



RETROSPECTIVE ANALYSIS OF BENIGN SPINAL CORD TUMORS :AN INSTITUTIONAL EXPERIENCE

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ABSTRACT:

BACKGROUND: Spinal cord tumors account for about 15% of central nervous system neoplasm. Benign and malignant neoplasms can arise from intraspinal structures such as meninges, spinal cord, nerve roots, blood vessels and other tissues.¹ These are 10 times less frequent than intracranial tumors with majority of them being benign. Space occupying lesions in the spinal canal cause compression of the structures with resultant neurological deficits.

AIMS AND OBJECTIVES: To study various clinical presentation radiological correlation, pathological nature, surgical approaches, morbidity, mortality, the recovery and improvement in follow up of patients operated for “Benign spinal tumors”

MATERIALS AND METHOD: In this prospective and observational study of 50 patient who Underwent surgery in the B.J.M.C, Government Medical College and Hospital, Ahmedabad, from August 2015 to December 2018 for “Benign spinal cord tumors”. Ethical clearance was taken from institutional review committee.

OBSERVATION AND RESULTS: Our study shows incidence of “ Benign spinal tumor” was maximum in age group 41-50 year with 20 % and minimum in 31-40 year with 6%, male is 54% and in female is 46 % which was almost equal, Patients presented with weakness (48 %) as the most common complain followed by back pain (46%). Most common bowel-bladder symptom was urinary incontinence which was present in (8%) of patients, followed by retention(6%), constipation in(4%) and fecal incontinence in 4%. Out of the 50 patients in this study 42 % had weakness in lower limbs, 6 % had weakness in upper limbs, 8 % had weakness in both and 44 % patients had no weakness. 46 % of our patients presents with hypertonia, 32 % of patients presents with impaired touch, pain and temperature sensation and 12 % with impaired joint and position sensation. most common location of tumor is in dorsal region (30%). most common location of tumor is in Intradural Extramedullary (IDEM) and then Intradural Intramedullary (IDIM). Benign spinal tumor causes displacement of the cord in 12 % of patient, compression in 52 % of patients, enlargement of the cord in 12 % and no effect in 24 % of patients. complete tumor removal was achieved in 86 % of patients, while in 14% near total removal was done. Out of the total 50 patients, in 39 patients dura was closed primarily, while in 11 patients fascia lata graft was used for dural repair. Our study shows most common tumors are nerve sheath tumors, accounts for 32% of the total tumors. Next most common tumor is meningioma, which accounts for 20% of the tumors and epidermoid is 20%. 72 % of patients improved neurologically



while 8% patients deteriorated neurologically and 20 % of patients remain same as preoperative status of neurology.

CONCLUSION: This study of describing the demographic characteristics, histopathological features, anatomical location, and vertebral level of these tumors treated surgically.. Data in the current study represent the characteristics of primary spinal cord tumors in Asian countries. Tumour type and biology plays an important role, with benign IDEM tumours displaying the best prognosis for long term survival after complete excision. The pretreatment neurological status of the patient is important in determining outcome after treatment. Delayed presentation is the main reason for poor preoperative neurologic status, leading to poor outcome in the management of spinal tumors. A high level of suspicion and acknowledging the classical symptoms of cord compression are the most important factors in shortening the time to diagnosis of spinal tumors.

INTRODUCTION

Spinal cord tumors account for about 15% of central nervous system neoplasm. Benign and malignant neoplasms can arise from intraspinal structures such as meninges, spinal cord, nerve roots, blood vessels and other tissues.¹ These are 10 times less frequent than intracranial tumors with majority of them being benign. According to their location, spinal tumors are conveniently 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 (intraduraextramedullary [IDEM]).²

Space occupying lesions in the spinal canal cause compression of the structures with resultant neurological deficits. Rapidly growing lesions cause severe loss of function as there is no time for the spinal cord to adjust itself. The presence of a tumor interferes with the normal movements of the cord, which occur during movements of the spinal column. Such impairment contributes to cord damage. In long standing tumors, there may be gliosis in the spinal cord due to ischemia and recovery may be incomplete despite complete removal of the tumor. Initial assessment of the patient with a primary spinal tumor requires meticulous application of common clinical tools including a detailed history and clinical examination. Clinical presentation usually relates to pain, varying degrees of motor sensory deficits as well as bowel bladder symptoms in some, which may be due to either mass effect or neurological compression.³

AIMS AND OBJECTIVES

To study various clinical presentation, radiological correlation, pathological nature, surgical approaches, morbidity, mortality, the recovery and improvement in follow up of patients operated for Benign spinal tumors.

