Section: Neurosurgery

Original Research Article

CLINICOPATHOLOGICAL STUDY OF INTRADURAL EXTRAMEDULLARY SPINAL CORD TUMORS

Gaddala Penchalaiah[1], Injeti Babji Syam Kumar[2], Lukka Venkata Rambabu[3], Medicherla Krishna Manikumar[4], Bode Sasidhar[5]

[1]*Associate Professor, Department of Neurosurgery, Government Siddhartha Medical College, Vijayawada, Andhra Pradesh, India.*
[2]*Professor & HOD, Department of Neurosurgery, Government Siddhartha Medical College, Vijayawada, Andhra Pradesh, India.*
[3]*Assistant Professor, Department of Neurosurgery, Government Siddhartha Medical College, Vijayawada, Andhra Pradesh, India.*
[4,5]*Postgraduate, Department of Neurosurgery, Government Siddhartha Medical College, Vijayawada, Andhra Pradesh, India.*

Received *: 03/03/2025*
Received in revised form *: 11/05/2025*
Accepted *: 30/05/2025*

Corresponding Author:
Dr. Gaddala Penchalaiah,
Associate Professor, Department of Neurosurgery, Government Siddhartha Medical College, Vijayawada, Andhra Pradesh, India.
Email: asrithpradam2010@gmail.com

DOI: 10.70034/ijmedph.2025.2.318

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (2); 1777-1781

ABSTRACT

Background: Aim: The aim of this study is to analyze the clinical presentation, imageology, resectability, to know the incidence of different types of tumors in intradural extramedually compartment and to study the surgical outcome.
Materials and Methods: This is a prospective study of 30 cases of intradural extramedullary tumors were treated in the department of Neurosurgery, government General Hospital, Guntur from September 2024 to April 2025.
Results: In the present series among all the spinal tumors the incidence of intradural extramedullary spinal tumors is 53.57%. Most of the intradural extramedullary tumors in the third decade (36.66%) Mean age of presentation for Meningioma is 36 years and for nerve sheath tumors is 39.5 years. In our series among the intradural extramedullary tumors, nerve sheath tumors contributed 50% followed by Meningioma 30%. Nerve sheath tumors shown male predominance (73%) as compared to Meningiomas, which are common in females (100%). Most of the followed by tumors were located in thoracic region (60%) followed by cervical (23.33%) and lumber (16.66%). Total excision of tumors is achieved in 93.33% cases. Early post operative complications were CSF leak (6.66%), wound infection (3.33%) and meningitis (3.33%). No neurological deterioration was seen post operatively. Immediate improvement is seen in (60%) and gradual improvement is seen in (36.66%) and one patient (3.33%) showed no improvement. Mean follow-up period was 11 months, maximum of 24 months and minimum of 6 months during this period. No recurrence of tumor noted. Percentage of syndromic lesions was 3.33% (1 patients had NF-II).
Conclusions: The present study concluded that, Nerve sheath tumors and Meningiomas are the most common in intradural extramedullary spinal lesions and complete excision is possible in all most all cases. Prognosis is usually good, in spite of poor neurological status at the time of presentation.
Keywords: Intradural extramedullary tumors, Meningiomas, Nerve sheath tumors.

INTRODUCTION

Intradural extramedullary tumors of the spine are the commonest intradural tumors of the spine (67% in the series of Elseberg).[1] They are common in middle age group and most of them are benign in nature, most of them being nerve sheath tumors and Meningiomas. The early diagnosis and surgical removal and relieving pressure on the cord along with an intensive rehabilitation gives excellent results with best outcome.

Aim and Objectives

The aim of this study is to analyze the clinical presentation, imageology, resectability, to know the incidence of different types of tumors in intradural extramedually compartment and to study the surgical outcome.

MATERIALS AND METHODS

This is a prospective study of 30 cases of intradural extramedullary tumors were treated in the department of Neurosurgery, government General Hospital, Guntur from September 2024 to April 2025.

Inclusion Criteria

1. Age groups from 1 year to 60 years.
2. Cases include Cervical, Dorsal, and Lumbar region.
3. Elective and emergency cases.
4. Cases undergone Histopathological examination.

