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EPIDEMIOLOGY OF SPINAL TUMOUR: AN INSTITUTIONAL STUDY IN A TERTIARY CARE CENTRE OF EASTERN INDIA

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ABSTRACT This retrospective study comprising 120 patients was aimed to study the demographic, clinical, pathological and surgical traits of spinal tumours in a tertiary health care centre of Eastern India. During a period of one year (October, 2018 to October 2019), 120 patients of spinal tumour fulfilling the inclusion criteria were studied for clinical spectrum, preoperative neurological and functional status (measured by Modified McCormick's Scale), operative details, histological subtypes and post-operative outcome. The resulting data was analysed and interpreted. IDEMs were the most common type of spinal tumour in our study. It is more common in males and average age affected is 35 years. Thoracic spine is afflicted most and neurofibromas and ependymomas are the most common subtypes of IDEM and IMSCT respectively. On proper diagnosis and standard surgical management (tumour microsurgical resection from posterior approach), most patients have good outcome. If a high degree of suspicion is maintained, spinal tumours can be timely diagnosed. Therefore timely treatment can lead to better outcomes with good prognosis.

KEYWORDS : IDEM, IMSCT, Neurofibroma, Ependymoma

INTRODUCTION:

Spinal tumours or neoplasms of the spinal cord contribute to less than ten percent of CNS tumours. To classify, spinal tumours are referred on the basis of their location within the spine, extradural (lying outside the dura mater) and intradural (lying inside the dura mater). Intradural tumours are further divided into intradural extramedullary (IDEM) and intramedullary spinal cord tumours (IMSCTs).

Of the limited number of cases of spinal tumours, most are bone metastasis from a primary tumour at another site. It is estimated that at least 30 percent and upto 70 percent of cancer patients may experience metastasis to spine.[1]

The primary spinal tumours can be meningiomas, schwannomas, neurofibromas (if, IDEM) or haemangiomas, ependymomas, astrocytomas (if, IMSCTs).

This retrospective study aims at studying the patterns of clinico-pathological features, pre-operative history, surgical management and post-operative outcome of the patients treated at our high volume referral centre in eastern India.

MATERIALS AND METHODS:

This is a retrospective study of 120 patients with spinal tumours who presented to our hospital (IPGMER and Bangur Institute of Neurosciences, Kolkata, West Bengal, India) between October 2018 and October 2019.

All the primary tumours to spine were included but metastasis to spine, vascular malformations and ineffective pathologies (including) pott's spine were excluded.[2]

Each patient included in the study were thoroughly assessed for detailed medical history, findings of physical examination performed during in/out patient evaluation and findings of radiological examinations. Modified McCormicks grading[3] was used for evaluating neurological and functional status of patients. In the post-operative period, patient outcome and incidence of recurrence was recorded.

Grade	Modified McCormick Scale
I	Intact neurologically, normal ambulation, minimal dysesthesia
II	Mild motor or sensory deficit, functional independence
III	Moderate deficit, limitation of function, independent with external aid
IV	Severe motor or sensory deficit, limited function, dependent
V	Paraplegia or quadriplegia, even with flickering movement

Table 1: The Modified McCormick Scale

OBSERVATIONS AND RESULTS:

A total of 120 patients were included in the study. Of these, 30 were extradural tumours, 72 had IDEM and 18 had IMSCTs.

75 patients were males. The mean age of patients at the time of surgery was 35.23 years. 21 patients were in the pediatric age group (<18 years).

The demographic data is inunciated in Table 2.

Table 2: The demographic profile of patients in study

	Extradural	IDEM	IMSCT
Number of cases	30	72	18
Number of pediatric cases	5	12	4
Gender (M/F)	21/9	40/32	4/14
Mean preoperative duration of symptoms	6.18 months	26.82 months	38.62 months
Mean age at surgery	29.95 years	38.71 years	22.44 years

All the tumours were studied for the location (cervical, thoracic, thoracolumbar, lumbar and lumbosacral) and for the histopathological attributes. It was found that thoracic tumours were most common types of spinal tumours. Detailed data is elucidated in the tables 3 and 4.

Table 3: Prevalence of tumours based on the location

Location of tumour	Total
Cervical	25
Thoracic	53
Thoracolumbar	19
Lumbar	17
Lumbosacral	6

Table 4: Prevalence of histopathological subtypes of the spinal tumours in the study.

Extradural	IDEM	IMSCT
Lymphoma (7)	Neurofibroma (22)	Ependymoma (10)
Malignant peripheral nerve sheath tumour (MPNST) without intradural extension (5)	Schwannoma (20)	Epidermoid (2)
Mixed germ cell tumour (4)	Meningioma (16)	Ganglioglioma (2)
Mesenchymal tumour (3)	Ependymoma (7)	Lipoma (2)
PNET (4)	Epidermoid (4)	Dermoid (1)

Myeloma (2)	Neurenteric cyst (2)	Haemagioblastoma (1)
Plasmacytoma (2)	Enterogenous cyst (1)	
Eosinophic granuloma (2)		
Chondrosarcoma (1)		

Figure 1 and 2 showing various locations of spinal tumors.

