



## Analysis of Quality of Life in Patients after Stabilization of Metastatic Vertebral Fractures

<sup>1</sup> Bikram Keshari Kar, <sup>2</sup> Anand Kumar Singh, <sup>3</sup> Rudra Narayan Dash

<sup>1</sup> Associate Professor, <sup>2</sup> Senior Resident, <sup>3</sup> Junior Resident

Department of Orthopaedics, All India Institute of Medical Sciences (AIIMS), Raipur

**\*Corresponding Author:**

**Anand Kumar Singh**

Department of Orthopaedics, All India Institute of Medical Sciences (AIIMS), Raipur

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

### Abstract

**Introduction:** Spine is the commonest site of bone metastasis. Spine metastases can reduce quality of life from excruciating back pain requiring high doses of analgesics, pathological bone fracture, instability, spinal cord compression, paraplegia and hypocalcaemia. Considering the fact that surgery cannot be curative, the goal for the surgeon is to stabilize the spine thus preventing further complications, early mobilization and provide a pain free life to the patient without causing significant morbidity.

**Methods:** This study was a prospective review of 17 cases of metastatic disease of spine operated in our institute. Preoperatively the following data were collected: demographic details, primary malignancy, and site of metastasis to spine, visual analogue scale (VAS) for pain and FACT-G score. The patients were followed up at 1 week, 1 month, 6 months and 1 year following surgery.

**Results:** Among the 17 patients, we had 11 females and 6 males. Mean age was 48 years (range 36-72). Significant pain relief was reported by all patients in all the follow up visits.

There was improvement in all domains of FACT-G score in follow up visits as compared to preoperative values. There were no post-operative complications encountered in any of the patients. All of our patients were alive at 1 year follow up.

**Conclusions:** In selected patients of spinal metastasis palliative surgery provides immediate improvement in pain relief and functional results in the form of improved quality of life scores that are sustained for up to the one year follow up period.

**Keywords:** spine; metastasis; quality of life; decompression; stabilization.

### Introduction:

Spine is the commonest site of bone metastasis. The most common primary malignancies metastasizing to the spine include the breast, lung, prostate, renal, GI and thyroid carcinoma<sup>1,2</sup>.

With the significant advances in medical oncology there has been substantial improvement in diagnosis and treatment of cancers resulting in increased survival of patients with spinal metastasis. Spine metastases can reduce quality of life from excruciating back pain

requiring high doses of analgesics, pathological bone fracture, instability, spinal cord compression, paraplegia and hypocalcaemia<sup>3</sup>.

Radiotherapy has been advocated as the standard treatment for spinal metastases<sup>4,5</sup>, but the prolonged immobilization associated with conservative management has its own complications including pressure sores, pulmonary complications having a negative impact on the overall quality of life.

Considering the fact that surgery cannot be curative, the goal for the surgeon is to stabilize the spine thus preventing further complications, early mobilization and provide a pain free life to the patient without causing significant morbidity.

Recently health-related quality of life measures have been increasingly used in the management of malignancies<sup>6</sup>. These measures can help decide the best treatment modality, compare between surgical and nonsurgical treatment options and during follow up. Some of the commonly used quality of life measures in cases of spinal metastases are FACT-G, University of Wisconsin-Quality of Life) UW-QOL, European Organisation for Research and Treatment of Cancer-Quality of Life Quotient (EORTC QLQ-C30), EQ-5D<sup>7</sup>.

Here we report a series of cases of metastatic spine disease treated with surgery. We have used the FACT-G questionnaire for quality of life assessment for its simple language and scoring system.

### Materials and methods:

This study was a prospective review of 17 cases of metastatic disease of spine operated in our institute. All the patients gave informed consent for the study.

#### Inclusion and exclusion criteria

All patients of metastatic spine disease operated in our institute with age >18 years, with no previous spinal surgery and no clinical and radiological signs of infection were included in the study. Patients with age <18 years, primary bone tumours and those with contraindications to surgical stabilisation were excluded.

#### Data collection

Preoperatively the following data were collected: demographic details, primary malignancy, and site of metastasis to spine, visual analogue scale (VAS) for pain and FACT-G score. All patients received postoperative chemotherapy as well as radiotherapy according to the treatment guideline for their primary malignancy. The patients were followed up at 1 week, 1 month, 6 months and 1 year following surgery. Postoperatively the following data were collected: VAS score for pain, FACT-G score and data regarding complications of surgery and death.

