



Case Report

Metastatic small cell neuroendocrine tumor with spinal cord compression – Understanding a rare entity

Shailesh Hadgaonkar¹, Amogh Zawar², Anoop Patel¹, Ajay Kothari¹, Ashok Shyam¹, Parag Sancheti¹

¹Department of Orthopedics, Sancheti Institute of Orthopedics and Rehabilitation, Pune, Maharashtra, India, ²Department of Orthopedics, University of Dundee, Dundee, Scotland, United Kingdom.

E-mail: Shailesh Hadgaonkar - drshadgaonkar@gmail.com; *Amogh Zawar - aaz190391@gmail.com; Anoop Patel - dranooppatelgsvm@gmail.com; Ajay Kothari - drjaykothari@gmail.com; Ashok Shyam - drashokshyam@gmail.com; Parag Sancheti - parag@sanchetihospital.org



*Corresponding author:

Amogh Zawar,

Department of Orthopedics,
University of Dundee,
24, Ninewells residences,
Dundee - DD19SY, Scotland,
United Kingdom.

aaz190391@gmail.com

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ABSTRACT

Background: Metastatic spinal cord compression with carcinoid tumor as primary is a rare entity with its own diagnostic dilemmas and surgical challenges. Most of these neuroendocrine tumors arise from the gastrointestinal tract or lungs with metastasis to spine in <2% cases. Early diagnosis in an orderly manner is of significance as most of it is delayed due to slowly developing symptoms. Furthermore, prompt management has been an important factor as morbidity and mortality are high in such cases and surgical intervention if needed, which can be a challenge due to disturbed alignment, complex regional anatomy, and careful handling of spinal cord.

Case Description: The authors describe a case report on similar lines of a middle aged gentleman presenting with low back pain and weakness in both lower limbs which on further investigations revealed a pathological fracture causing spinal cord compression due to metastasis from small cell carcinoma in the lungs, managed with surgical intervention, and subsequently with radiotherapy.

Conclusion: Secondary metastatic deposits in the lumbar vertebrae due to carcinoid tumors in the lungs are a rare entity and can be difficult to diagnose and manage further. However, it should be included in the list of differential diagnosis. The case report emphasizes on using investigative modalities such as PET-CT scan to aid an early diagnosis and plan further treatment plan as early as possible to offer a better quality of life to the patients.

Keywords: Carcinoid tumors, Lumbar spine, Metastasis, Spinal cord compression

INTRODUCTION

Carcinoid tumors are neoplasms arising from neuroendocrine enterochromaffin cells with an overall incidence of 1–2 in 100,000.^[6] The most frequent primary sources of these lesions include the gastrointestinal system and lungs. Common sites for metastases include liver, lymph nodes, and lungs.^[3] Bony metastases are infrequent (10%), and those going to the spine are even more rare.^[8] Here, we report a 49-year-old male who presented with spinal cord compression attributed to a metastatic carcinoid tumor warranting lumbar surgical intervention.

CASE REPORT

A 49-year-old male presented with 2 months of low back pain (VAS score 8), and the recent onset of paraparesis (ODI score 80). On examination, he had bilateral quadriceps weakness (3/5) and

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a bilateral foot drop (0/5), diminished patellar and Achilles responses (1+), and decreased pain appreciation in the L3–L5 distributions.

Diagnostic studies

The plain lumbosacral radiographs showed a L3 compression fracture (50% loss of height) [Figure 1]. The magnetic resonance imaging (MRI) documented marrow signal changes involving multiple lumbar vertebral bodies, pedicles, and spinous processes along with L3 body retropulsion, and an epidural soft-tissue mass compressing the cauda equina at the L3 level [Figure 2]. The fluoro-2-deoxy D-glucose (FDG) positron emission-computerized tomography (PET-CT) confirmed multiple FDG avid lytic lumbar lesions [Figure 3]. The tumor marker study was also positive for carcinoembryonic antigen (CEA).

Surgery

The patient underwent a L3 corpectomy with mesh cage placement, followed by a L1–L5 laminectomy with pedicle screw/rod fixation. On removing the L2–L4 lamina, a grayish-white mass was observed compressing the spinal cord [Figure 4].

Pathology

Immunohistochemistry (IHC) studies were consistent with metastatic deposits of small cell (neuroendocrine) carcinoma. They were positive for cytokeratin, CD56, and synaptophysin markers with MIB-1 proliferation index of 70%, all consistent with metastatic carcinoid disease [Figure 5].

Adjunctive therapy

Postoperatively, with the diagnosis of an original primary lung carcinoid tumor with multilevel spinal metastases, the patient underwent adjunctive radiation therapy to the lumbar spine and pelvis (e.g., using six MV photons, using a total dose of 20Gy in five fractions).

