THE SPECTRUM OF INTRADURAL SPINAL TUMORS

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ABSTRACT

Objective: *To assess the spectrum of clinical, radiological and histological features of patients with intradural spinal tumors.*

Materials and methods: This *descriptive study was carried out in Department of Neurosurgery Lady Reading Hospital Peshawar, from April 2003 to March 2009. Medical records of patients with spinal tumors were revieqwed and patients operated for intradural spinal tumors were identified. A total of 312 patients, out of 525 cases of spinal tumors, with different intradural spinal tumors were considered in this study. Their clinical features, radiological reports, peroperative findings and histological reports were analyzed in different aspects.*

Results: *There were total of 312 patients with age range from 2 years to 74 years, with median age of 38 years. Out of these 187 were males and 125 were female, overall male to female ratio of 1.5:1. Backache, leg weakness, parasthesia and poor sphincters were the main clinical features. MRI spine (274 cases) was the main diagnostic tool along with plain X-rays and X-ray myelography in limited cases (35 cases). CT myelogram was done only in 3 cases. The common site of involvement was dorsal spine followed by lumber and cervical spines respectively in 185, 80 and 47 cases. Histological report was suggestive of Neurofibroma in 166, Meningioma in 96, Ependymoma in 20, Dermoid in 12, Astrocytoma in 7, Hemangioblastom and Tuberculoma in 3 cases each and Hydatid cyst in one case.*

Conclusion: *Neurofibroma and meningioma constituted majority of cases belonging to intradural extramedulary group, while ependymoma and astrocytoma were common intramedullary tumors. Third and 5th decade of life was the common age group for both Intramedulary and extramedulary tumors. Intramedulary lesions were common in 3rd decade of life.*

Key words: *Spinal tumors, spinal neurofibroma, intradural meningioma, spine dermoid.*

INTRODUCTION

Spinal canal is a confined space and expanding spinal tumors within this space may have a devastating effect upon the function of spinal cord and nerves. The tumors commonly arising within the space are intradural and majority of cases respond satisfactory to surgical excision[1].

Spinal tumors are 15 % of all primary CNS tumors out of which 65 to 82 % are intradural. Intradural extramedulary tumors are mainly, neurofibroma and meningioma making about 80-90% of these tumors. Lipoma, dermoid, epedermoid and drop metastasis are less common. Only 7-22% are intramedullary either astrocytoma or ependymoma[2]. The clinical features mimic different neurological disorders like entrapment neuropathy, intercostal neuralgia and referred pain like angina, cholycystitis and renal pain.

Sciatica is a common symptom in tumors at or below conus medularis. Cord compression is leading to long tract signs as quadriplegia. Paraplegia is late neurological dysfunction resulting in significant morbidity, bed sores and sphincteric problems. Back pain including nocturnal pain is another important feature of spinal tumors[3].

There are limited local studies on intraspinal tumors. In assessing the different aspects of these lesions, this study will help the clinicians to identify these lesions early, in time for treatment and thus decrease morbidity and improve prognosis of the patients.

MATERIAL AND METHODS

The record of all patients with spinal tumors was seen and patients with intradural tumors were analyzed in detail. Out of 525 patients admitted as diagnosed cases of spinal tumors, only 312 were having intradural tumors and operated in the neurosurgery department, PGMI, lady reading hospital Peshawar between April 2003 to March 2009. Patients of both genders irrespective of their age who had intradural extramedulary and intramedullary lesions were included in the study and those who had recurrence of the tumors or those who had extradural lesions were excluded. These patients belonged to different areas of the province. The demographic data and clinical, radiological, and histological features of the patients were analyzed. All the patients were operated after establishing a neuroradiological diagnosis. X- rays were done in all the cases. Neuroradiological investigations included myelography, CT myelography, CT scan and MRI of the concerned area. Preoperative work up was done. For proper localization loop guided localization was done in the cervical, thoracic and thoracolumber area. All the patients under went Laminectomy and microscopic decompression was done. Gross total resection was done in intradural extramedulary tumors. Median myelotomy was performed for Intramedulary lesions and far lateral and transspinal approach in cases of dumbbell tumors. For tissue diagnosis, biopsy was taken and preserved in 10% formaline and sent to laboratory on same day. All cases were reported by one senior pathologist. In cases of doubtful diagnosis re-opinion was taken.

