

## Case Report

# Intra medullary Spinal Cord Metastasis from Carcinoma Breast treated with Palliative Radiotherapy– A Report of Four Cases

A. Sasidharan, T. Wadasadawala<sup>1\*</sup>

<sup>1</sup>Department of Radiation Oncology, Tata Memorial Centre, Mumbai, India

## Abstract

### Reason

We report a series of 4 cases of intramedullary spinal cord metastasis (IMSCM) from breast cancer. It is a rare diagnosis, but increasingly detected now as the use of magnetic resonance imaging for evaluation of spinal metastases has become more common.

### Methods

Cases who presented with clinico-radiological features suggestive of an intramedullary spinal cord metastasis have been reported here. Most patients presented with pain and neurological deficit. Palliative radiotherapy with doses ranging from 12 Gy/2#/weekly once to 30 Gy/10#/2 weeks daily were given to these patients along with corticosteroids. All patients received systemic chemotherapy either prior or subsequent to development of IMSCM.

### Results

Three cases were Her 2 + and one was triple negative breast cancer. Mean age of the patients was 53.3 years. One had cervical cord metastasis and the rest had thoracic cord metastasis. Three patients had prior or concurrent brain metastasis. Two patients were still alive with 9 and 12 months follow up. Three patients were non ambulatory at diagnosis, one was ambulatory with assistance. Symptomatic improvement in pain or numbness was present in all cases. But there was no significant change in motor power leading to change in status of ambulation.

### Conclusion

IMSCM from breast cancer presents with rapid onset neurological deficit and results in poor survival. There seems association of IMSCM with negative hormonal receptor and positive Her2. Early diagnosis using MRI and institution of palliative radiotherapy is likely to give symptomatic benefit in pain and numbness.

**Keywords:** Intramedullary; Breast Cancer; Spinal Cord; Metastases; Radiotherapy

### Introduction

Malignant metastatic involvement of the spinal cord is usually observed secondary to vertebral collapse or leptomeningeal involvement. Intra-spinal or Intra-medullary metastasis is observed very rarely and most cases have been observed in patients with advanced lung cancers. However breast cancer

is the second most common primary cancer resulting in intramedullary spinal cord metastasis (IMSCM) [1]. This can present either denovo or as a recurrent lesion within the previous radiotherapy portal given for vertebral metastases. Till now less than 100 cases of IMSCM from breast cancer have been reported in the published literature [1-4]. Most of the patients present with rapid onset of neurological deficit. Given the poor prognosis, early recognition and institution of appropriate palliative treatment becomes important. The increase in use of magnetic resonance imaging (MRI) has contributed to increase in detection of intramedullary spinal cord metastasis. Microsurgical resection of these tumors may provide symptomatic benefit but no significant change in ambulation status or survival benefit has been reported [5-7]. We report a case series of four consecutive patients of breast cancer diagnosed with IMSCM at our institute.

### Cases

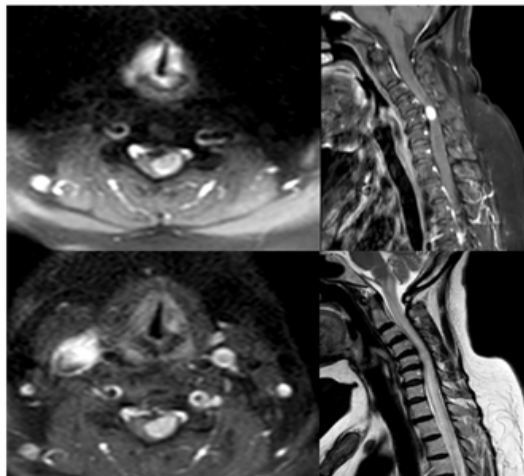
Case 1: 55 year old lady with hormone receptor negative and Her2 positive breast cancer with liver, nodal and skeletal metastasis, receiving palliative chemotherapy, presented with three months history of pain in upper back, numbness in both hands and imbalance while walking. She had diminished power in her left hand (4/5). MRI of brain and spine showed intramedullary lesion at C4-5 level with spinal cord edema extending from cervicomedullary junction till D5 and multiple ring enhancing lesions scattered in brain parenchyma with perilesional edema (**Figure 1**). She received 12 Gy in 2 fractions weekly once to whole brain and two fractions of 8 Gy and 6 Gy weekly to the intramedullary metastasis. Due to logistic constraints and long standing neurological deficit, weekly

