LIBYAN INTERNATIONAL JOURNAL OF ONCOLOGY

Original article

Adult Metastatic Spinal Cord Tumors: A clinical Audit

Faisal Taleb[1]*, Seraj Ajaj[1], Abdussalam Abograra[2]

Citation: Taleb F, Ajaj S, Abograra A. Adult Metastatic Spinal Cord Tumors: A clinical Audit. Libyan Int J Oncol. 2024;3(2):59-63.

Received: 22-06-2024
Accepted: 23-08-2024
Published: 17-09-2024

Funding*: This research received no external funding.*

Conflicts *of Interest: The authors declare no conflict of interest.*

[1]Department of Neurosurgery, Tripoli University Hospital, Tripoli, Libya
[2]Department of Radiology, Hamad Medical Corporation, Doha, Qatar
***Correspondence**: Talebfaisal@gmail.com*

Abstract

The treatment scheme for patients with spinal cord metastasis is complex, but it had evolved in the last decade by introducing new technologies and techniques. Stereotactic radiosurgery, robotic, minimally invasive procedures, immunotherapy, and advanced imaging facilities all are incorporated to treat spinal cord metastasis aiming to improve outcome and quality of life. However, surgery is still the core stem for management in the majority of cases. In this prospective study, we discussed 22 cases suffering from spinal cord metastasis and their outcome. This was a prospective study of 22 cases whose data were collected as per the pre-prepared datasheet as a single Neurosurgeon experience in frame time between January 2020 to December 2021. Management of 22 patients with complete data were analyzed. Of 22 patients, 13 (59%) were male, 9 (41%) were female and the mean age of all cases was (59) years. Pre-operative walk status was documented in all cases utilizing ASIA score. Pre-operatively, Class (E) ASIA were found in (13) patients, and ASIA class [B, C, D] were found in one, three, and five patients, respectively. Post-operatively the ASIA score was improved by one point higher in nine patients and no change from the pre-operative score in the rest. Kyphotic spinal changes due to metastasis were calculated and showed a range between 13 to 29 degrees in the affected spinal level were documented in 20 patients while 2 patients showed a Kyphotic angle of 38 to 58 degrees, respectively. Surgical and radiological interventions have an acceptable role regarding treating spinal metastases as we observed in our cases. The goal of surgery should be tailored according to patient status and to prolong the survival of the already diseased patient to slow the disease progression. Further studies are mandatory to evaluate if aggressive surgical intervention would prolong the survival in our population and what is the burden and costs to achieve optimal results.

Keywords. *Metastatic Spinal Cord Compression, American Spinal Injury Association Impairment Scale, Magnetic Resonance Imaging.*

Introduction

Metastatic spinal cord compression (MSCC) develops in 5 to 10% of all cancer patients, resulting in up to 20% of those will become symptomatic from spinal cord compression [1-2]. When the tumors reach a metastatic status, the spine is regarded as one of the most common sites of metastases. Once metastatic tumors impede upon the neural elements, they cause significant morbidity and spinal instability symptoms as a result of direct compression on the neural elements which may cause nocturnal back pain, lower extremity weakness, sensory loss, and bowel or bladder dysfunction. Three mechanisms could explain the symptom from this disease: local tumor expansion into the epidural space through Batson's plexus, vertebral fracture, resulting from loss of integrity of the bone caused by tumor infiltration, with fragment displacement into the epidural space, or a paraspinal mass extending into the epidural space through the neural foramina [3].

With the high morbidity associated with this disease, thoughtful therapeutic approaches based on input from multiple medical and surgical specialties are essential. The main objectives in treatment modalities are focused on the prevention of neurological deficit and providing spinal stability and improving the quality of life. This prospective clinical audit

reviews 22 cases of spinal metastases from single surgeon experience. Our aim was to determine the magnitude of cases and an overview of the current challenges and future directions of neurosurgical care for patients with spinal metastases in Libya.

Methods

Setting

This was a prospective study of 22 cases whose data were collected as per the pre-prepared data sheet as a single Neurosurgeon experience in a single tertiary institute in Tripoli (i.e., Tripoli University Hospital) in frame time between January 2020 to December 2021.

Data analysis

Data were collected by the authors on this topic, and the information was analyzed in MS Excel. The source of data was from the prepared data sheet for each patient, imaging results, and operation notes. The tables representing the frequency, percentage of the diagnosis, and findings were summarized.

Results

Management of 22 patients with complete data was analyzed. Of 22 patients, 13 (59%) were male, 9 (41%) were female and the mean age of all cases was (59) years. The type of primary cancer of the 22 patients with spinal metastasis is summarized in Table 1.

