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Clinical Epidemiologic Profile of Intradural Intramedullary Spinal Cord Tumours in Western Rajasthan

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Abstract: ***Introduction*: Benign and malignant intramedullary tumors of the spinal cord are common and require an early definitive diagnosis for their appropriate management and outcome.The current study looks at the clinical profile of intramedullary spinal cord tumors in Western Rajasthan with an aim to utilise these data to improve region specific diagnostic and treatment facilities in future. *Methodology*: In the current study a total of 54 patients having diagnosed intramedullary spinal tumors in a 5 year period in a tertiary care institute were included. *Observations*: Majority of the patients were ependymoma (50%) followed by astrocytoma with most having either a thoracic//lumbar or thoracolumbar location of intramedullary spinal tumour and in a discrete location. In approximately 60% of the patients dissociated sensory loss was seen and atrophy of hand muscles was seen in approximately 30% of the patients with a cervical location of intramedullary spinal tumour. Approximately 82% patients, had a good outcome at 6 months post-operative. *Conclusion*: Early recognition of signs and symptoms of intramedullary spinal cord tumour facilitates early diagnostic treatment which potentially minimizes neurologic morbidity and may improve outcome. Female are commonly affected and ependymomas being the commonest intramedullary spinal cord tumour.***

Keywords: **S**pinal tumors, intramedullary

1. Introduction

Benign and malignant intramedullary tumors of the spinal cord are common and require an early definitive diagnosis for their appropriate management and outcome. Spinal tumors depending on their location can be classified as extradural and intradural, although some can be both inside and outside the dura. Intradural tumors can be intramedullary (intramedullary spinal cord tumor [IMSCT]) or extramedullary (intradural extramedullary [IDEM]).

Most of the clinical features result from compression of the structures and rapidly growing lesions cause severe deficits. The presence of a tumor interferes with the normal movements of the cord, which occur during movements of the spinal column and this impairment results into more damage to the cord.Gliosis in the spinal cord due to ischemia may occur in tumors of longer duration and recovery is partial despite complete removal of the tumor. Evaluation includes meticulous clinical examination to look of varying degrees of motor sensory deficits as well as bowel bladder symptoms. The clinical outcome is better in patients who are diagnosed early with an appropriate surgical and non-surgical management[1,2,3,4].

Despite significant advancements in neurimaging and other diagnostic modalities in the evaluation of intramedullary spinal cord tumors, data regarding the exact clinical profile of these tumors in the Western Rajasthan is scanty. The current study was therefore planned to find out the clinical profile of intramedullary spinal cord tumors in Western Rajasthan with an aim to utilise these data to improve region specific diagnostic and treatment facilities in future.

2. Material and Methods

The current study is a single centre observational study performed in a tertiary referral centre of Western Rajasthan, India. A total of 56 patients who presented to Department of Neurosurgery from June 2014 until June 2019were included and evaluated by a single Neurosurgeon. All patients having MRI confirmation of Primary or Secondary malignant and non-malignant (including infectious) intramedullary tumors of spinal cord were included in the study. All patients with a vascular malformation of the spinal cord were excluded. All these patients were followed up post surgically for a period of 12 months and patients with an incomplete follow up were excluded from the final cohort. A detailed history, physical examination, radiologic reports, other relevant

investigations were recorded in a predesigned proforma. Modified McCormicks grade was used to evaluate the neurological and functional status of patients. Follow up imaging was done whenever indicated

3. Observations

In the current study a total of 54 patients having diagnosed intramedullary spinal tumors were included as per the inclusion criteria.

Table I: Number, location, intraoperative and histopathology of intramedullary spinal tumors

Type of Tumor	Number (n=54)	Location	Radiologic diagnosis given (MRI/ CT or both)	Intraoperative diagnosis	Histopathologic diagnosis
Astrocytoma	22 (40.74%)	Cervical-7 Thoracic-13 Dorsolumbar-4	16	20	22
ependymoma	27 (50%)	Cervical-12 Thoracic-5 Dorso-lumbar-10	23	27	27
Anaplastic Oligodendroglioma	1 (1.8%)	Dorsal-1 (D5 to D10)	0 (Astrocytoma)	0 (Astrocytoma)	1
Epidermoid	2 (3.7%)	Dorsolumbar-2	2	2	2
Dermoid	2 (3.7%)	Lumbar-1	2	2	2

Majority of the patients in the current study were ependymoma (50%) followed by astrocytoma. Epidermoid and Dermoid were only 3.7 % in the present series with only one patient having anaplastic oligodendroglioma.