Follow-up

Six weeks following surgery, the patient was able to ambulate with a walker [Table 1]. The 3-month postoperative CT scan confirmed adequate anterior/posterior lumbar fusion [Figure 6].

DISCUSSION

Frequency, clinical findings, and diagnostic delays

Carcinoid tumors are slow-growing malignancies; bony metastases to the spine occur in about 2% of patients and

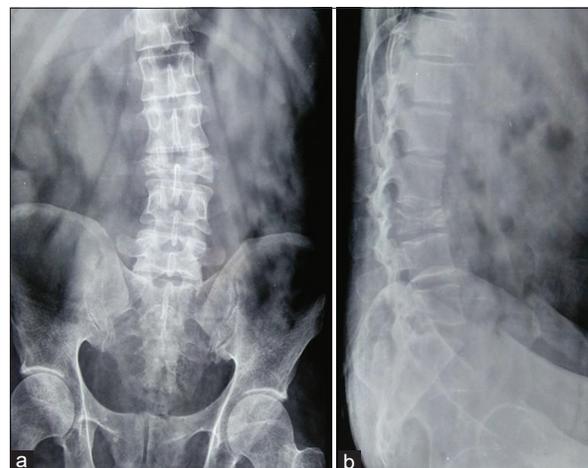


Figure 1: Preoperative plain radiograph of lumbar spine in (a) anteroposterior and (b) lateral views revealing compression fracture of L3 vertebral body with loss of height.

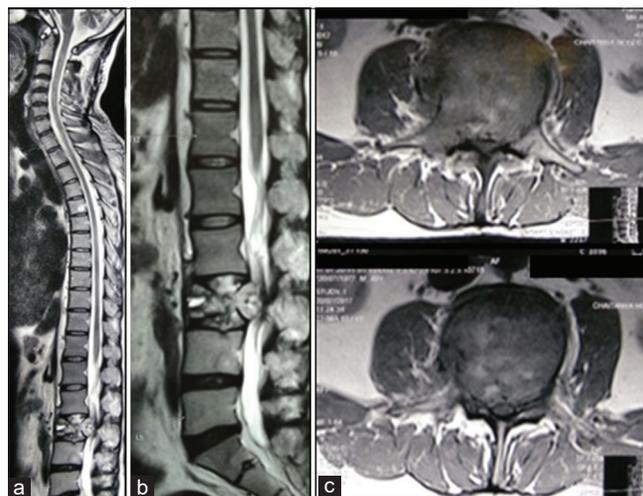


Figure 2: Magnetic resonance imaging scan showing (a) screening of whole spine, (b) sagittal, and (c) axial cut sections revealing retropulsed segment of L3 vertebral body causing spinal cord compression.

most commonly involve the thoracic vertebrae (40%).^[1] Hori *et al.*^[4] observed that these patients typically present with mild back pain. Often, there are significant delays in diagnosing spinal metastatic carcinoid lesions.

X-ray/bone scan/PET-CT findings

Plain radiographs and MRI, along with bone scintigraphy, octreotide scintigraphy, and PET-CT facilitate the staging of metastatic carcinoid to the spine and pelvis. Although most skeletal carcinoid metastases in the literature were osteoblastic,^[2,4,8] the lesions in this case were osteolytic (e.g., readily seen on the FDG PET-CT scan).

Table 1: Neurological recovery chart of the patient along with VAS and ODI scores.

Duration	Right				LEFT				VAS	ODI
	Motor ^a		Sensory (%) ^b		Motor ^a		Sensory (%) ^b			
	L3-4	L5-S1	L3-4	L5-S1	L3-4	L5-S1	L3-4	L5-S1		
Preoperative	1	0	80	80	1	0	80	80	8	72
2 weeks	3	0	50	50	3	0	50	50	4	42
6 weeks	4	1	20	20	4	1	20	20	2	25
3 months	4	1	20	20	4	1	20	20	2	25

VAS: Visual analog score, ODI: Oswestry disability index, ^aMotor power grading as per MRC guidelines, ^bPercentage reduction of sensation. 100% = No sensation, 0% = Normal

