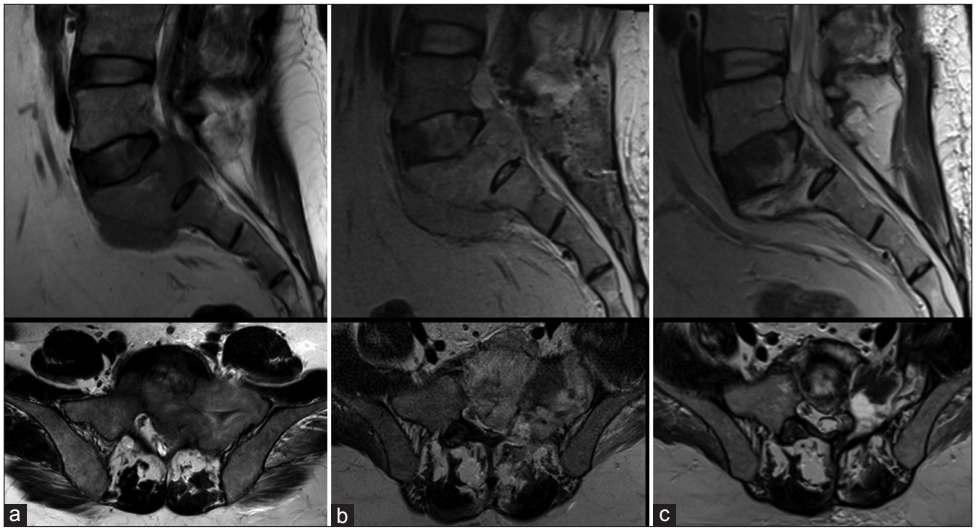

Figure 2: Sequential T2-weighted sagittal and axial magnetic resonance images; (a) Before treatment, (b) At 48 h postmicrowave ablation and (c) 4 months post-ablation. In the initial image before treatment, (a) the lesion is hypointense on images at 48 h and (b) the tumor with a slight increase in its size and a total change in its potency when it became hyperintense; in its control at 4 months, disappearance of the lytic lesion and the soft tissue component can be observed, with a noticeable decrease in the height of the S1 vertebra and formation of sclerotic areas in the bone.

Figure 3: (a) Ablation antenna used in the patient's surgical procedure; 14.5 gauge; Med Waves. (b) Image of the surgical procedure where the introduction of the antenna toward the sacral region can be seen. (c) Image obtained by fluoroscopy at the moment of the introduction of the antenna in one of the 5 vectors directed toward the sacral lesion.

recovery of sphincter function. He was lost to further follow-up.

DISCUSSION

Plasma cell neoplasms are characterized by the neoplastic proliferation of a single plasma cell clone that typically produces monoclonal immunoglobulin. Single lesions occur most frequently in bones, but they can also be found in soft tissues (extramedullary plasmacytoma).[8] Patients typically present with bone pain and/or atraumatic fractures.[5] Imaging studies usually reveal single spinal lesions. Tumor/bone marrow biopsies typically show plasma cell infiltration, with <10% plasma cells.[2] Surgery is usually warranted when there is spinal cord compression, along with instrumented fusions. As tumors exhibit a high local recurrence rate, additional radiotherapy (RT) is typically warranted, and dexamethasone has a cytoreducing effect after RT[3,5,7,10-12,14] [Table 1]. Chemotherapy is used to tumors larger than 5 cm that do not respond to RT, delaying the time to tumor progression to MM.[1,2,5]

MWA

MWA has become an important minimally invasive treatment option for different types of tumors, including bone tumors.[4,6,9] MVA can induce the destruction of tumors using frequencies ranging from 900 MHz to 2450 MHz and uses an antenna that heats up rapidly using electromagnetic energy up to 2 cm around the antenna.[13]

Table 1: Solitary plasmacytoma of bone: representative treatment results from the literature.

Author, Year	Treatment option	No. Patients	Institution	Local control (%)	Overall survival (%)
Tsang *et al.*, 2001	Radiotherapy	46	Princess margaret hospital Canada	83	65 (at 8 years)
Wang *et al.*, 2018	Radiotherapy	1,047	Second affiliated hospital China	*	36.8 (at 10 years)
	Radiotherapy and surgery	399		*	45.7 (at 10 years)
	Surgery Only	94		*	25.9 (at 10 years)
Aviles *et al.*, 1996	Adjuvant chemotherapy	25	Oncology Hospital, National Medical Center Mexico	95	88 (at 8 years)
Mignot *et al.*, 2019	Radiotherapy Lenalidomide-Dexamethasone	46	Institut Curie, Hôpital Tenon Hôpital Cochin, France	96.3	94.8 (at 5 years)

*Not specified

CONCLUSION

Plasmacytoma is a rare lesion that can respond to microsurgical assisted ablation and adjuvant cytoreduction therapy using high-dose dexamethasone.

Declaration of patient consent

Patient's consent not required as patient's identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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