**\*Corresponding author:** Tabassum Wadasadawala, Associate Professor, ACTREC, Tata Memorial Centre, Mumbai - 410210, Tel: +91-22-27405079; Email ID: twadasadawala@actrec.gov.in, drtabassum2004@rediffmail.com

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**Figure 1:** Clockwise from top left: T1 + C axial MR image showing hyperintense well defined intramedullary spinal cord lesion; Sagittal view of T1 + Contrast MR image showing lesion at C4-5 level; Sagittal view of T2\_TSE MR image showing spinal cord edema from cervicomedullary junction till D5; Axial view of T1+C Fat suppressed MR image.

fractionation was employed. There was 25% reduction in pain with no neurological improvement and patient died within 2 months of palliative radiotherapy. Overall survival was 37 months.

#### Case 2

51 year old lady with hormone receptor negative and Her2 positive locally advanced breast cancer, diagnosed in 2012 and treated with 4 cycles of adriamycin/cyclophosphamide followed by modified radical mastectomy and 4 cycles of paclitaxel, presented with bladder and bowel incontinence, lower limb weakness (right side power 1/5 and left side 3/5) and numbness since 10 days in 2013. She was diagnosed to have cerebellar metastasis along with paratracheal and internal mammary nodes. She underwent metastectomy for the cerebellar metastasis followed by whole brain radiotherapy and systemic chemotherapy with capecitabine and lapatinib. Patient was ambulatory and sensori-motor deficit had improved. In 2015 she again presented with bilateral lower limb weakness (power – 1/5) and decreased sensation. Bladder sensations were intact. MRI Spine showed nodular cord lesion with post contrast enhancement at D9 vertebral level and long segment of cord edema at D4-5 level. She received palliative radiotherapy to a dose of 30 Gy in 10 fractions to the dorsal spine (D8-11). Patient had improvement in numbness post radiotherapy. There was slight improvement in motor power but patient did not become ambulatory. Patient is alive with a post radiotherapy follow up of 12 months. Overall survival is 48 months.

#### Case 3

52 year old lady with hormone receptor negative and Her2 positive metastatic breast cancer who had presented with history of lump in her breast since 6 months, progressive paraplegia since 1 week and urinary retention since 1 day. On evaluation she was found to have visceral and skeletal metastases. MRI showed a well defined enhancing nodular lesion within the thoracic spinal cord



**Figure 2:** T1 + C sagittal MR image showing hyperintense well defined intramedullary spinal cord lesion at D10 – D11 level.

at D10-D11 vertebral body level showing moderate post contrast enhancement and also multiple brain metastases (Figure 2). She received palliative radiotherapy to a dose of 30 Gy in 10 fractions, but had no neurological improvement and she died 1 month post radiotherapy. Overall survival was only 1 month

#### Case 4

56 year old lady, with triple negative breast cancer with nodal and skeletal metastases, presented with lower back ache and spinal tenderness and inability to walk due to pain in lower back. On evaluation with MRI spine intramedullary spinal cord lesion was identified at D4-D6 vertebral body level and multiple bone metastases and impending spinal cord compression at L1. She received palliative radiotherapy to a dose of 20 Gy in 5 fractions to the spine and pelvis. There was significant reduction in pain as well as ambulation post radiotherapy. She subsequently underwent palliative chemotherapy with epirubicin and cyclophosphamide. Overall Survival is 9 months.