RESULTS

We studied 525 patients with spinal tumors out of which 312 patients had intradural spinal lesions. Patient characteristics are shown in Table 1. Figure 1-3 shows the radiological, per operative and histopathological features.

Figure 1: A: MRI of Cervical intradural extramedulary spinal tumor (Neurofibroma)
B: Histopathology of Neurofibroma with Antoni A and B cells

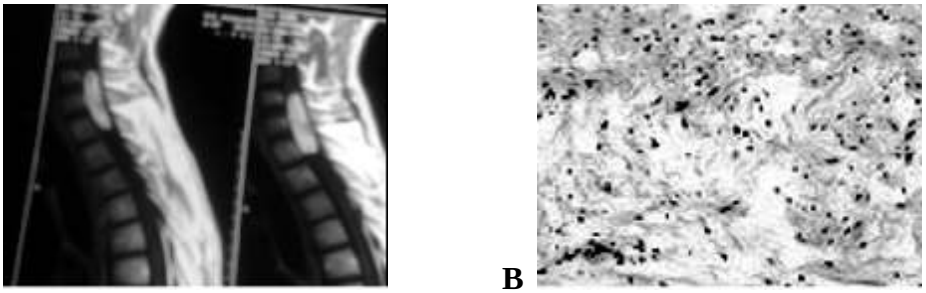

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Figure 2 A & B: Dorsal intradural extramedulary spinal tumor (Meningioma)

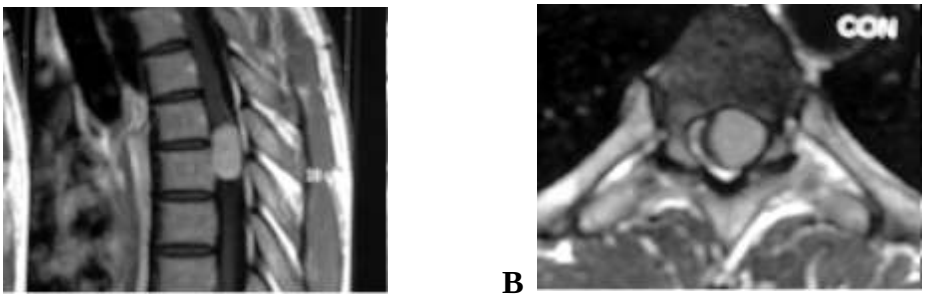

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Figure 3: A: Meningioma removed surgically
B:Histopathology of meningioma with Psamoma bodies

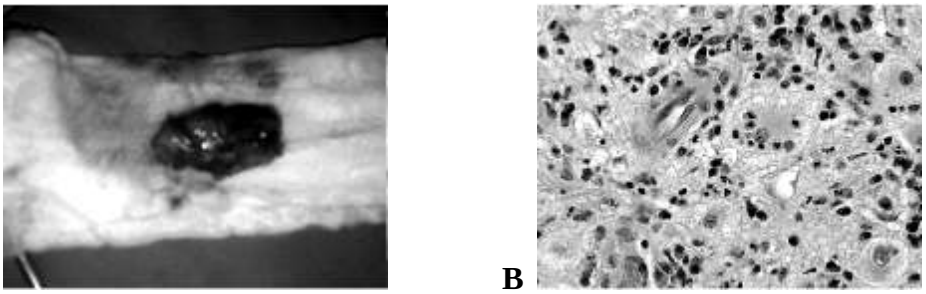

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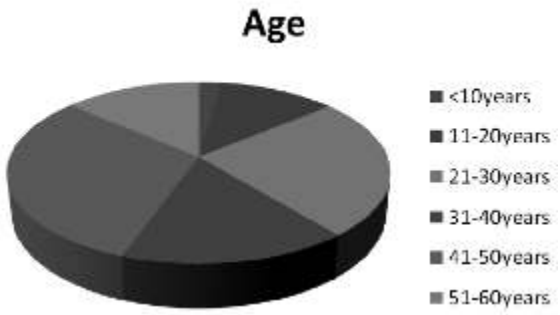
Table 1: Patient Characteristics (n = 312)

