

Sacral Mass Resection

KARIM ABDELAZIZ MOHAMED, M.D.*; AHMED EL SAID AHMED ELSAID, M.D.*;
KHALID MUBARAK MARI BIN MADI, M.D.** and HAITHAM KANDIL, M.D.*

The Department of Neurosurgery, Faculties of Medicine, Cairo and Hadrmour** Universities*

Abstract

Background: Sacral tumours are rare tumours that affect sacrum and can cause back pain and neurological disorders, bony erosion different pathologies can occur like chordoma, metastasis, giant cell tumour, neurofibroma and schwannoma, surgical excision with or without fixation is the ideal management.

Aim of Study: The aim of this study is to record the radiological and clinical results of sacral masses that have been post-located.

Patients and Methods: Between January 2020 and January 2023, ten patients with post-located sacral masses underwent surgical resection using a post approach, with or without spinopelvic fixation using a modified Galveston technique if more than 50% of the sacroiliac joints were involved. The pathology showed giant cell tumors in two cases, aneurysmal bone cysts in three cases, chordomas in three cases, and neurofibromas in two cases; gross total resection was performed in eight cases, and the patients' low back and leg pains recovered well in eight of the cases, while the two cases that required fixation remained for approximately five months before fusion occurred, with the exception of four cases in which sphincteric disturbance recovered after three months.

Conclusion: In conclusion, spinopelvic reconstruction and partial or complete sacrectomy are necessary for the surgical management of sacral malignancies. Due to the fact that most spine surgeons are not experienced with the technique needed for these procedures, these lesions provide a significant surgical obstacle.

Key Words: Sacral masses – Modified Galveston technique.

Introduction

RARELY, 1–7% of all spine tumors are tumors of the sacral bone and associated neural tissue and organs. The majority of metastases from sacral tumors are from multiple myeloma, breast, colon

cancer, lung, or prostate cancer. More than half of primary sacral tumors are chordomas, which are the most frequent type of sacral tumor. The most common benign lesion of the sacrum is giant cell tumors [1].

Lower sacrum tumors typically manifest as perineal numbness, discomfort, and incontinence of the stools and urine tumors of the upper sacrum that cause compression of the s1 root and exhibit similar symptoms to gastrocnemius weakness MRI is the recommended imaging modality to learn more about the tumor extension because tumors can occasionally grow to a size where they can be felt during a rectal examination without causing any symptoms [2].

Sacral tumors present a significant challenge in surgical treatment due to the lengthy and bloody nature of the procedure. The surgical plan typically involves spinopelvic reconstruction, which can be achieved using the modified Galveston technique or double iliac screw fixation with posterior lumbar fixation. This is accompanied by a partial or total sacrectomy, which can be performed using either an anterior or posterior approach. The stability of the lumbosacral iliac region is maintained by the sacrum and ilium ligaments, as well as the posterior bone structures. When at least 50% of the sacroiliac joint remains intact, the resection of these tumors generally does not have a significant impact on sacroiliac stability [1].

However, because most spine surgeons are not familiar with the techniques needed for these procedures, adjuvant therapy such as chemotherapy with or without hyperthyremia and cryosurgery and embolization of sacral tumors may be helpful in minimizing blood loss.

Correspondence to: Dr. Karim Abdelaziz Mohamed,
The Department of Neurosurgery, Faculty of Medicine,
Cairo University

Patients and Methods

This study presents a retrospective analysis of ten cases involving patients with documented sacral masses, based on clinical and radiological evaluations. The treatment approach varied: in some cases, patients underwent excision of the mass alone, while in instances where more than 50% of the sacroiliac joint was affected, the treatment included fixation using a modified Galveston technique [3].

Patients were admitted to Cairo University Hospital's neurosurgery unit, where they had surgery.

Prior to surgery, every patient underwent assessment and underwent the following:

- 1- Clinical background.
- 2- Clinical assessment
- 3- Examine in a lab.
- 4- A radiological examination.

Every patient underwent computed tomography, magnetic resonance imaging, and plain radiography [4].

Operative procedure:

In all patients, pedicle screws are placed bilaterally in the L3–L5 lumbar pedicles. If more than 50% of the sacroiliac joint is damaged, the procedure may include additional fixation using a modified Galveston technique. The proper positioning of the screws is confirmed during surgery using an intraoperative X-ray.