Table II: Demographic profile of the patients

	Intramdullary
Number of patients	54
Mean age at presentation (years)	34±3 (range 25-60)
Male	21
Female	33
Mean age at surgery (years)	36±7
Mean pre-operative duration of symptoms (months)	15±5
Mean follow up after surgery (month)	24±5

In the current study approximately 53% astrocytoma were seen in females while 62% patients having ependymoma were females. Both the dermoid in the current series was seen in females while epidermoid was seen in one female out of 2 patients. Most of the patients in the current series had either a thoracic//lumbar or thoracolumbar location of intramedullary spinal tumour.In the current series all the tumours were in a discrete location and in none of the of the patients the tumour was seen at multiple locations. In approximately 60% of the patient's dissociated sensory loss was seen and atrophy of hand muscles was seen in approximately 30% of the patient's occurring exclusively in patients having cervical location of intramedullary spinal tumour. In approximately 70% of the patients having a thoracic/lumbar/thoracolumbar location the presentation was paraparesis. In approximately 10% of the patient hypotonia was seen instead of spasticity. Sphincter disturbances were also seen in 35% patients.

In all the patients in the current series a posterior approach using standard microsurgical techniques was performed irrespective of the location of a tumor. None required instrumentation and total excision was achieved in 90% of the patients with ependymoma irrespective of the location. In all the patients with astrocytoma subtotal excision could be performed because no clear-cut plane for excision was available and there was significant intermingling of tumour with neural tissue increasing the chances of poor post-surgical outcome. In one patient with Dermoid only biopsy could be taken and excision could not be performed because no clear-cut plane for excision was available

Outcome was defined as "good outcome" as the improvement in patient's preoperative modified McCormick score[1]at 6 month post-operative follow-up. Those who had an improvement of ≥2 grades were labeled as having "significant improvement". The patients who either remained same or showed a deterioration of modified McCormick score were considered "poor outcome". In the current series approximately 82% patients, had a good outcome at 6 months post-operative. All the patient's with good outcome were ambulatory with or without a walking aid (McCormick score ≤3). This was significant because approximately 90% of the patient's preoperatively were unable to walk even with external aid (McCormick Grade 4 and 5). 2 patients out of 54 were lost to followup before 6 month post-operative visit.

None of the patient in the current series died or required ventilation post-operative. 2 (3.7%) patients, had a significant operative site wound infection with staph epidermidis Bladder and bowel symptoms were not relieved in 7.4% patients and 1 patient had wound dehiscence and cerebrospinal fluid leak which was managed conservatively. 1 patient (1.8%) , who had thoracolumbar astrocytoma deteriorated in severity of paraparesis and had 0/5 post-operative strength in both lower extremities, even at 6 month follow up. One patient who had an extensive long segment ependymoma with both intramedullary and extramedullary component (D12-S2) was treated with a subtotal excision. This patient, however had significant improvement post-operative and had a power of 4+/5 (preoperative being on 1/5). She required a repeat surgery on 1 ½ year later and currently continues to have 4+/5 strength in both lower extremities.

4. Discussion

Primary spinal cord tumors account for 4–10% of all central nervous system tumors and are characterized based on their location as intramedullary (IMSCT), IDEM, and extradural[2].In various series intradural extramedullary spinal cord tumours have been reported to range from 43% to 67%

while intramedullary spinal cord tumours have been reported to range from 8% to 20% of all spinal cord tumours[3,4]. In the current series only intradural intramedullary tumours were included to find out the clinical and Radiologic spectrum in Western Rajasthan.

Unfortunately, there is a paucity of data regarding intradural intramedullary tumours in India and also Western Rajasthan. In the current study almost 50% of the patient's had an ependymoma which was located commonly in thoracolumbar region (56%). This is in contrast to other reported studies which mention cervical region, is a common location for intradural intramedullary ependymomas.

Astrocytoma's on the second common intradural intramedullary spinal cord tumours in the current series and constituted approximately 40.74% of all the patients. Almost 59% of the astrocytomas were located in the thoracic region which is almost the same as reported by other studies from India and globally. Both epidermoid and Dermoid was seen in approximately 3.7% of the patients which is almost similar to the observations made by other Indian and Western studies.[5,6,7]
In most of the studies reported from the Western population, female preponderance has been mentioned while in most of the Asian studies there has been either equal male-female ratio or slight male preponderance. There is a paucity of Indian data regarding the gender distribution of intradural intramedullary spinal cord tumours. In the current study there was a female preponderance, however a larger follow up for 5 years or more with a larger sample size is required to confirm this observation.[5,8,9,10]

The mean age of presentation of patients with intradural intramedullary tumours in the current study was 34±3 years (range 25-60 years) and for astrocytoma the mean age was 29±2 years with a range of 25-35 years. The mean age of intradural intramedullary tumours in the current study is slightly higher as compared to the other Indian studies and also the Western population. However, no definitive explanation could be provided for this observation.

