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PALLIATIVE SURGERY IN THORACOLUMBAR VERTEBRAL METASTASES: A TWO YEARS PROSPECTIVE STUDY

Neurosurgery

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ABSTRACT

Vertebral metastases and spinal cord/ cauda equina compression is a major cause of development of neurological symptoms in patients attending hospital. Oncological treatment alone cannot improve the neurological status unless the involved segment is decompressed. Palliative surgery by local decompression and maintenance of necessary spinal stability may improve the neurological deficits and quality of life of the patient.

KEYWORDS

Thoracolumbar spine: Metastasis: Palliative surgery

INTRODUCTION

Skeletal system is the third most common site of metastasis after liver and lungs and vertebral column is the most commonly affected site of metastasis within the skeleton. Malignancy of breast, lung and prostate have a propensity to metastasize to skeletal system. Vertebral metastasis is far more common to cause neurological symptoms than primary tumors. In one study, 66% of 350 cases with neurological symptoms due to spinal cord involvement were found to be metastatic. [1] It is also supported by some large autopsy series that there is a huge clinical impact of cancer metastasis in vertebral column. [2] Each case of vertebral metastasis may cause spinal cord compression and it is estimated that approximately 5% of all cancer may have features of spinal cord compression due to vertebral metastasis. [3] Palliative surgical decompression with maintaining possibly maximum spinal stability may improve the quality of life of the patients in respect of improving motor, sensory and urinary symptoms.

AIMS AND OBJECTIVES

This two years prospective study was started with an objective to note any improvement of neurological status of patients suffering from metastatic spinal cord/ cauda equina compression, which definitely does not alter the life expectancy but surely alter the quality of life by offering sufficient confidence to manage day to day activities themselves.

MATERIALS AND METHODS

We selected 24 cases of thoracolumbar vertebral metastasis, attended in the period from July 2017 to June 2018, presenting with lower limb power ≤3 with or without sensory and urinary symptoms. Diagnosis was made by MRI and confirmed by CT guided FNAC. All patients were undergone palliative decompressive laminectomy at affected levels of all thoracolumbar vertebra and pedicular screw rod fixation with decompressive laminectomy in selected cases of lower dorsal and lumbar region lesion. Follow up was continued at the end of first month and third month following surgery. Post operative X ray in all cases and MRI in selected cases were done. Effect of treatment of the primary disease (malignancy) like surgery, radiotherapy or chemotherapy was not considered in this study. Paraplegic patients were not included in this study.

RESULT AND DISCUSSION

In various autopsy series, it is found that as much as 15-41% of patients dying from cancer have vertebral metastasis.[4] Different factors play major role of spread of metastases to vertebra. In 1940, Batson rediscovered the vertebral venous plexus which was first described by Breschet in early 19th century, and illustrated some pathways for metastases in axial skeleton from pelvic, abdominal, thoracic and breast malignancies. [5]Apart from this, Paget's seed-and soil hypothesis, [6] Ewing's anatomic and hemodynamic factor [7] also explain the metastatic spread. Spinal metastases may be intramedullary, leptomeningeal and epidural. In a series of 600 cases of spinal compression from metastases, it was found that more than one vertebral segment was affected in 86%.[8] In the initial stage of vertebral metastases compression of Batson's plexus by tumor causes venous congestion followed by white matter edema and axonal swelling that causes early myelopathy. In next stage, direct tumor compression over spinal cord causes more venous congestion followed by arteria blood flow impairment and in the last stage further vascular compromise causes irreversible spinal cord damage. [9] Types of primary tumor causing metastases to vertebral column in different studies are tabulated as follows:[10]

Table 1

Primary tumor	Barron KD	Gilbert RW	Stark RJ	Rodichok LD
Lungs	24%	13%	33%	31%
Breast	16%	20%	28%	24%
Prostate	4%	9%	4%	8%
Kidney	9%	7%	3%	1%
Myeloma	7%	4%	*	1%
GI tract	5%	4%	5%	9%
Female reproductive	*	2%	3%	6%
Miscallaneous	13%	18%	22%	8%

*Excluded in the study/ insufficient data

In our study, total number of male patients were 16 (66.67%) and female 8. Vertebral metastasis was the only presenting symptom in 6 (Male 4, female 2) patients of malignancy. Types of diagnosed primary malignancies at the time of presentation are tabulated as below:

Table 2

Primary Malignancy	Male=16 (66.67%)	Female=8 (33.33%)	Total
Lungs	5	2	7
Breast	-	2	2
Kidney	1		1
Prostate	3		3
Myeloma	2	1	3
G I Tract	1		1
Female Genital	-	1	1
Unknown	4	2	6

The symptoms of decreased lower limb power, sphincteric involvement and sensory deficit were noted at the time of admission and tabulated as follows:

Table 3

Clinical symptoms	Male	Female
Power 3/5	12	6
Power 2/5	3	2
Power 1/5	1	-
Sphincteric involvement	8	2
Sensory deficit	4	2

MRI was done in each case and destructive collapse or compression of vertebra with thecal (cord or cauda equina) compression were found in different levels as tabulated below. CT guided FNAC was considered as an initial tool to exclude the other cases of vertebral non traumatic inflammatory collapse.

Palliative surgery in the form of either laminectomy and decompression or, the same with pedicular implants placement were done in all 24 cases. Tissues from excised lamina and vertebral body

from transpedicular route were taken in each case for histopathology. Among the sixteen male patients, only laminectomy was done in 13 cases and pedicular screw rod fixation at one level above and two levels below the involved segment(s) were done in rest 3 cases. In female patients, implant placement was done only in 2 cases. All patients were discharge on 8th to 10th post operation days without any significant morbidity and antero-posterior with lateral view X ray of involved vertebral segment was done in every case with implant placement before discharge.

Table 4

Involved vertebral level On MRI	Male	Female
Upper thoracic	4	5
Lower thoracic	6	3
Thoracolumbar	5	-
Lumbar	1	-

We could follow up all 24 patients at the end of first month, but nine of them (male -6, female-3) did not turn up at the end of third month. As per information received over telephone from the near relatives, we got to know that five out of nine patients, those we did not find at second follow up, had gone to other state for treatment of the primary cancer and four male patients (all were suffering from Lung Ca) expired at their local hospital.

At the end of first month the tabulated result is as follows:

Table 5

Clinical feature	Male	Female
Power 5/5	-	-
Power 4+/5	3	2
Power 4-/5	6	4
Power 3/5	3	2
Power 2/5	-	
Power 1/5	-	
Sphincter involvement	4	-
Sensory involvement	1	1

The above table clearly demonstrates that after only one month of palliative decompressive surgery, there was significant neurological improvement of the patients and most of them were able to do their household personal works by themselves.

Tabulated result of follow up at the end of three months.
(Male- 10, Female-5)

Table 6

Clinical feature	Male	Female
Power 5/5	-	-
Power 4+/5	4	2
Power4-/5	4	2
Power3/5	2	1
Power 2/5	-	-
Power 1/5	-	-
Sphincter involvement	2	-
Sensory involvement	-	-

Even after losing some patients in the second follow up, we were satisfied seeing the improvement of the quality of life of patients whose days are actually numbered due to their malignant diseases and they were also happy being almost self-sufficient for their day-to-day activities. We failed to follow up further due to Covid 19 pandemic except online connections with an insignificant number of patients.

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