A hole is created in the cortex of the medial posterior iliac crest at the S2/S3 level to insert the pilot rod into the cancellous bone of the ilium. This procedure establishes a path for the contoured rod, which is essential for the proper placement of the Galveston rods in the ilia. The temporary rod is then carefully tapped into place, positioned 1.5cm above the sciatic notch and situated between the two cortices of the ilium [5].

Once the pilot rod is removed, an adjustable template rod is inserted and shaped accordingly. This rod is then taken out, and a temporary rod is positioned to be approximately 1.5cm above the sciatic notch and placed between the two cortices of the ilium. The rod is tapped gently using a mallet to a depth of at least 2cm. After that, the contoured rod, having been cut to the appropriate length and bent to match the shape of the template rod, is inserted into the ilium to a depth of 4 to 5 centimeters. The rod is then secured to the lumbar pedicle screws. Following this, cross-links are placed between the rods to enhance stability [6].

Post operative follow-up:

Clinical follow-up: A post-operative neurological examination and functional status assessment was conducted both immediately following surgery and every six months thereafter. The results were finalized and documented at least a year later [3].

Radiological follow-up:

Follow-up radiological procedures comprise Every three months to evaluate fusion and follow-up, a single day X-ray and CT scan of the lumbosacral spine were performed to determine the position of screws if the modified Galveston approach was applied. An MRI of the lumbosacral spine was performed three and twelve months apart to determine the extent of excision and to look for any recurrences [5].

Results

Ten individuals The age range of the six women and four men admitted to Kasr Al-Aini University Hospital was 17 to 55. Accompanied by sacral mass. The most prevalent presenting symptom (100%) was low back pain; 50% reported bilateral lower limb pain; 60% reported urine and stool incontinence; and 50% reported lower limb weakness [7].

Three patients required a modified Galveston approach for fixation because to sacroiliac joint injury and instability, as revealed by lumbosacral XRAY and CT scans. Seven patients had boney erosion.

A malignant mass involving the sacrum that extended to the pelvic cavity or a protruding posterior was seen on the MRI.

In four cases, lumbar laminectomy was performed to eliminate the tumor's expansion; in sex cases, the tumor had destroyed the sacrum and extended into the subcutaneous tissue. Post approach through multilevel sacral laminectomy in the prone position was utilized in all cases [9].

Tumor consistency can range from soft mucoid in chordomas to fibrous firm in giant cell tumors. In three cases, the dura was closed with a fat graft to stop CSF leakage, and as much of the sacral nerve roots as feasible were saved [3].

There are five cases of sacroiliac joint affection, but only two cases two in which the modified Galveston technique was used for fixation and a bone transplant was utilized for fusion show more than 50% affection. These two patients were instructed to remain on bed rest for three months. For a duration of three months, these two patients were rec-

ommended to remain in bed exclusively and walk with assistance until complete fusion occurred.

Two instances had giant cell tumors, two had aneurysmal bone cysts, two had chordomas, three had neurofibromas, and one had metastases.

Two chordoma instances received adjuvant radiation therapy; all cases did not recur after a one-year follow-up.

Three incidences of infection are treated with antibiotics and frequent dressing changes [8].

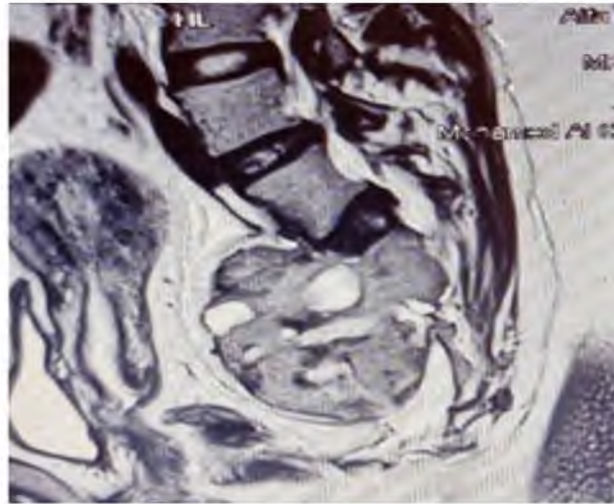


Fig. (1): Totally excising a giant cell tumor in a 26-year-old female and fixing it spinopelvic.