In the current series the mean age at surgery was 36±7 years[11,12] which is significantly higher when compared to most of the Western studies but very similar to the studies conducted in developing world. This may be attributed to the fact that in Western Rajasthan many cultural factors and apprehensions regarding surgery delay diagnosis and also treatment, which may be offered well in time. Patients and their families need intensive counselling and also extreme perseverance to ensure appropriate and adequate followup.

The post-operative outcome in the current series was better in terms of overall motor and sensory outcome which may be attributed to the fact that ours is a tertiary level institute with excellent intraoperative and post-operative facilities for rehabilitation. [13,14,15,16]

5. Conclusion

Early recognition of signs and symptoms of intramedullary spinal cord tumour facilitates early diagnostic treatment which potentially minimizes neurologic morbidity and may improve outcome.Female are commonly affected and ependymomas being the commonest intramedullary spinal cord tumour.

Primary treatment is surgical resection and predictors ofoutcome include preoperative functional status (limited to no neurological deficit predicts for better outcome) , histological grade of tomours(lower grade for improved survival) , and extent of surgical resection (image verified complete resection improves survival).

References

[1] Mc cormick PC, Torres R, Post KD, Stein BM. Intramedullary ependymoma of spinal cord. J Neurology, 1990; 72:523-32
[2] Abul Kasim K, Thurnher MM, Mckuver P, Sundyen PC. Intradural spinal tumours current classification and MRI features: Neuroradiology, 2008;50:301-14.
[3] Rawlings CE III Giangaspero F, Burger PC, et al. Ependymomas: a clinicopathological study, SurgNeurol 1988; 29:271-81.
[4] Epstein FJ, Farmer JP, Freed D. Adult intramedullary spinal cord ependymomas: the result of surgery in 38 patients, J Neurosurg 1993; 79: 204-9.
[5] Schillenges KA, Propp JM, Villano JL, Mc Carthy BJ. Descriptive epidemiology of primary spinal cord tumour. J Neurooncol. 2008;87:173-79.
[6] Ardehali MR. Relative incidence of SCT. Clin. Neurol. Neurosurg. 1990; 92: 237-43.
[7] Engelhard HH, Villano JL, Porter KR, Stewart AK, Barua M, Barker FG, Newton HB. Clinical presentation, histology and treatment in 430 patients withb primary SCT, spinal meninges tumour or cauda equine tumour. J Neurosurg. Spine 2010; 13:67-77.
[8] Preston martin S. Descriptive epidemiology of primary tumour of SC and spinal meningesin Los Angles County1972-1985, neuroepidemiology 1990;9:106-11.
[9] Cheang CM, Hwaung SL, Hwong SL, an analysis of intraspinal tumour in south Taiwan, Kaohseung Med. Sci 1997;13:229-236.
[10] Helseth A, Mark SJ, primary intraspinal neoplasm in Norway, 1955-1986, a population based survey of 467 patients. J Neurosurg 1989; 71:842-45.
[11] ElsbergCA . some aspects of the diagnosis and surgical management of tumours of SC with a study of the end result in a series of 119 operations. Ann Surg. 1925; 81:1057-73.
[12] Parsa AT, chi JH, Acosta Jr. FL, et al. intramedullary SCT: Molecular insights and surgical innovation. Clin. Neurosurg 2005;52: 76-84.
[13] Innocezi G, Salvati M, Cervori L, et al. Prognostic factor in IM astrocytomas. ClinNeurolNeurosurg. 1997; 99:1-5.
[14] Cooper PR, outcome after operative treatment of IMSCT in adult: intermediate and long term results in 51 patients. Neurosurgery 1989;25:855-59.
[15] Ferrante L, Mastronardi L, Cerli p et al, IMSC ependymoma- a study of 45 cases with long term follow uo. Acta Neurochir(wein) 1992;119:14-19.
[16] Shrivastava RK, Epstein FJ, Perin NIet. Al. IMSCT in patients older than 50 years of age , management and outcome analysis. J Neurosurg spine 2005;2: 249-55