Original Research Article

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Clinicopathological Study of Patients with Intradural Extramedullary Spinal Tumours and Surgical Outcome

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Abstract

Background: Intradural extramedullary spinal cord tumours prevelance approximately two thirds of all intraspinal neoplasm. Current study designed to analyze the clinical history, radiological aspects and resectability to identify the incidence of variou tumors in intradural extramedullary compartment and their management to understand the surgical outcome. *Methods:* 35 patients with intradural extramedullary tumors were thoroughly evaluated to know the symptoms and signs with particular stress on motor and sensory deficits and evaluated with MRI. Intradural extramedullary tumors were surgically managed by posterior or posterolateral approach and they were followed up regularly to measure the outcome. Based on Nurick grading scheme, patient's ambulatory status was classified. *Results:* Most of the tumors belong to intradural extramedullary spinal tumors (60%) in total spine tumors and Nerve sheath tumours incidence is 37%. Mean age of meningioma patients was 38 years and nerve sheath tumour patients was is 40 years. Male predominance (70%) in nerve sheath tumour. Thoracic region is the mostly affected area. 85% of cases were excised their tumor. Mean follow up period was 11 months, no recurrence of tumor noted clinically. Immediate improvement is seen in (60%) and gradual improvement is seen in (30%). *Conclusion:* In the current study, intradural extramedullary tumors detected by MRI are mostly benign and good clinical results can be obtained by treated surgi-cally. Total surgical excision potentially minimizes neurologic morbidity and improved outcome.

Keywords: Extramedullary Spinal Tumors; Meningiomas; Nerve Sheath Tumours.

Introduction

An intradural extramedullary tumor is a spinal cord tumor that causes spinal cord compression, nerves in and around the spinal cord are compressed as the tumor grows in size and they develop in a certain location and stay there. Less than 15% of all central nervous system (CNS) tumors are spinal. Their annual incidence is 2 to 10 per 100.000. Extramedullary intradural spinal tumors are rare. Meningiomas and nerve sheath tumors make up the majority of intradural extramedullary tumors usually benign. The most common presenting symptoms include weakness, back pain and radicular pain [1-4]. Schwannomas are the most common intradural extramedullary spinal lesions (30% cases), followed by meningiomas (25% cases) [5]. In the pediatric population, the most common intradural extramedullary neoplasms are leptomeningeal metastases resulting from primary brain tumours. Intradural extramedullary masses can have a number of general morphological features like: solitary vs multiple, may have a dural tail (especially meningiomas) and may have a neural exit foraminal (extradural) component (i.e. dumbbell appearance) [6]. Depending upon when the intradural extramedullary tumor is discovered, there are several treatment options that may be possible. Tumors inside the spinal canal are much more likely to need surgery than tumors outside of it. Even large tumors that exist outside of the spinal canal can often simply be monitored.

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Materials and Methods

This study consists 35 cases of intradural extramedullary tumors admitted at department of

Neurosurgery, Narayana medical college and Hospital, Nellore, Andhrapradesh, India during 5 years. All patients were thoroughly studied clinical history, symptoms like stress on motor and sensory deficits, histopathology and their surgical outcome. All patients studied radiologically to identify the changes in spines, to identify delineation of the lesion and cord changes, and tumor compression. Tumors were treated surgically by posterior or posterolateral approaches and followed up to measure the outcomes. Nurick's Grade includes: Grade 1- Normal walk, Grade 2- Slight difficulty in walking, Grade 3- Disability limiting normal walk, Grade 4 -Required assistance in walk, Grade 5-Bed ridden. Results in the clinical history, radiological parameters and outcome measures were expressed in mean and percentage.

Results

Thirty five cases of intradural extramedullary tumors (60%) were identified in total 58 spinal tumors which were admitted during 5 years. In total, male to female ratio observed as 14 (40%): 21 (60%). Nerve sheath tumors and meningiomas are common intradural extramedullary tumors (37%). Age group recorded as 3 to 60 years. 30 to 40 year age group is mostly affected (14 patients-40%). Mean age of meningioma patients was 38 years and nerve sheath tumour patients was is 40 years. In our study, meningioma is commonly observed in females and nerve sheath tumor observed mostly in male (70%). Thoracic region is the mostly affected area.

The clinical symptoms duration was 3 months to 4 years.

Nurick Grade

Grade 1 and 2 patients shown duration of Gait difficulty from 6 months. Grade 5 patients were bed ridden.

Radiology and Biochemical Observations

Preoperative investigations, X-ray AP lateral view, MRI and surgical fitness were done to all patients. Maximally, 80% cases the tumors were identified at posteriorly, remaining at posterolaterally. 60% of tumors located at thoracic region and remaining at lumbar and cervical regions.