Exclusive Criteria

1. Extremely ill health and not fit for surgery cases were excluded.
2. Recurrent cases.
3. Patients who are not giving consent were excluded.
4. Age above 60 years.

Clinical Evaluation

The clinical presentation, imagiology, repectability, histopathology, surgical outcome were studied. All the patients were thoroughly evaluated to know the symptoms and signs with particulars stress on motor and sensor deficits.

Imageological Evaluation

The patients were investigated with plain spinal radiography to note the changes in spines and their joints. All the patients are evaluated with MRI for delineation of the lesion and to know the relations with cord and to know intrinsic cord changes due to tumor compression.

Surgical Treatment

All cases are treated surgically by posterior or postero lateral approaches outcome and complications were evaluated.

Follow up

All the patients were follow-up periodically and the results are analyzed.

Ambulatory status was classified on admission by using Nurick-grading scheme.

Nurick's Grade

1. Normal walk.
2. Slight difficulty in walking.
3. Disability limiting normal walk.
4. Required assistance in walk.
5. Bed ridden.

RESULTS

During September 2024 to April 2025, 56 spinal tumors were treated at Department of Neurosurgery, Government General Hospital, Guntur. Out of which 30 cases were intradural extramedullary tumors i.e. 53.57%.

Age Incidence

The youngest patient in this series was 1-year-old male child and the oldest patient was 60 years old male. Most of them were in 30-40 years age group i.e., 11 patients (36.66%).

Table 1: Age incidence

Age	Nerve Sheath Tumors	Meningioma	Others
0-10	-	-	1
11-20	-	-	-
21-30	3	3	-
31-40	6	3	2
41-50	3	2	1
51-60	3	1	2

SEX INCIDENCE

Male: 12 (40%)

Female: 18 (60%)

Slight female predominance is seen in occurrence of intradural extramedullary tumors.

Table 2: Sex Incidence

Sex	Nerve Sheath Tumors	Meningiomas	Others
Male	11 (73.33%)	0	4 (66.66%)
Female	4 (26.66%)	9 (100%)	2 (33.33%)

Clinical Features

The duration of symptoms varies from 2 months to 5 years with a mean of 2 years 2 months.

Table 3: Clinical Featurs

Symptoms	Total	Nerve Sheath Tumors	Meningioma	Others
Neck Pain / Radicular Pain	15	5	8	2
Paraeshesia	19	7	8	4
Weakness Of Limbs	29	15	9	5
Bladder & Bowel Symptoms	12	5	4	3

Ambulatory status was classified on admission by using Nurick-grading scheme. Eleven patients were ambulatory on admission and exhibits nurick grade 1 and 2 status. Eleven patients were in Grade 1 and in

Grade 2. The mean duration of gait difficulty was 6 months. Eight patients were in grade 3, 7 patients in grade 4 and 4 patients were bed ridden. i.e., with grade 5.

Table 4: Nurick Grade

Nurick Grade	Total	Nerve Sheath Tumors	Meningioma	Others
Grade - 1	7	4	-	3
Grade - 2	4	3	-	1
Grade - 3	8	4	2	2
Grade - 4	7	3	4	-
Grade - 5	4	1	3	-

All patients were investigated with plain X-ray Ap and lateral view of the appropriate region and by MRI study. And other investigations for surgical fitness like CXR, ECG, Blood urea, blood sugar, serum creatinine and blood grouping Rh typing were done.

Tumor Location

The tumor location was noted be thoracic in 18 (60%) patients, lumbar in 5 (16.66%) and cervical in 7 (23.33%) patients. In 80% of cases the tumors were located posteriorly and 20% were located posterolaterally.

Table 5: Tumor location

Tumor Location	Total	Nerve Sheath Tumors	Meningioma	Others
Cervical	7 (23.33%)	5 (33.33%)	1 (11%)	1
Thoracic	18 (60%)	8 (53.33%)	8 (89%)	2
Lumbar	5 (16.66%)	2 (13.33%)	0 (0%)	3

Surgery: All the patients underwent surgery, 26 patients were operated through the posterior approach, laminectomy was performed and in 4 patients laminectomy was extended laterally to remove the tumor completely.

Total excision was achieved was achieved in 28 cases. Near total excision was done in 2 cases.