MATERIALS AND METHOD

In this prospective and observational study of 50 patient who Underwent surgery in the B.J.M.C, Government Medical College and Hospital, Ahemedabad, from August 2015 to December 2018 for “Benign spinal cord tumors”.

INCLUSION CRITERIA

- Intraduraextramedullary benign spinal tumors.



- Extradural benign spinal tumors extending into intradural compartment.
- Intradural Intramedullary benign congenital tumor.

EXCLUSION CRITERIA

- Intramedullary malignant tumor like astrocytoma and ependymoma
- Vascular malformations
- Infective pathologies including tuberculoma, hydatid cyst etc
- Primary bony spinal tumor.
- Tumor like conditions like eosinophilic granuloma, Histiocytosis X, aneurysmal bone cyst.

OBSERVATION AND RESULTS

- Our study shows incidence of “ Benign spinal tumor” was maximum in age group 41-50 year with 20 % and minimum in 31-40 year age with 6%. Benign spinal tumor was also frequent in pediatric age group in first and second decade. In our study male is 54% and in female is 46 % which was almost equal.
- Patients presented with weakness (48 %) as the most common complaint followed by back pain (46%). Most common bowel-bladder symptom was urinary incontinence which was present in (8%) of patients, followed by retention (6%), constipation in (4%) and fecal incontinence in 4%. Out of the 50 patients in this study 42 % had weakness in lower limbs, 6 % had weakness in upper limbs, 8 % had weakness in both and 44 % patients had no weakness. 46 % of our patients presents with hypertonia, 32 % of patients presents with impaired touch, pain and temperature sensation and 12 % with impaired joint and position sensation.
- Our study shows most common location of tumor is in dorsal region (30%). Next common location is Dorsolumbar region (28%), followed by cervical region (14.08%).
- Our study shows most common location of tumor is in Intradural Extramedullary (IDEM) and then Intradural Intramedullary (IDIM). Benign spinal tumor causes displacement of the cord in 12 % of patient, compression in 52 % of patients, enlargement of the cord in 12 % and no effect in 24 % of patients.
- Our study shows complete tumor removal was achieved in 86 % of patients, while in 14% near total removal was done. Out of the total 50 patients, in 39 patients dura was closed primarily, while in 11 patients fascia lata graft was used for dural repair. Out of which 3 (2.7%) duroplasty was having CSF leak in which one is FLG and two is primary dural repair. Both of which was treated by conservative management like repeated aspiration, antibiotic and tab Diamox. Other complications are primary wound infection in 3.6%. In 3.6 % of the patients in our study there was transient deterioration of power which gradually improved over time.
- Our study shows most common tumors are nerve sheath tumors, accounts for 32% of the total tumors. Next most common tumor is meningioma, which accounts for 20% of the tumors and epidermoid is 20%. Other least common tumors are arachnoid cyst, neuroenteric cyst, dermoid, lipoma, simple cyst.



- Our study shows 50 patients of “Benign spinal tumors” 52 % of patients improved neurologically while 8% patients deteriorated neurologically and 40 % of patients remain same as preoperative status of neurology.

Table- 1: Age Distribution

S.N.	Age (Yr)	No of Patient	Percentage %
1.	1-10	6	12%
2.	11-20	6	12%
3.	21-30	9	18%
4.	31-40	3	6%
5.	41-50	10	20%
6.	51-60	8	16%
7.	61-70	10	20%
8.	≥ 71	0	0

Table - 2: Sex Distribution

Sex	No Of Patient	Percentage %
Male	27	54%
Female	23	46%

Table - 3: Clinical Symptoms

Symptom	No Of Patient	Percentage (%)
Back pain	23	46%
Radiating pain	17	34%
Limb pain	7	14%
Numbness/ Tingling	16	32%
Ulcer in l/l	1	2%
weakness	24	48%
Walking difficulty	22	44%
Back swelling	1	2%