#### Surgical procedure

All patients underwent posterior stabilisation surgery with or without decompression. 12 patients had long segment pedicle screw fixation whereas 5 patients had short segment fixation. No anterior segment procedure was carried out in any of the cases.

### Results:

Among the 17 patients, we had 11 females and 6 males (Figure 1). Mean age was 48 years (range 36-72). 8 patients had breast carcinoma, 4 had thyroid malignancy, 3 had lung carcinoma and 2 had prostate carcinoma (Figure- 2). 12 patients had thoracic metastasis while 6 had lumbar metastasis (Figure-3).

All patients had moderate to severe pain preoperatively (mean VAS score for pain 7.8). Significant pain relief was reported by all patients in all the follow up visits. The mean postoperative VAS score at 1 week, 1 month, 6 months and 1 year were 4.6, 2.8, 2.4 and 2.5 respectively (Figure-4).

Quality of life was assessed preoperatively as well as at each follow up through the FACT-G scoring system. There was improvement in all domains of FACT-G score in follow up visits as compared to preoperative values (Figure-5) (Table-1).

There were no post-operative complications encountered in any of the patients. All of our patients were alive at 1 year follow up.

### Discussion:

The incidence of skeletal metastases is as high as 70% in autopsies of cancer patients, and the spine is the most common site of bony metastases.<sup>8,9</sup>

Most patients with spinal metastases present with spinal instability and back pain due to pathological fracture(s).<sup>10,11</sup>

Approximately 5% to 10% of these patients present with spinal cord compression resulting in neurological deficit.<sup>12,13</sup>

Both instability related pain and neurological deficit can significantly affect quality of life.<sup>14</sup>

Patients are likely to be bed bound because of intractable pain and neurological deficits. Immobilization in bed can lead to complications, including orthostatic pneumonia, pressure sores, urinary tract infection, thromboembolism, and joint contractures.<sup>15,16</sup>

The treatment of spinal metastases is usually palliative, aiming to provide pain relief, maintenance or recovery of neurological function, local durable tumour control, spinal stability, and improved quality of life,<sup>17, 18</sup> although in rare cases, patients who present with isolated spinal metastases at an early stage may be treated with radical resection.

Metastasis to spine is among the dreaded complication of common malignancies. Severe pain, decreased mobility and possibility of neurological compression are some of the problems associated with spine metastasis. Management of such conditions is often a multidisciplinary affair with treatment of primary malignancy taking centre stage. Chemotherapy, radiotherapy, curative as well as palliative surgery in different combinations are employed in management of spine metastasis.

Palliative surgery in form of posterior stabilisation with pedicle screws for thoracic and lumbar metastases has advantages such as decreased pain, early ambulation and prevention of catastrophic neurological complications<sup>3</sup>. But before planning for surgery general condition of patient, stage of primary malignancy and expected survival needs to be kept in mind. Complications such as surgical site infection, screw loosening and back out are also needed to be considered<sup>19</sup>. Some studies have reported increase in life expectancy following palliative surgery but such results have not been reproduced by majority of literature<sup>20</sup>.

The use of quality of life indices in preoperative as well as postoperative evaluation of patients of malignancies has increased in recent years<sup>6</sup>. As the aim of cancer treatment shifts from achieving maximum possible survival rate towards more

functional results, the use of quality of life indices to assess patients, to compare results of different modalities of treatment and even to set goals of treatment itself makes more sense.

In our study we had operated 17 cases of spine metastasis. We did not encounter any surgical complications and none of our patients died within the 1 year follow up period. All patients had significant improvement in VAS score for pain in postoperative period which was maintained till the last follow up.

We also evaluated all patients using the FACT-G scoring system as a quality of life index. All patients showed improvement in all 4 domains of FACT-G score in post-operative period. Our results are comparable with Quan et al and Wu et al who also reported improved VAS score as well as quality of life index scores following palliative spine surgery<sup>21</sup>.

Some of the limitations of our study include the small number of patients, heterogeneity of primary cancer and lack of a control group of non-surgically treated patients for comparative analysis.