Description	No. of patients	%age
Sex		
Male	187	59.9%
Female	125	40.1%
Feature		
Backache	244	78.2%
Leg weakness	239	76.6%
Parasthesia/poor sphincters	104	33.3%
Radicular pain	94	30.13%
Spine tenderness	72	23.08%
Nocturnal pain	59	18.9%
MRC grading		
0	21	08.79%
1	33	13.81%
2	54	22.59%
3	57	23.85%
4	39	16.30%
5	35	14.64%

Age incidence: Their ages ranged from 2 and half to 74 years, with mean age of 36.1 $\pm$ 13.914 years (Figure 4).

Figure 4: Age distribution of the sample



Neuroimmaging: MRI spine was the main diagnostic tool and was done in 274 (87.8%) cases. plain x-ray and myelography was done in 35 (11.2%) patients. CT myelographs was done in 3 cases only.(Table 2).

Histathology: The histopathology of the sample showed predominance of neurofibroma cases (n=166), followed by Meningioma and Ependymoma (n= 96 and 20) respectively. (Table 3)

Table 2: Location of tumor

	No. of patients	%age
Cervical spine	**47**	**15.1%**
Meningioma	14	
Neurofibroma	21	
Ependymoma	06	
Astrocytoma	04	
Others	02	
Thoracic spine	**185**	**59 .3%**
Meningioma	57	
Neurofibroma	113	
Ependymoma	03	
Astrocytoma	02	
Others	10	
Lumbar spine	**80**	**25.6%**
Meningioma	35	
Neurofibroma	32	
Ependymoma	11	
Astrocytoma	01	
Others	1	

Table 3: Histopathology of lesions

	No. of patients	%age
Neurofibroma	166	53.21%
Meningioma	96	30.77%
Ependymoma	20	6.41%
Dermoid	12	3.85%
Astrcytoma	7	2.24%
Tuberculoma	3	0.96%
Hemangioblatoma	3	0.96%
Arachnoid cyst	2	0.64%
Lipoma	2	0.64%
Hydatid cyst	1	0.32%

DISCUSSION

Intraspinal tumors are 15 % of all primary CNS tumors and constitute a large group of patients presenting to neurosurgeons in clinical practice. Studies reveal that although no age limit is spared but intradural spinal tumors are more common in peoples in 3th to 6th decade of life[4, 5]. We almost have the same results operating upon the patients whose age ranged between 2 to 74 years and most of them were in 3rd and 5th decade of life. In our study intradural spinal tumors commonly occurred in males, but Nittner have reported that meningiomas are more common in females while incidence of neurofibroma is equal in men and women[5]. The exact cause for this commonalty of intradural spinal tumors in males is not clear.

Extramedulary tumors are more common (50-60%) than intramedullary tumors (7-22%) of all intraspinal tumors. Meningioma and neurofibroma are the most common, making 80-90% of intradural extramedulary tumors. Others are lipoma, dermoid and epidermoid. Of the intramedullary tumors astrocytoma are 30% and ependymoma are 29%[2]. We have comparable results in our study and meningioma and neurofibroma comprised more than 84% of total intradural extramedulary tumors, while ependymoma and astrcytomas were the commonest intramedullary tumors[2].