Comorbidities that we observed in our cases include chronic obstructive lung disease, hypertension, asthma, liver cirrhosis, polycythemia, coronary artery disease. Furthermore, smoking was observed in 11 cases. The level of metastasis to the spine was mainly to the thoracic spine, but cervical and lumbar spine was also recorded. Cord compression due to metastasis was documented in all cases. Pre-operative walk status was documented in all cases utilizing American Spinal Injury Association impairment scale (ASIA). Pre-operatively, Class (E) ASIA were found in 13 patients and ASIA class [B, C, D] were found in 1, 3, and 5 patients, respectively. Two patients with ASIA D had previous revision spine surgeries. Post-operatively the ASIA score was improved by one point higher in 9 patients and no change from the pre-operative score in the rest. Kyphotic spinal changes due to metastasis were calculated and showed a range between 13 to 29 degrees in 20 patients while 2 patients showed a Kyphotic angle of 38 to 58 degrees respectively.

All metastatic lumbar cases were operated via standard posterior approach while thoracic spine cases via costotransversectomy. In cervical spine, anterior approach for resecting the affected vertebral bodies were used. In all cases the affected segments were replaced by bone cement and cages. For posterior fixation of the spine in lumbar and thoracic cases; pedicle screws either in 2 levels above and 2 levels below or as single level fixation were performed [see Table 2, Figure 1 (A, B, C,) and Figure 2 (A, B)].

Table 1: Diagnostic profile of 22 Metastatic Spinal Cord Tumors

Diagnosis of primary cancer	Frequency (%)
Breast	3 (14)
Lung	7 (32)
Prostate	1 (5)
Renal	2 (9)
Pancreatic	2 (9)
Lymphoma	1 (5)
Leiomyosarcoma	1 (5)
Naso-pharyngeal	1 (5)
Thymic	1 (5)
Plasmacytoma	2 (9)
Paraganglioma	1 (5)

Table 2: The operative and postoperative characteristics of all cases

Character	Results
Blood loss (ml) *	(300-5500)
Operation time (hours) *	(2.75-9.75)
Hospital stay (days) *	(5-49)
Emergency surgery	(2)
Revision of surgery	(2)
Pre-operative radiation	(11)
Pre-operative chemo-therapy	(3)
Post-operative radiation	(9)

[Range*]

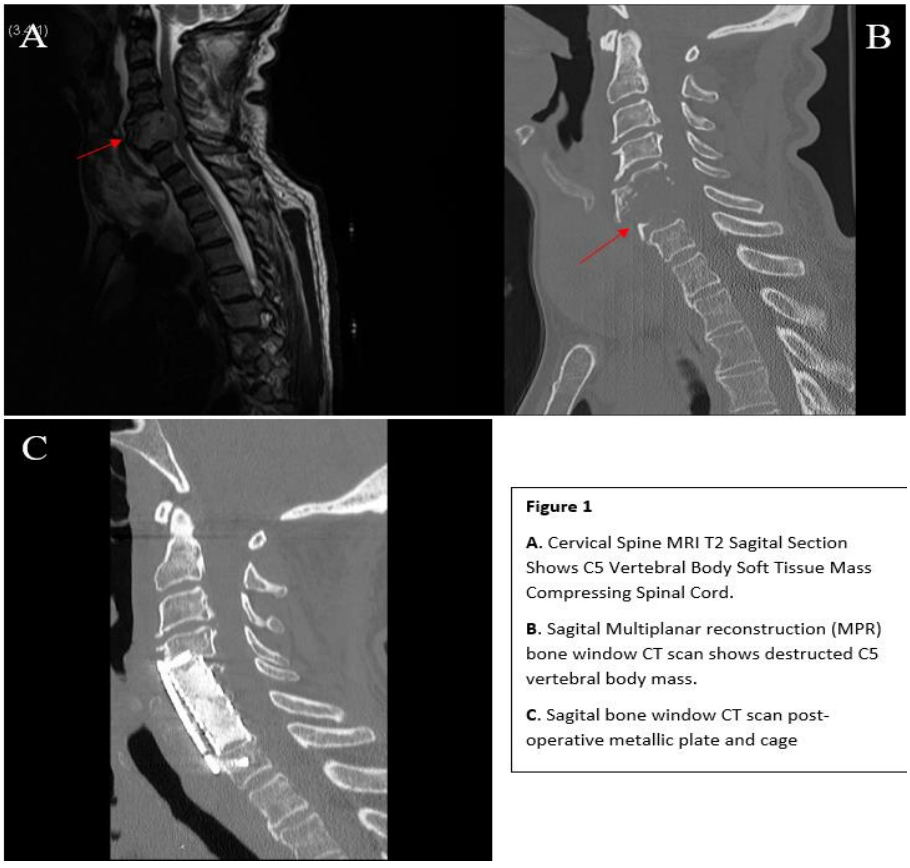

Figure 1

A. Cervical Spine MRI T2 Sagital Section Shows C5 Vertebral Body Soft Tissue Mass Compressing Spinal Cord.

B. Sagital Multiplanar reconstruction (MPR) bone window CT scan shows destructed C5 vertebral body mass.

C. Sagital bone window CT scan post-operative metallic plate and cage

Figure 2 A. Spine echo T1WI L5 vertebral body mass. **B.** Sagital bone window post-operative shows Pedicle screw instrumentations have been placed at 1 level above and below the lesion before resection.