### Conclusion:

In selected patients of spinal metastasis palliative surgery provides immediate improvement in pain relief and functional results in the form of improved quality of life scores that are sustained for up to the one year follow up period. Quality of life indices such as FACT-G can be used to document outcomes of palliative surgery in such cases. This strategy provided rapidly improved functional outcome with a low risk of complications. Use of a multidisciplinary approach can improve quality of life for fragile patients with spinal metastases.

### References:

1. Wong DA, Fornasier VL, MacNab I. Spinal metastases: the obvious, the occult, and the impostors. *Spine*. 1990 Jan;15(1):1-4.
2. Cancer Statistics, 2009 - Jemal - 2009 - CA: A Cancer Journal for Clinicians - Wiley Online Library [Internet]. [cited 2021 Nov 23]. Available from: <https://acsjournals.onlinelibrary.wiley.com/doi/full/10.3322/caac.20006>
3. Surgery improves pain, function and quality of life in patients with spinal metastases: a prospective study on 118 patients [Internet]. [cited 2021 Nov 23]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3207332/>
4. Kocialkowski A, Webb JK. Metastatic spinal tumours: survival after surgery. *Eur Spine J*. 1992 Jun 1;1(1):43-8.
5. Systematic Review of the Diagnosis and Management of Malignant Extradural Spinal Cord Compression: The Cancer Care Ontario

- Practice Guidelines Initiative's Neuro-Oncology Disease Site Group | Journal of Clinical Oncology [Internet]. [cited 2021 Nov 23]. Available from: <https://ascopubs.org/doi/10.1200/JCO.2005.00.067>
6. Patient-reported Outcomes in Cancer: A Review of Recent Research and Policy Initiatives - Lipscomb - 2007 - CA: A Cancer Journal for Clinicians - Wiley Online Library [Internet]. [cited 2021 Nov 23]. Available from: <https://acsjournals.onlinelibrary.wiley.com/doi/full/10.3322/CA.57.5.278>
  7. Singh D. Quality of Life in Cancer Patients Receiving Palliative Care. *Indian J Palliat Care*. 2010 Feb 27;16:36–43.
  8. Coleman RE: Clinical features of metastatic bone disease and risk of skeletal morbidity. *Clin Cancer Res* 12:6243s– 6249s, 2006
  9. Hatrick NC, Lucas JD, Timothy AR, Smith MA: The surgical treatment of metastatic disease of the spine. *Radiother Oncol* 56:335–339, 2000
  10. Gilbert RW, Kim JH, Posner JB: Epidural spinal cord compression from metastatic tumor: diagnosis and treatment. *Ann Neurol* 3:40–51, 1978
  11. Helweg-Larsen S, Sørensen PS: Symptoms and signs in metastatic spinal cord compression: a study of progression from first symptom until diagnosis in 153 patients. *Eur J Cancer* 30A (3 30A):396–398, 1994
  12. Jacobs WB, Perrin RG: Evaluation and treatment of spinal metastases: an overview. *Neurosurg Focus* 11(6):e10, 2001
  13. Schiff D, O'Neill BP, Suman VJ: Spinal epidural metastasis as the initial manifestation of malignancy: clinical features and diagnostic approach. *Neurology* 49:452–456, 1997
  14. Tomita K, Kawahara N, Kobayashi T, Yoshida A, Murakami H, Akamaru T: Surgical strategy for spinal metastases. *Spine (Phila Pa 1976)* 26:298–306, 2001
  15. Detmar SB, Muller MJ, Schornagel JH, Wever LDV, Aaronson NK: Health-related quality-of-life assessments and patient-physician communication: a randomized controlled trial. *JAMA* 288:3027–3034, 2002
  16. Dittmer DK, Teasell R: Complications of immobilization and bed rest. Part 1: Musculoskeletal and cardiovascular complications. *Can Fam Physician Médecin Fam Can* 39:1428– 1432, 1435–1437, 1993
  17. Choi D, Crockard A, Bungler C, Harms J, Kawahara N, Mazel C, et al: Review of metastatic spine tumour classification and indications for surgery: the consensus statement of the Global Spine Tumour Study Group. *Eur Spine J* 19:215–222, 2010
  18. Kim CH, Chung CK, Sohn S, Lee S, Park SB: Less invasive palliative surgery for spinal metastases. *J Surg Oncol* 108:499–503, 2013
  19. Dunning EC, Butler JS, Morris S. Complications in the management of metastatic spinal disease. *World J Orthop*. 2012 Aug 18;3(8):114–21.
  20. Patchell RA, Tibbs PA, Regine WF, Payne R, Saris S, Kryscio RJ, et al. Direct decompressive surgical resection in the treatment of spinal cord compression caused by metastatic cancer: a randomised trial. *The Lancet*. 2005 Aug 20;366(9486):643–8.
  21. Health-related quality of life in patients with spinal metastases treated with or without spinal surgery - Wu - 2010 - Cancer - Wiley Online Library [Internet]. [cited 2021 Nov 23]. Available from: <https://acsjournals.onlinelibrary.wiley.com/doi/full/10.1002/cncr.25126>