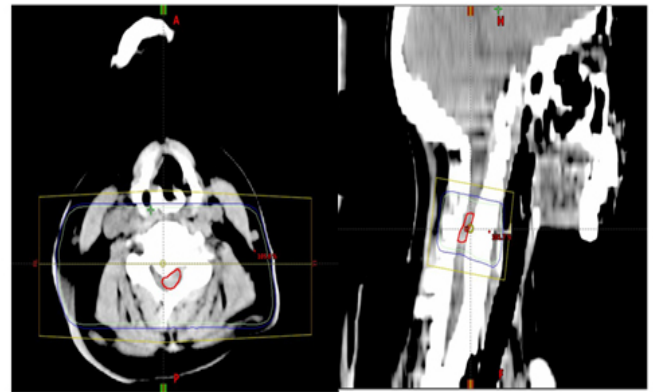
#### Discussion

Intramedullary metastasis from breast cancer is seen as distinct nodular enhancing lesions on T1 contrast MRI scan. Cord edema is seen around the lesions in T2 weighted images. Rapid progression of symptoms distinguishes them from primary intramedullary tumors, which typically present with a slower progression of symptoms[6]. The cervical and the thoracic cord are the most common sites (40% each) followed by the lumbar cord (20%). The median survival ranging from 4-22 months has been reported in literature. Patients undergoing surgical debulking are associated with better survival (6.3 months vs 4.1 months) [6]. But no significant improvement in power is achieved leading to ambulation. In this case series, three of the cases had Her 2 positive cancer and either concurrent or prior brain metastasis. Two patients had relatively longer survival. Biopsy was not taken to confirm intramedullary metastasis as it was considered unethical to take biopsy from the spinal lesion in the presence of other metastases. CSF cytology was not obtained as unlike leptomeningeal metastasis CSF cytology is rarely positive in IMSCM [1]. There is no evidence on the benefit of using craniospinal irradiation or intrathecal methotrexate for

intramedullary spinal cord tumors..

Chest X-ray, ultrasound of abdomen and pelvis and bone scintigraphy was used for metastatic workup in these patients. Due to financial constraints, an ultrasound was done instead of computerized tomography scan. Supplementary to bone scan, MRI is routinely recommended and used as an imaging modality for assessment of complicated spinal lesions. MRI of the spine is the most accurate imaging for confirmation of intramedullary spinal cord metastasis [8]. PET scan on the other hand is not the first modality to be used according to international recommendations. Moreover, since PET scan is an expensive imaging modality, it is usually reserved for cases where the findings from conventional imaging are equivocal or conflicting.

All patients received corticosteroids in the form of moderate doses of dexamethasone (24 mg daily and tapered doses) and were on some form of systemic chemotherapy. Palliative radiotherapy was given using 1.25 MV or 6 MV photons with conventional portals (bilateral portals for cervical lesions and single posterior for thoracic and lumbar lesions) covering the tumor with adequate margin including one vertebra above and below the level of the lesion (Figure 3). As there are no strong guidelines on the target volume to be treated for IMSCM, these are usually treated as per recommendations for vertebral metastases. Immobilization was done using thermoplastic mask, and CT scan was taken for radiotherapy planning. Diagnostic MRI was used and the lesion was delineated in the planning CT scan. The planning aim was to adequately cover the lesion with 95% isodose. The dose-fractionation used depended on the performance status, duration of neurological deficit, the extent of metastasis at other sites and the feasibility of the patient to come for fractionated daily treatment. Advanced techniques like stereotactic radiotherapy can be employed in cases of re-irradiation [14]. Palliative radiotherapy delivered within adequate time from the onset of symptoms, leads to improvement in pain and numbness to a greater extent with partial recovery of the neurological deficit. Ambulatory status post



**Figure 3:** Radiotherapy portals encompassing the intramedullary lesion with adequate margin covering one vertebral level above and below the lesion

treatment had improved only in Case 4 where the lady had no neurological deficit at presentation. She had difficulty in walking due to severe pain. As shown in Table 1, survival ranging from 1 – 22 months post radiological diagnosis of intramedullary metastasis from breast cancer has been reported.

### Conclusion

IMSCM in breast cancer is very rare and likely to occur in hormone receptor negative and Her 2 positive cases. It is associated with rapid onset neurological deficit, pre-existing or concurrent brain metastases and poor prognosis. MRI spine is diagnostic with lesions seen as distinct well defined and enhancing nodules with surrounding edema. Palliative radiotherapy along with corticosteroids provides symptomatic relief in pain and numbness, but with less improvement in motor deficit. Change in ambulation status of the patient depends on motor deficit at presentation.

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Department of Radiation Oncology, Tata Memorial Centre.

**Table 1:** Review of literature on IMSCM from breast cancer

Study	No of breast cancer patients	Mean age (years)	Location	No associated with brain metastases	Survival (months)	Treatment
Current case series	4 /4	53.5	C5 – D11	1/4	1 – 12	Radiotherapy
Wilson D et al, 2012 [9]	4/9	56	C5 – D12	No	0.5 – 5	Surgery
Hashii H et al, 2011 [10]	6 /18	50.2	NA	6/12	0.5 – 11	Radiotherapy
Lee S et al, 2007 [11]	6 /12	51.5	NA	6/18	0.8 – 18.4	Radiotherapy
Crasto S et al, 1997 [12]	7 /18	54	C, T, L	NA	NA	NA
Schiff D et al, 1996 [13]	5 /40	NA	NA	22 /40	4	Radiotherapy / Surgery

C: Cervical, T: Thoracic, L: Lumbar

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