Surgery and followup

Thirty five intradural intramedullary tumor patients managed by surgery. In total of 35 cases, 29 cases operated through the posterior approach and laminectomy. 6 cases underwent laminectomy, which was extended laterally to remove total tumor. Total excision was achieved in 29 cases and follow-up period was 11 months. Commonly, CSF leak in 5 cases of repeated lumbar punctures. Morbidity observed in 8 cases. No recurrence was noted clinically. There was no adverse events observed during the treatment. 85% of cases were excised their tumor. Mean follow up period was 11 months, no recurrence of tumor noted clinically. Immediate improvement is seen in (60%) and gradual improvement is seen in (30%).

Table 1: Classification of intradural extramedullary tumors according to Nurick grade

Nurick grade	Total	Nerve Sheath tumours	Meninigiomas
Grade-1	5	3	-
Grade-2	4	4	-
Grade-3	9	3	4
Grade-4	7	1	5
Grade-5	7	2	4

Table 2: Tumor location

Tumor location	Nerve Sheath tumors	Meninigiomas	Total
Thoracic	7	8	21
Lumbar	2	1	7
Cervical	3	2	7

Table 3: Nurick Grade before and after treatment for intradural extramedullary tumors

Nurick Grade	Before treatment	After treatment
Normal Walk	6	8
Slight difficulty in walking	5	9
Disability limiting normal walk	8	10
Required assistance in walk	8	4
Bed ridden	7	3

Discussion

Most of the tumors belongs to intradural extramedullary spinal tumors (60%) in total spine tumors and Nerve sheath tumours incidence is 37%. Mean age of meningioma patients was 38 years and nerve sheath tumour patients was is 40 years. Thoracic spine was common site of occurrence which is corresponding with the study reported by McCormick [7]. In previous study, the incidence of nerve sheath tumors reported as 25% [8]. Mean age of meningioma patients was 38 years and nerve sheath tumor patients was is 40 years. Male predominance (70%) in nerve sheath tumour.

In our study, majority of tumors were identified at in thoracic region location, followed by cervical and lumbar regions. The majority tumors were intradural and 15% extended through the dural root sleeve as dumbbell tumors occupies both intra and extradural compartments. Majority were located posteriorly or posterolateral.

Common clinical symptoms in patients with tumors are pain and paresthesia in the abdomen and the lower limbs, motor abnormality, and dysuria. In our study, symptoms with duration 3 months to 2 years, like back pain, hyperreflexia, tingling and numbness, bladder disturbances and severe spasticity were recorded during admission. Majority of the patients were ambulatory on admission.

Many intradural extramedullary tumors are benign and are treated primarily with an aggressive surgical excision because they can be separated easily from the spinal cord due to the developments of diagnostic and surgical instrumentation as well as microsurgical and neuroanesthesia techniques. Complete excision of the lesion was achieved in all cases. During this resection, care was taken to remove the sensory nerve branch without damaging the motor nerve branch using the nerve excitability test. There was no mortality and no neurological deterioration recorded. Upon follow up, 80% of patients had normal sensation who had prior sensory loss, and 50% of patients who had grade II motor deficits preoperatively came to normal, grade III deficit patients improved to grade II.

Within the period of 6 months follow up, bladder function was improved, and grade V patients were changed to grade IV with in 1 year follow- up.

In our study, meningioma patients presented symptoms like pain in 9 cases, weakness in 9, sensory disturbance in 8, bladder dysfunction in 4 cases were recorded. Gait abnormality seen in all patients (3 cases of non ambulatory), whereas study by Gottified et al. [9], recorded in 32% cases.

In the current study, majority of tumors were identified at thoracic region, whereas studies by Roux et al. [10], Solero et al. [11], were recorded 80 and 82%.

Histologically, all spinal meningiomas are predominantly are of benign tumors of the meningotheial and psammomatous type.

Present study achieved total excision in all of the cases, whereas 99% in Gottfried et al. [9], and 93% in Roux et al. [10].

All safety measures were taken to attain functional outcome, which was observed as excellent in this study. Bladder dysfunction exhibited normal after 2 months postsurgery.

There was no recurrence of spinal meningiomas in one year follow up of our study, whereas Ketter et al. [12], reported that spinal meningiomas did not have the genetic abnormalities found in recurrent intracranial meningiomas suggesting that they had a more indolent nature. In our series upon 1 year follow up no tumor recurrence noted.

Conclusion

In our study, Nerve Sheath tumours and meningiomas were managed by aggressive surgical approach and resulted good treatment outcomes. Hence, aggressive surgical approaches are important to treat the intradural extramedullary tumors.

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