Table-4: Bowel and Bladder Involvement

Symptom		No of Pts	(%)
Urinary Symptoms	Retention	3	6%
	Incontinence	4	8%
Bowel Symptoms	Constipation	2	4%
	Incontinence	2	4%



Table – 5:Neurological Examination

Examination		Pts	(%)
Decreased Power	Upper Limbs	3	6%
	Lower Limbs	21	42%
	Both	4	8%
	None	22	44%
Tone	Increased	23	46%
	Decreased	5	10%
	Normal	22	44%
Impaired Sensation	Touch, Pain& Temperature	16	32%
	JPS	6	12%

Table-6:RadiologicalLocation of Tumor

Location	No of Patient	Percentage (%)
Cervical	10	20%
Cervicodorsal	2	4%
Dorsal	15	30%
Dorsolumbar	14	28%
Lumbar	7	14%
Lumbosacral	2	4%
Total	50	100%

Table – 7: Location of Tumor

Location	EDEM	IDEM	IDIM
Cervical	2 (4%)	5(10%)	3(6%)
Cervicodorsal	0	1(2%)	1(2%)
Dorsal	1(4%)	10 (20%)	4(8%)
Dorsolumbar	2(4%)	7(14%)	5(10%)
Lumbar	1(2%)	4(8%)	2(4%)
Lumbosacral	1(2%)	1(2%)	0
Sacral	0	0	0
Total	7(4%)	28(4%)	15(30)

Table 8:Effecton The Cord by Tumors

S.N.	Feature	No of Pts	Percentage (%)
1	Compressed	26	52%
2	Displaced	6	12%
3	Enlarged	6	12%
4	None	12	24%

Table – 9:Extent OfTumor Removal



Tumor Removal	Total	Percentage (%)
Complete	43	86%
Neartotal	7	14%
Total	50	100

Table – 10: Dura closure

Closure	Patients (%)
Primary	39 (78%)
FLG	11 (22%)

Table-11:Postoperative Complication

Complication	Pts
CSF Collection	3 (2.7%)
Wound Hematoma	0
Primary Infection	4 (3.6%)
Deterioration Of Power	4 (3.6%)
Spine Instability	0

Table-12:Histopathological Incidence

N	Diagnosis	Pts (%)	
1	Meningioma	10 (20%)	
2	Nerve sheath Tumor	Schwannoma	11
		Neurofibroma	5
		16 (32%)	
3	Arachnoidcyst	2(4%)	
4	Neuroenteric/ Enterogeneous Cyst	4 (8%)	
5	Epidermoid	10 (20%)	
6	Dermoid	2 (4%)	
7	Lipoma	3 (6%)	
8	Simple Cyst	3 (6%)	



Table – 13:Follow Up For Weakness

Status of Weakness	Total	Percentage (%)
Improved	36	72%
Deteriorated	4	8%
Same	10	20%

DISCUSSION:

We have compared our study age group with study of **Linh Duong et.al U.S 2012 (1)** and **Kyu Jung et.al Korea 2014(2)** in given below table.

S.N.	Age Group (Yr)	(%)	Linh Duong et al U.S 2012	Kyu Jung et al Korea 2014
1.	1-10	12	1.5	1.0
2.	11-20	12	3.3	3.2
3.	21-30	18	6.0	6.7
4.	31-40	6	10.4	13.2
5.	41-50	20	17.0	22.4
6.	51-60	16	20.6	22.9
7.	61-70	20	17.2	18.8
8.	≥ 71	0	15.4	10.0

We have compared our study sex group with study of **Linh Duong et.al U.S 2012 (1)** and **Kyu Jung et.al Korea 2014(2)** in given below table.

Sex	%	Linh Duong et al U.S 2012	Kyu Jung et al Korea 2014
Male	54	38.1	42.2
Female	46	61.9	57.8

We have compared our study clinical symptoms with study of **Rajnishkumar et.al North india 2015(14)** in given below table

Symptom	%	Rajnishkumar Et. Al North India 2015
Pain	46	41.44
Parasthesias	32	18
Motor weakness	48	70.27
Walking difficulty	44	70.27
Spine deformity	0	1.8



We have compared our study bladder and bowel involvement with study of **Rajnishkumar et.al North india 2015(14)** in given below table.