FACT-G Domain	Physical wellbeing	Social wellbeing	Emotional wellbeing	Functional wellbeing	Total FACT-G score
Preoperative	10	13	9	12	44
1 week	10	14	13	15	52
1 month	16	18	18	20	72
6 month	17	18	20	21	76
1 year	17	17	20	20	74

Table-1: FACT-G Score At Follow Up

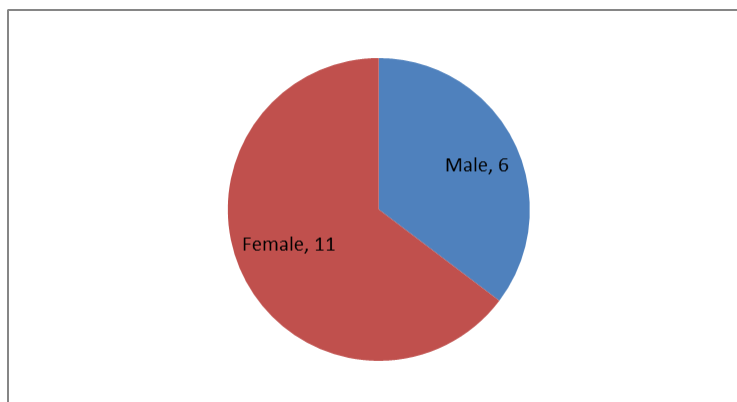


Figure-1: pie chart showing sex ratio

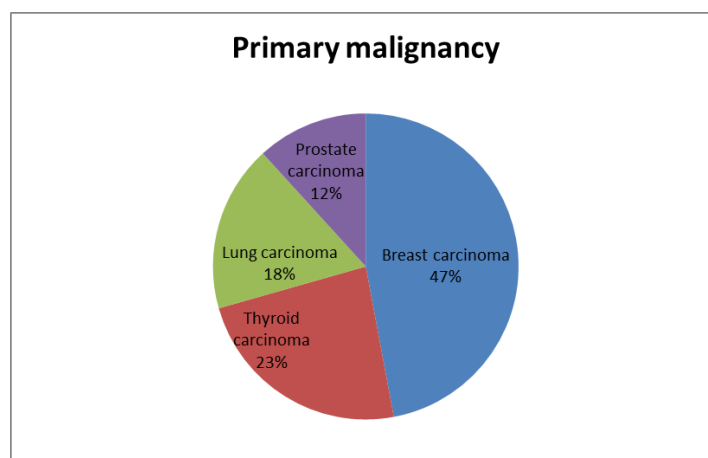


Figure-2: pie chart showing site of primary tumour

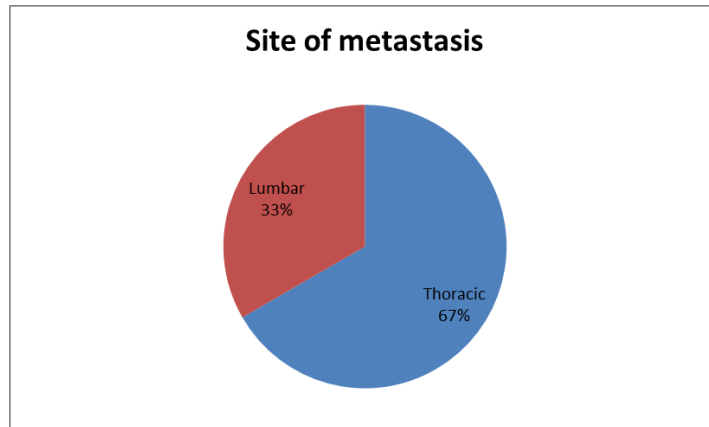