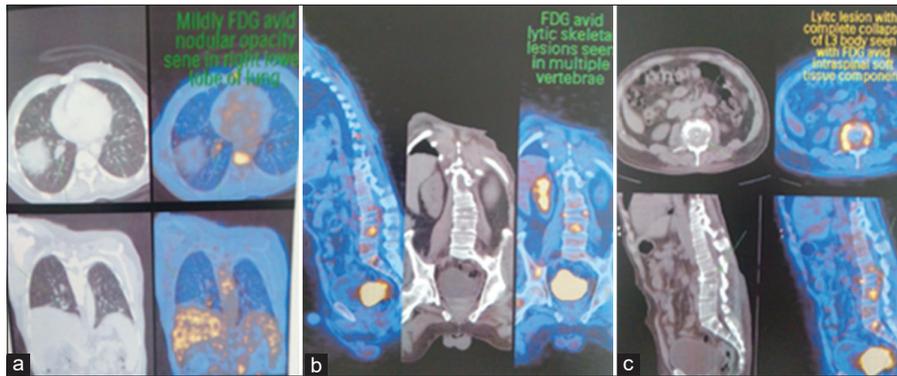


Figure 3: Fluoro-2-deoxy D-glucose positron emission-computerized tomography scan showing (a) primary lesion in the lungs, (b) and (c) multiple lytic lesions in the lumbar spine and pelvis.

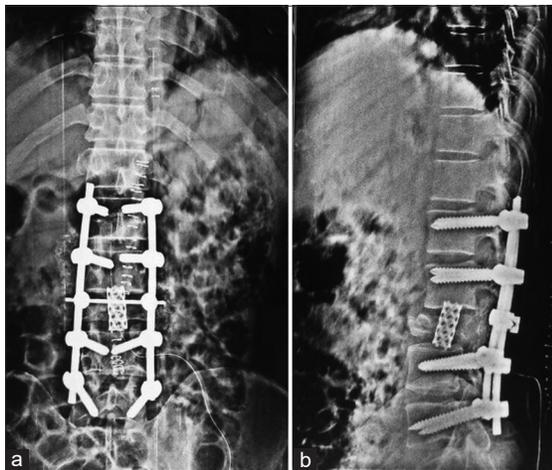


Figure 4: Postoperative radiograph revealing posterior instrumented stabilization with pedicle screws and rods with mesh cage at L3 level after performing corpectomy in (a) anteroposterior and (b) lateral views.

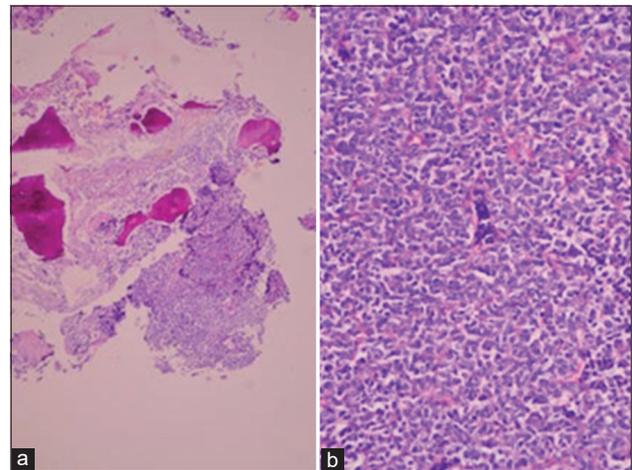


Figure 5: Histological study slide as seen under light microscopy (a) showing characteristic tumor cells with small size, scanty cytoplasm and (b) round to fusiform shape and absent or inconspicuous nucleoli representing small cell neuroendocrine tumor.

Patient survival and adjuvant radiotherapy

Patient survival varies from few weeks to up to 2 years. Radiotherapy is an important palliative treatment.^[3] Surgery typically improves the quality of life, by reducing pain, and

spinal cord compression.^[5] Tanabe *et al.*^[7] used both surgery and radiotherapy in their case report, noting that the efficacy of systemic chemotherapy was limited.

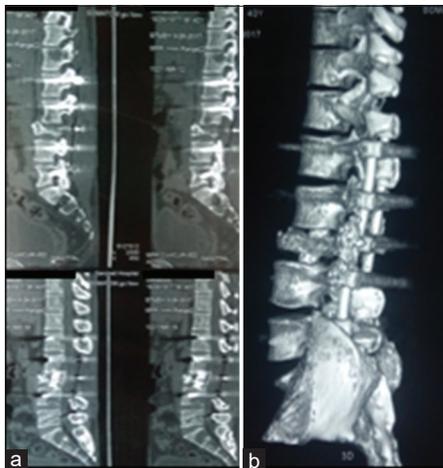


Figure 6: A sequential sagittal (a) computed tomography scan imaging study at 3 months after surgery revealing implants and cage *in situ* with no retropulsion. A three-dimensional image (b) confirming the same findings.

CONCLUSION

MR and PET-CT studies best document carcinoid metastases to the spine. Avoiding diagnostic delays and opting for early spinal/neural decompression and/or appropriate utilization of adjuvant radiation therapy achieve the best outcomes.

Declaration of patient consent

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

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Conflicts of interest

There are no conflicts of interest.

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