Discussion

Spinal metastases are a challenging oncological condition, as 20% to 40% of cancer patients are affected during the period of their illness and up to 20% of those will become symptomatic from spinal cord compression [1-3]. Said that; spinal metastasis is a complicated and highly demanded spectrum for surgeons and patients at the same time. Our clinical observation demonstrates surgical intervention as the main treatment. We followed up our cases post-surgery for up to 2 years. The most common primary tumor source regarding metastases to spine were the lungs and the breast. In 20 cases (90%) The most affected spinal level was the thoracic spine. In terms of complication, instrumental failure was documented in two cases and infection also in another two cases. The overall survival depending on disease progression and systemic illness was up to 2 years and the mortality was documented in five cases. The treatment plans for patients with spine metastases have advanced significantly over the past decade. Incorporating stereotactic radiosurgery into these paradigms has been particularly transformative, offering precise delivery of tumoricidal radiation doses with the sparing of adjacent tissues. In our review, surgical resection was the main method for treatment, we tailored our surgical approach according the anatomical location and extension of the pathology. Surgical time from skin to closure ranged between 2.75 up to 9.75 hours. Blood loss during the surgical intervention ranged between 300 to 5500 milliliters (ml). Histopathological samples for tumor type determination were taken during the operation and post-operative management course regarding radiotherapy and chemotherapy have been proceeded with our oncology team colleagues. Evidence supports the safety and efficacy of radiosurgery as it currently offers durable local tumor control with low complication rates even for tumors previously considered radioresistant to conventional radiation [4]. However, the role of surgical intervention remains consistent, but a trend has been observed toward less aggressive, often minimally invasive approaches [5-8]. Utilizing modern technologies and improved instrumentation, surgical outcomes continue to improve with reduced morbidity. These advances have brought forth a need for new prognostication measures and a more critical review of long-term outcomes. The complex nature of current treatment schemes necessitates a multidisciplinary approach including surgeons, oncologists, radiation oncologists, and pain specialists.

Conclusion

Surgical and radiological interventions have an acceptable role regarding treating spinal metastases as we observed in our cases and the goal of surgery should be tailored according to patient status and to prolong the survival of the already diseased patient and slow the disease progression. Further studies are mandatory to evaluate the magnitude of the disease and if incorporation of new surgical interventions and modalities would prolong the survival in our population and what is the burden and costs to achieve optimal results.

References

1. Loblaw DA, Laperriere NJ, Mackillop WJ. A population-based study of malignant spinal cord compression in Ontario. Clin Oncol (R Coll Radiol). 2003;15(4):211-217.
2. Barzilai O, Fisher CG, Bilsky MH. State of the Art Treatment of Spinal Metastatic Disease. Neurosurgery. 2018 Jun 1;82(6):757-769. doi: 10.1093/neuros/nyx567.
3. Maccauro G, Spinelli MS, Mauro S, Perisano C, Graci C, Rosa MA. Physiopathology of spine metastasis. Int J Surg Oncol. 2011;2011:107969. doi: 10.1155/2011/107969.
4. Cobb CA, Leavens ME, Eckles N. Indications for nonoperative treatment of spinal cord compression due to breast cancer. J Neurosurg. 1977;47(5): 653-658.
5. Klimo P Jr, Thompson CJ, Kestle JR, Schmidt MH. A meta-analysis of surgery versus conventional radiotherapy for the treatment of metastatic spinal epidural disease. Neuro Oncol. 2005;7(1):64-76.
6. L'Esperance S, Vincent F, Gaudreault M, et al. Treatment of metastatic spinal cord compression: cepo review and clinical recommendations. Curr Oncol. 2012;19(6):e478-e490
7. Klimo P Jr, Schmidt MH. Surgical management of spinal metastases. Oncologist. 2004;9(2):188-196.
8. North RB, Larocca VR, Schwartz J, et al. Surgical management of spinal metastases: analysis of prognostic factors during a 10-year experience. J Neurosurg Spine. 2005;2(5):564-573.