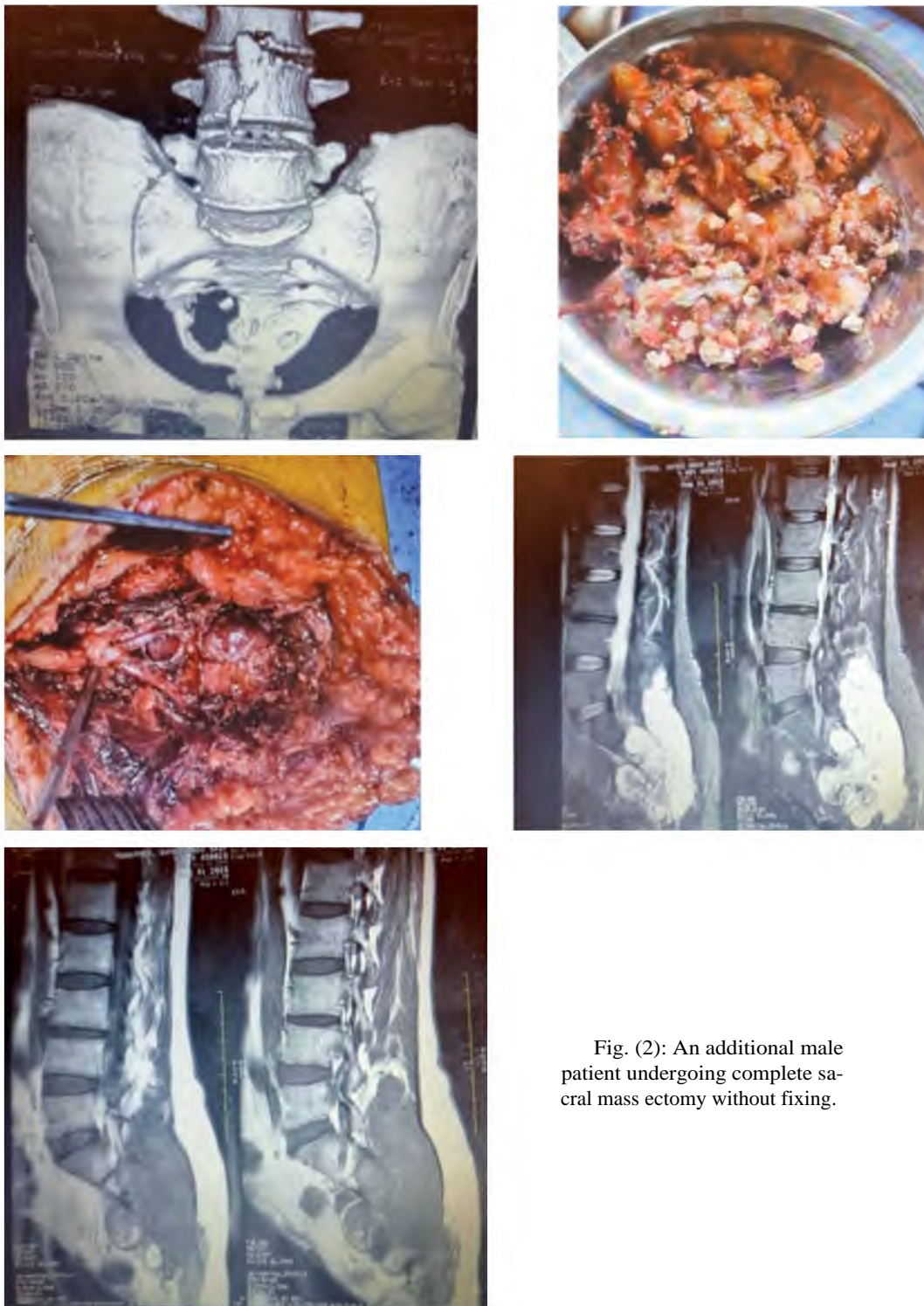


Fig. (2): An additional male patient undergoing complete sacral mass ectomy without fixing.