Meningioma accounts for the 25% of intraspinal neoplasm[3]. Meningiomas are slow growing benign lesions. Peak incidence is in 5th and 6th decades. Spinal meningiomas are most commonly seen in thoracic spine region although that can occur in cervical and lumber regions[4]. Incidence in thoracic region is 80%, cervical region 15% and lumber region 3%. Eighty percent meningiomas occur in females[5]. In our study almost 31% of patients had meningioma. They were common in female and in dorsal spine.

According to levy W et al[6], with a series of 66 spinal nerve sheath tumors, 83% neurofibromas were intradural, 10% extradural and 7% both intradural and extradural. Peak age is 40-50 years. It's Incidence in thoracic spine was 39%, lumber 32% and cervical 23%. In our study 166 patients had neurofibroma making it 53.21%.

Intramedullary spinal cord tumors comprise 4-10% of all CNS tumors. They account for about 25% of adult intradural spinal tumors but in children they account for 50% of intradural spinal tumors. Ependymomas are slightly more common than astrocytoma in adults, but astrcytomas are more prevalent in children and adolescents[7-10]. In our study Ependymomas were more common than astrcytoma.

Hemangioblatoma accounts for 3-4% of intramedullary spinal cord tumors. Dermoids are congenital lesions. More common in childerns and usually occur in lumbar spine. Epedermoids usually occur in conus or Cauda equine region. We had 3 patients with Hemangioblatoma in our study, two of them were in the 1st decade of life and 3rd one was 13 years old.

Multiple cavernous angiomas of the Cauda equine manifests as acute onset of severe low back pain radiating into the bilateral legs[11]. Primary intraspinal peripheral primitive neuroectodermal tumors are extremely rare tumors with only seven reported cases in the literature[12]. Primary intraspinal hemangiopericytoma is a rare malignant mesenchymal tumor with high rate of recurrence and metastasis[13]. We had no patient with multiple cavernous angiomas or hemangiopericytoma in our study.

The tumors damage the spinal cord and nerve roots by compression, ischemia and infiltration of neoplastic cells. The symptoms and signs are pain, weakness, sensory loss, autonomic dysfunction, gait disturbance and spinal deformity. The patient can present with any combination of the above symptoms and signs. In children there is loss of developmental milestone, scoliosis, kyphosis, foot deformity, gait disturbance and enuresis.

Pain is the most common presenting symptom. Motor deficit occurs in 80-90%, which is patchy and asymmetrical. Sphincter disturbance reported in 15 % cases[4]. In our study backache and motor deficit was noted in 78.2% and 76.6% patients respectively, which is comparable to the literature. Sphincteric dysfunction was more common (33.3 %) in our study; this may be because of late presentation of the patients for treatment.

Magnetic resonant imaging (MRI) provides crucial information regarding the extent, location and internal structure of mass, thus critically narrowing the differential diagnosis and guiding surgery [2, 14-16]. Because of this reason MRI was the investigation most commonly done in our study (274 cases/ 87.8%).

Surgical indications of intraspinal tumors are: neurological deficit, intractable pain, tissue diagnosis and spinal deformity. The goals of surgery are; decompression of spinal canal, tumor resection or debulking, tissue diagnosis, correction of spinal deformity and stabilization of the spine. Minimally invasive approaches to spinal tumors have evolved rapidly over the past 15-20 years as clinicians seek to avoid the morbidity and long-term dysfunction associated with traditional open surgical procedures[17]. Cyber knife radio surgical ablation of such tumors is technically feasible and associated with low morbidity. The outcome of surgery depends upon preoperative neurological status of the patient. Patients with severe neurological dysfunction usually do not recover, whereas patients with mild to moderate dysfunction can often recover in part or completely.

CONCLUSION

Neurofibroma and meningioma constituted majority of cases belonging to extramedulary intradural group while ependymoma and astrocytoma were common intramedullary tumors. Overall males are affected more than females. Third and 5th decades of life were the common age groups for both intramedullary and extramedulary tumors. Intramedulary tumors were common in 3rd decade of life. Astrocytoma is more common in cervical spine while ependymoma in lumbar spine.

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