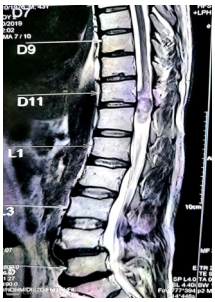

Figure 1. Saggital section of MRI spine showing Spinal tumor at D12 Level

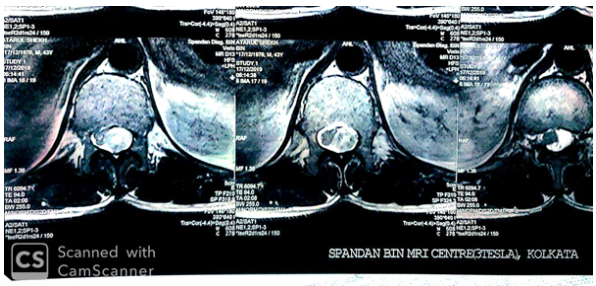

Figure 2. Axial section of MRI dorsal spine showing IDEM at D12 Level

Amongst the various presenting symptoms most common were motor weakness (61.66 %) followed by pain (48.3%) and sensory loss (40.83 %) as shown in table 5.

Table 5: Clinical profile of patients included in the study.

Symptom/sign	Number of patients
Motor weakness	74
Pain	58
Sensory loss	49
Bladder involvement	20
Paresthesia	18
Hypotonia	8
Bowel involvement	6
Wasting	4
Scoliosis	2
Local tenderness	1

After clinic-radiological assessment, tumour was resected under microscope via posterior approach in all cases, irrespective of the location of tumour. Instrumentation was used in 11 cases. Tumour was excised completely in 83 cases (69.16%). To preserve vital structures, near total excision was done (>90% tumour removed) in 14 cases (11.66%).

Post operatively, outcome was studied during in-patient recovery as well as upto 3 month follow up period.

Good outcome was defined as improvement in patient's preoperative modified McCormick scale, at the time of last follow up. Patients with ≥2 grades improvement were labelled as 'significant improvement'.[2] Patients who did not improve at all or deteriorated were considered poor outcome.

In our study, 78 patients (65%) had good outcome by the time of last follow up. 9 patients had a bad outcome with 7 complaining of persistent pain, 2 complaining of bladder and/or bowel symptoms. There was no mortality.

Recurrence (new symptomatic tumour growth or incidental tumour finding on routine radiological assessment[2]) was seen in no patients at the time of last follow up.

DISCUSSION:

Primary tumours of spine are rarer than metastatic disease and account for only 10% of all tumours of spine. The incidence of primary spinal neoplasms is estimated to be between 2.5 to 8.5 per 100,000 per year.[4]

In our study, maximum cases were Intradural extramedullary (60%), followed by extradural (25%) and only 15% cases as intradural intramedullary. The incidence of extradural tumours appears to be a little less than the data provided by American Association of neurological surgeons.[1] But that might be attributed to the exclusion of metastatic disease of spine in this study which mostly presents as extradural tumours.

A clear male preponderance (62.5%) is seen in our study which is also evident in the study by Arora RK et al[2] and some other Asian studies[5,6]. But for intramedullary intradural tumours, female incidence was much higher (71.42%). In accordance with pre-recorded data, meningioma was more commonly seen in females (13/16 cases)[7,8,9,10].

The average age of patients with IMSCTs was lesser than those of IDEM and extradural tumours which is due to a slightly higher ratio of pediatric cases in this group. This finding corelates with other Indian studies.[2,5,6]

Most common location of tumours in our study was thoracic as comparable to other studies. This was followed by cervical, thoracolumbar, lumbar and lumbosacral tumours in descending order.

Amongst IDEM tumours, nerve sheath tumours like neurofibromas and schwannomas are the most common. which is similar to results of other Indian studies. Meningiomas are the next most common IDEMs. Other histological subtypes are ependymomas, epidermoids, neurenteric and enterogenous cysts. This pattern is similar to other Indian studies.[2]

Ependymomas are the most frequent IMSCTs encountered in our study by a huge margin. This was also comparable to other studies. All the other subtypes like epidermoids, gangliogliomas, lipomas, dermoid and haemangioblastomas were too less in number to make a significant comparison between them. A follow up study over longer period of time is required.

As per available data metastatic disease of spine are the most common type of extradural tumours. Since we excluded metastasis from our study, lymphomas were the most common type of extradural tumours as elucidated in other studies. But the difference in incidence of other subtypes like Malignant peripheral nerve sheath tumour (MPNST) without intradural extension, mixed germ cell tumours, mesenchymal tumours was again too insignificant to remark. Other rare tumours were also seen like PNET, plasmacytomas, chondrosarcomas etc.

Most common presenting symptom was motor weakness followed closely by pain and sensory loss. Similar finding was observed by other Indian authors and is evident in literature.[2,5,6] Bladder involvement and paresthesia were not uncommon. The spectrum of clinical features included hypotonia, bowel involvement, scoliosis and rarely local tenderness.

After thorough preoperative clinical and radiological assessment, all patients underwent resection surgery under microscope from posterior approach.[11] In 69% cases tumour was excised completely and in 11.66% cases >90% tumour mass was excised. The resection rate is comparable to that reported in other studies.[2]

All patients were closely followed up for a minimum period of 3 months. The “good outcome” rate of 65% is similar to other studies. There was no mortality in our study.

CONCLUSIONS:

The non-specificity of symptoms in the initial stages leads to delay in patient seeking appropriate medical aid and therefore delayed diagnosis.[12] Which further causes poor pre-operative neurological and functional status leading to poor outcomes. A high degree of suspicion and awareness of classical symptoms of cord compression is required for timely diagnosis and good post-operative outcome.

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