Discussion

Because the sacral canal is wide enough to accommodate a slowly developing tumor, sacral malignancies are rare and difficult to diagnose at first.

This investigation involved the diagnosis of several pathological lesions, such as aneurysmal bone cysts, chordomas, giant cell tumors, and neurofibro-

mas. In the Feldenzer et al series, which involved 9 cases involving sacral tumors, the pathological lesions included chordomas (22.2%) and schwannomas [9].

In the series by Feldenzer et al., which reviewed nine cases of sacral tumors, a range of pathological lesions were identified. These included aneurysmal bone cyst, chordoma, giant cell tumor, and neurofi-

broma. Specifically, the lesions were classified as follows: Chordoma, schwannoma, and metastatic renal cell carcinoma each accounted for 22.2% of the cases; neurofibroma and neurofibrosarcoma each represented 11.1%; and aneurysmal bone cyst also made up 11.1% [8].

Although the patient's age at diagnosis varied, chordomas appeared later in life than aneurysmal bone cysts.

Lumbosacral MRI, both with and without dye, was carried out in every instance since it is the preferred method of study because it clearly shows the tumor's contours and how it interacts with surrounding pelvic tissues.

It also provides information about the tumor's vascularity in particular. A lumbosacral CT scan and X-ray are also necessary to evaluate bone involvement.

Although several authors advised preoperative needle biopsy, we now know that it has little bearing on the surgical therapy of big lesions that result in neurological deficits.

Numerous writers advised preoperative embolization, particularly for highly vascular malignancies like giant cell tumors, but none of our cases involved this practice [11].

All of the cases were operated on using the post method. Some surgeons think that the amount of intrapelvic tumor, the patient's age, the size of the tumor's pathology, and the involvement of the sacroiliac joint all influence the technique that is used. In our investigation, we used the post-approach to eliminate everything [6].

The main challenge of the post approach was blood loss in highly vascular tumors because the main blood supply is anterior, but this issue may be resolved by preoperative embolization. It was simpler and more comfortable than the anterior route, and all cancers were completely removed with the exception of one giant cell tumor case.

A combined anterior and posterior approach is advised for large sacral tumors with a large presacral component, even though we utilized the posterior approach in every instance [5].

In the study by Feldenzer et al., total resection was achieved in 55.5% of cases (5 out of 9), while subtotal resection was performed in the remaining 44.5% (4 cases). In contrast, our series reported total resection in 90% of cases (9 out of 10), with subtotal resection occurring in one case of giant cell

tumor due to the inability to remove the extensive anterior component.

According to Feldnzer et al., the choice to remove the tumor was palliative because it was malignant in five cases (55.5%) and subtotal in four cases.

In two cases, the modified Galveston technique was employed to stabilize the sacroiliac joint due to over 50% destruction. Bone grafts were used to facilitate the fusion process. Postoperatively, these patients were instructed to remain in bed for four months to allow initial fusion, followed by walking with support for an additional two months until complete fusion was achieved. Routine X-rays were also scheduled to monitor progress [2].

Surgical management of sacral masses necessitates spinopelvic reconstruction and either partial or total sacrectomy. These procedures are particularly challenging due to their complexity and the specific skills required, which many spine surgeons may not be familiar with. The approach to surgery should be carefully tailored based on factors such as the patient's age, neurological status, overall health, and the size and extent of the tumor [1].

In cases where more than 50% of the sacroiliac joint is damaged, techniques such as the modified Galveston approach may be employed to stabilize the joint, and bone grafts are often used to promote fusion. Postoperative care is crucial and typically includes an initial period of bed rest followed by walking with support until complete fusion occurs, with routine X-rays to monitor progress [3].

Overall, successful treatment of sacral tumors relies on a thorough understanding of the surgical techniques involved and a personalized approach to each patient's condition.

Conclusion:

Spinopelvic reconstruction, along with partial or complete sacrectomy, is essential for the surgical treatment of sacral masses. Given that many spine surgeons may not be well-versed in these specific techniques, managing these tumors can be particularly challenging. The surgical approach should be customized based on the patient's age, neurological condition, over all health, and the size and extent of the tumor [1].

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