<u>Symptom</u>	<u>%Of Our Study</u>	<u>Rajnishkumar Et.Al North India 2015</u>
<u>Bladder</u>	14	34.23
<u>Bowel</u>	8	8.1

We have compared our study clinical examination with study of **Rajnishkumar et.al North india 2015(14)** in given below table.

<u>Examination</u>	<u>%Of Study</u>	<u>RajnishkumarEt.Al 2015</u>
Decreased Power	56%	70.27 %
Tone	Increased	70.27 %
	Decreased	9.1 %
Impaired Sensation	32%	49.54 %

We have compared our study of tumor location with study of **Rajnishkumar et.al North india 2015(14)** in given below table.

<u>Location</u>	<u>Percentage Our Study</u>	<u>Rajnishkumar Et. Al North India 2015</u>
Cervical	20	18.91
Cervicodorsal	4	9.1
Dorsal	30	34.23
Dorsolumbar	28	13.51
Lumbar	14	10.81
Lumbosacral	4	5.40
Sacral	0%	6.30

We have compared our study of tumor location with study of **Rajnishkumar et.al North india 2015(14) and Kenichi Hirano et.al Japan 2012(15)** in given below table. Our study results are almost same with japan study.



Study	EDEM (%)	IDEM (%)	IDIM (%)
Our Study	14	56	30
Rajnishkumar et.al 2015	27.02	36.03	36.93
Kenichi Hirano et.al 2012	4.0	77.6	18.3

We have compared our study with study of **Rajnishkumar et.al North india 2015(14)**

Tumor Removal	% Of Study	RajnishkumarEt.Al 2015
Complete	86%	51.35
Neartotal	14%	19.81
Subtotal	0%	27.02

We have compared our study Complication with study of **Rajnishkumar et.al North india 2015(14)** in given below table.

Complication	% Of Study	Rajnishkumar Et. Al 2015
CSF Collection	2.7%	0.9
Wound Complication	0	1.8
Primary Infection	3.6%	0
Deterioration Of Power	3.6%	5.41
Spine Instability	0	0.9

We have compared our study of tumor Histopathology with study of **Rajnishkumar et.al North india 2015(14)** and **Kenichi Hirano et.al Japan 2012(15)** in given below table.



Diagnosis	% Of Study	Rajnishkumar Et.Al 2015	Kenichi Hirano Et.Al 2012
Nerve Sheath Tumor	32%	22.52	60.6
Meningioma	20%	6.3	11.7
Arachnoidcyst	4%	0.90	-
Neuroenteric/ Enterogeneous Cyst	8%	1.80	-
Epidermoid	20%	6.30	-
Dermoid	4%	3.60	-
Hemangio- blastoma	0	0.90	3.4
Lipoma	6%	2.70	1.5
Teratoma	0	0	-
Meningeal Cyst	0	0	-
Simple Cyst	6%	0	-

We have compared our study outcome with study of **Rajnishkumar et.al North india 2015(14)** in given below table.

Outcome	%of Our Study	RajnishkumarEt.Al 2015(14)
Improved	72%	79.27
Deteriorated	8%	5.41
Same	40%	15.31

CONCLUSION

This study of “Benign spinal cord tumors” describing the demographic characteristics, histopathological features, anatomical location, and vertebral level of these tumors treated surgically. Similar to other reports from Asian countries, there is a equal male/female ratio for all Benign spinal cord tumors in this study. There is also a higher proportion of NSCTs, and a lower proportion of meningiomas and neuroepithelial tumors as compared to NSCTs. Data in the current study represent the characteristics of primary spinal cord tumors in Asian countries.

Tumour type and biology plays an important role, with benign IDEM tumours displaying the best prognosis for long term survival after complete excision. The pretreatment neurological status of the patient is important in detennining outcome after treatment.

Delayed presentation is the main reason for poor preoperative neurologic status, leading to poor outcome in the management of spinal tumors. A high level of suspicion and



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DISCUSSION

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