Figure-3: pie chart showing site of metastasis in spine

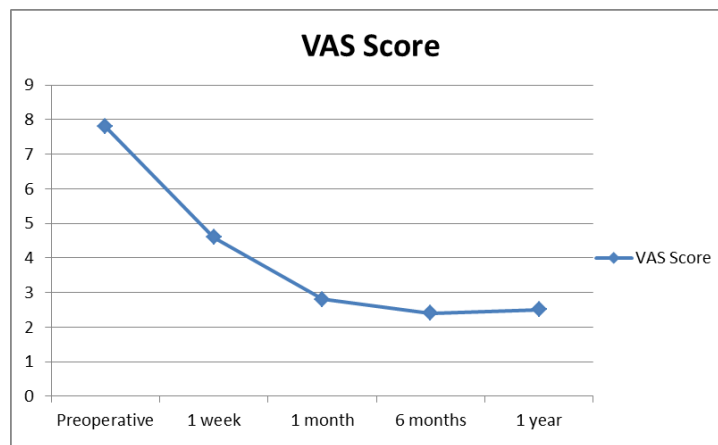


Figure-4: VAS score at follow up

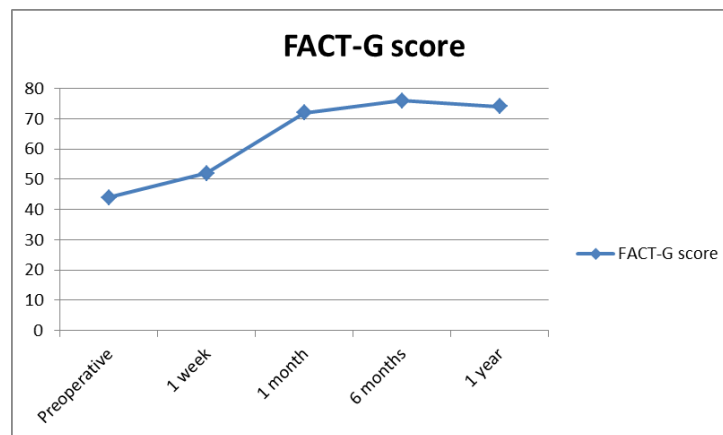
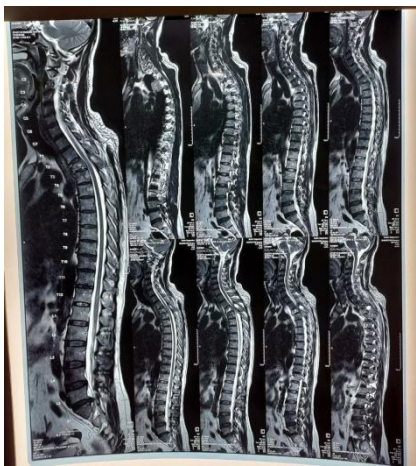


Figure-5: Fact-G Score at follow up

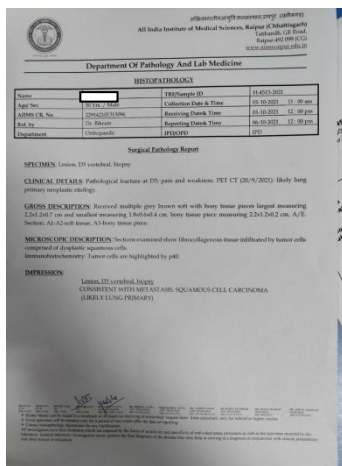


**Case-1:**

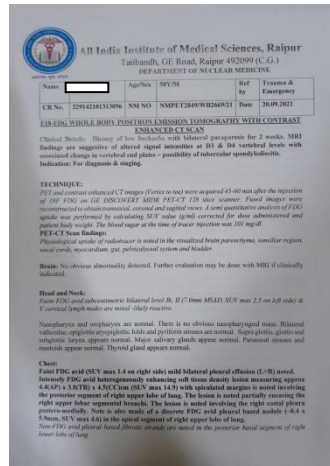
50 years/male patient having primary Lung Carcinoma with D3 metastasis operated with decompression and fixation.