Complications

The postoperative period was smooth in all patients. No postoperative neurological deterioration was found. CSF leak occurred in 2 patients (6.66%) who were treated with repeated lumbar punctures and actezolamide. One patients (3.33%) developed wound infection and one patient (3.33%) developed meningitis in postoperative period, who responded to the appropriate antibiotics. 24 cases were followed up. Mean follow up period was 11 months. No recurrence was noted.

Table 6: Histopathology

	N=30	%
Nerve Sheath Tumors	15	50%
Meningioma	9	30%
Lipoma	1	3.33%
Granulomatous Lesions (TB)	3	10%
Arachnoid Cyst	2	6.66%

Nerve sheath tumor was the common histopathological type (15) followed by Meningiomas (9), out these 9 cases 5 were psammomatus Meningiomas, 4 were meningothelial Meningiomas.

OUTCOME

Table 7: Outcome

Nurick Grade	At Presentation		After Surgery	
	No. Of Cases	Percentage	No. Of Cases	Percentage
1. Normal walk	7	23.33%	10	33.33%
2. Slight difficulty in walking	4	13.33%	8	26.66%
3. Disability limiting normal walk	8	26.66 %	7	23.33%
4. Required assistance in walk	7	23.33%	4	13.33%
5. Bed ridden	4	13.33%	1	3.33%

DISCUSSION

This is a prospective study of 30 cases of intradural extramedullary tumors carried out at Government General Hospital, Guntur, from Septmber2024 to April 2025. All the cases were operated in Govt. General Hospital, Guntur by team of surgeons. An analysis of clinical features and surgical outcome is discussed.

Out of 56 cases of spinal cord tumors operated during the period, 30 tumors were located in the intradural extramedullary compartment, the incidence in our series being 53.57%. There were 15 cases of nerve sheath tumors (50%) and 9 cases of meningiomas (30%), 2 cases of Arachnoid cyst (6.66%), 3 cases of

Granulomatous lesions (10%) 1 case of lipoma (3.33%).

The incidence of nerve sheath tumor reported, was 50% and that of meningioma 30% of all intradural extramedullary tumors. Majority of the nerve sheath tumors were present in 3rd decade and majority of meningioma were present in 2nd and 3rd decades with female preponderance. Thoracic spine was common site of occurrence which is corresponding with the literature reported by Sridhara et al.[1]

Spinal Nerve Sheath Tumors

The benign nerve sheath tumors, neurinomas were the commonest intraspinal tumors in our series of 30 total cases with incidence of 15 (50%). In the literature the incidence of nerve sheath tumors reported as 25% in the series reported by Kinsella et al,[4] majority of the tumors occur in middle age group from 35-55 years in our series.

Neurofibromas occur frequently in the thoracic region, the rest being almost equally distributed between the cervical and lumbosacral regions. In series 60% of tumors were located in thoracic region, 23.33% in cervical, 16.66% in lumbar region which is 7:2:2 ratios corresponding with Pense series.[3] Majority of the tumors located posteriorly or posterolaterally to the spinal cord, ensuring a greater percentage of surgical success without complications. In our series 86.66% were located posteriorly, 13.33% posterolaterally. The majority tumors occupy both intra and extradural compartments.

The presenting symptoms in our series presented with mean duration of 2 years and 2 months. Symptoms were back pain 50%, tingling and numbness 63.33%, weakness of extremities 96.66%, bladder disturbances 40%, hyperreflexia and severe spastisity noted in 72% were documented on initial neurological examination. Radicular pain and sensory symptoms corresponding with series of Taylor et al,[2] higher incidence of weakness and bladder disturbance in our series due to randomized distribution of population and availability of facilities and socio economical status of patient population.

Surgical Outcome

Surgery was indicated in all patients in our series and complete excision of the lesion was achieved in 93.33% of cases. Which corresponds with results of Sridhara et a1.[1] The rate of nerve root preservation in our series was 98%, without any persisting deficits after sacrificing the nerve root in 2 cases. We have no mortality in our series. No postoperative neurological deterioration noted in our series.