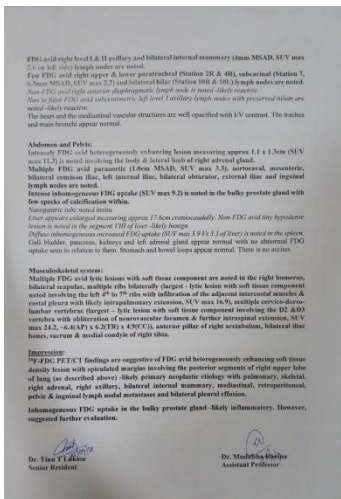
1



2



3



4



5



6

1- MRI, 2-Biopsy Report, 3&4- PET Scan, 5- Pre-op X ray, 6-Post op X ray

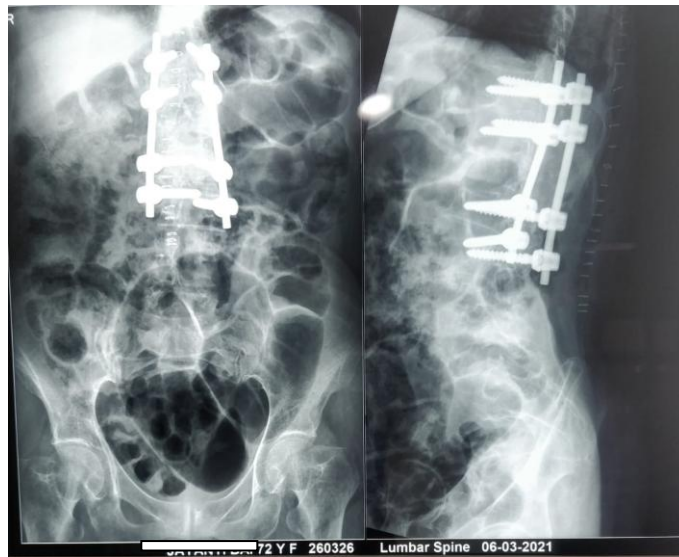
**Case 2:**

72 years female patient having Primary Follicular Thyroid Carcinoma With L1 Pathological Fracture.

Procedure- posterior decompression at L1 level with transpedicular biopsy and stabilization by long segment pedicle screw fixation.



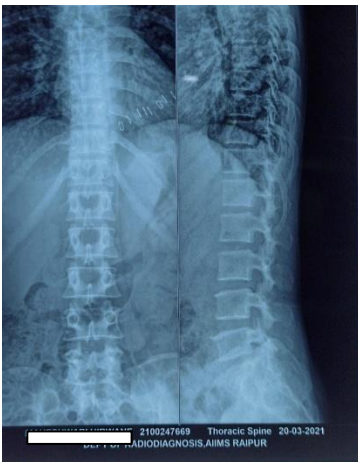
**Pre-op X ray**



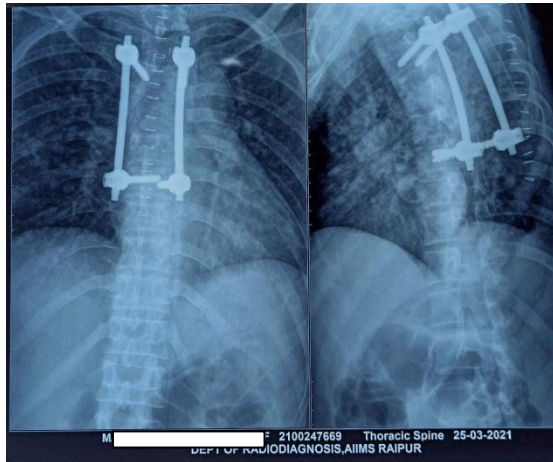
**Post-op X ray**

**Case 3:**

43 years female patient having Primary Carcinoma Breast with D4, 5 Pathological Fracture. Procedure - posterior decompression and fixation with pedicle screws.



**Pre-op X ray**



**Post-op X ray**