Functional Outcome

In our series in the immediate post operative period on day 1 improvement in spasticity was seen 90% of cases, and 85% had complete pain relief on follow up. 80% of patients had normal sensation who had prior sensory loss, and 50% of patients who had grade II motor deficits preoperatively improved to normal, 10% of preoperative patients with grade III deficit improved to grade II on 6 months follow up.

Bladder function improved in 90% of patients on follow up for 6 months, and 9% of patients with grade V preoperatively had improved to grade IV on 12 months follow up. One patient had urinary incontinence as no improvement post operatively. The functional outcome results in our series correspond with the series reported by Taylor et al.[2]

The presenting symptoms in our series of Meningioma cases were pain in 8 (89%), sensory disturbance in 8 (89%), weakness in 9 (100%) bladder dysfunction in 4 (44%) were corresponding to Roux et al5series with 72%, 61%, 80% and 37%. Gait abnormality was seen in all 9 (100%) of all patients in our series by O.N. Gottified et al.[6]

In our series majority of tumors (89%) were located in thoracic region, which is corresponding with 80%, 80%, 83% and in a series of mayo clinic, Roux et al,[5] Solero et al,[7] respectively.

Overall functional outcome was excellent in our series and no deterioration seen. The results compared with king et al 95% and 1% and O.N. Gottfried et al,[6] with 92% and 0% respectively. In our series preoperative ambulatory patients were 63.33%, non ambulatory 36.66% and in other ErieKing et al8 74%, Samii10 74% and postoperatively in our series 96.66% became ambulatory in 2 months period which is corresponding with 97% in king et al.[8]

Morality was nil in our series where cause of death is unrelated to surgery and primary disease. Our series result was corresponding with 0% morality.

In present series histopathology showed 44% meningithelial and 56% psammomatus Meningiomas. Recurrences of spinal Meningiomas were most series the rate ranged from 1.3 to 6.4%. Ketter et al,[9] reported that Meningiomas did not have genetic abnormalities found in recurrent intracranial Meningiomas suggesting that they had a more indolent nature.

CONCLUSION

Nerve sheath tumors and Meningiomas are the most common in intradural extramedullary spinal lesions and complete excision is possible in all most all cases. Prognosis is usually good, in spite of poor neurological status at the time of presentation.

Conflict of Interest: None

Funding Support: Nil

REFERENCES

1. K. Sridhra, Ravi Rammurthy, MC Vasudevan et al: Gaint invasive schwannoma. Definition and management stratergy. J Neurosurg. Spine 94: 210-15, 2001.
2. Taylor AR, Byrnes DP, foramen magnum and high cervical cord compression. Brain 1974: 97, 473-480.
3. Pesne M, galasko CS, Barrie JL; Dealy in diagnosis of intradural spinal tumors spine 17 (9): 1110, 1992.
4. Kinsella LJ Carney, Goddey K, Fledmann E. Lichen Simplex chronicus as the initial manifestation of intramedullary neoplasm and syringomyelia. Neurosurg. 30: 418, 1992.
5. Roux F: Nataf F, Pinaudaeu M, et al: intra spinal Meningiomas, review of 54 cases with dispensation to poor

prognosis and modern therapeutic management Surg. Neurol, 46: 458-464, 1996.
6. Gottried MD. Wayne auF, Nd, Alfredo quinines - Hirojasa MD Peterkin. Spinal Meningiomas, surgical management and outcome. Neurosurg focus: 14: 6: 2: 2003.
7. Elseberg CA, Beer E, the operability of intramedullary tumors of spinal cord. Remarks on extrusion of intra spinal tumors. Am. J. Med. Sci. 142: 636: 1911.
8. Solero CL. Forneri M. Giombini S et al: spinal Meningiomas. Review of 134 operated cases. Neurosurg. 25: 153-166: 1989.
9. King AT, Shar M. Gudan RW et al: Spinal Meningiomas: A 20 hrs Review: J: Neurosurg. 12: 521-526: 1998.
10. Ketter R. Henn W, Nieder Mayer I, et al: predictive value of progression associated Chromosomal for prognosis of Meningioma. Retrospective study 198 cases J. Neurosurg. 95: 601-607-2001.
11. Kleolamp J, Samii M, Surgical results for spinal Meningiomas. Neurol. 52:552 – 562, 1999.