

TO DETERMINE SHORT TERM COMPLICATIONS OF INTRADURAL EXTRAMEDULLARY SPINAL TUMOR SURGERY

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ABSTRACT

Objective: To determine short term complications of spinal intradural extramedullary tumors surgery.

Materials And Methods: This was a cross sectional descriptive study of one year from 01-04-2014 to 31-3-2015 on 56 patients. The study was conducted after approval from hospitals ethical and research committee. MRI spine were studied in detail for all patients to know about the site, size, shape, extent and nature of the tumor. History, examination, pre-operative MRI findings, post-operative complications were documented. Short term post-operative complications were documented immediately after surgery, during stay at hospital and follow-up visits till 7th post operative day.

Results: In this study, 56 patients with spinal intradural extramedullary tumors had observed. Male to female ratio was 1.33:1. Average age of the patients was 34 years+11.02SD with range 5-63 years.. Meningitis was the common complication and occurred in 18(32.1%) patients, followed by Neurological Deficit 17(30.4%) cases, Wound Infection was found in 11(19.6%), CSF leak was noted in 13(23.2%) patients and mortality was found in 2(3.6%) of the cases.

Conclusion: Early recognition of the signs and symptoms of intradural extramedullary spinal cord tumors facilitates early diagnostic evaluation and treatment, potentially minimizes neurologic morbidity, and may improve outcome.

Key Words: Neurological deficit, Meningitis, CSF leak, intradural extramedullary tumors.

INTRODUCTION

Approximately 15% to 20% of all the central nervous system tumors occur in the spinal canal. Intradural extramedullary spinal cord tumor lies inside the dura matter. These tumors comprise more than 2/3rd of all the spinal tumors. Patients presents with progressive neurological signs and symptoms. These include pain, which is radicular in nature, dull aching sensations aggravated more at night especially at lying down and relieved in upright position.^{1,2}

Motor weakness is also the presenting feature with either hyper reflexia and spasticity or hypotonic paraplegia. Autonomic dysfunction i.e. bladder and bowel incontinence or retention may occur early in course of disease specially with tumors of cauda equina^{1,2} and late presentation in tumors of filum terminale.² Sensory deficits may occur including loss of sensations, parasthesia & numbness.²

The most commonly used investigation modality is Magnetic Resonance Imaging (MRI)^{2,3} Schwannomas are isointense on T1 weighted images and enhance brightly on contrast. Meningiomas are hyperintense on contrast and show linear enhancement pattern called dural tail sign.²

The management option includes laminectomy one level above and below the lesion ,gross total resection of tumor was done through posterior approach. A hemi laminectomy and tumor removal can be an alternative approach.³

Short term complications of surgery for spinal intradural extramedullary tumors include risks of GA, hemorrhage, CSF leak, infection and new significant neurological deficits which often do not resolve.^{3,6} These Neurological deficits may be motor sensory or autonomic ranging from 16.6% to 38.8%.^{2,7,8} CSF leak according to some studies is 13% to 23%.^{2,7,9} is treated with either lumbar puncture, lumbar drain or re exploration of the wound⁶. Wound infection according to some studies range from 9% to 13.7%^{7,10,11} may need intravenous antibiotics and or debridment for treatment.⁶ The overall complication rate according to some studies ranges from 32% to 75%.^{3,7,11}

Despite the advances in microsurgical technique, there remain a number of serious complications related to the treatment of spinal tumors. Identification and acknowledgment of these potential problems may assist in their prevention, early detection, and increased quality of life for patients afflicted with this disease. The aim of this study is to highlight the complication rates of surgery for these tumors in our population. The results

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of this study can be very useful as if significantly high, we can formulate further recommendations for further research work over it before coming on to recommendations which will help us in reducing morbidity related to surgery for spinal intradural extramedullary tumors.

MATERIALS AND METHODS

This study was considered after approval by the ethical committee of Naseer teaching hospital, Peshawar. This was a cross sectional descriptive study of one year from 01-04-2014 to 31-03-2015 on 56 patients. All patient of either gender and any age having spinal intradural extramedullary tumor operated through posterior approach only, and willing for surgery included in this study. Those patients meeting the inclusion criteria were enrolled in the study through OPD and were admitted in the ward for further workup like History, examination, pre-operative MRI findings. Informed written consent were taken from patient or relatives.

Patient with recurrent tumors and metastatic lesion especially drop metastases from the brain were excluded as they make the study results biased.

MRI brain were studied in detail for all patients to diagnose spinal intradural extramedullary tumor by Hypo to iso-intense lesion on T1 weighted image and hyperintense lesion on T2 weighted image with post contrast enhancement, uniform or bright. Short term post-operative complications (Neurological deficit, Wound infection, meningitis, CSF leak and in-hospital mortality) were documented. Short term post-operative complications were documented immediately after surgery, during stay at hospital and follow-up visits till 7th post operative day.

All the surgeries were performed by single experienced neurosurgeon having minimum of 7 years of experience. Laminectomy and tumor resection were

performed through posterior approach in all cases. Posterior spinal fusion was additionally carried out to prevent postoperative instability for the 5 cases of tumor which was located at the distal part of thoracolumbar junction. During removal of cervical tumor ventral to spinal cord the dentate ligament were incised to allow lateral retraction of spinal cord. During the excision, the nerve fiber over the surface of tumor were carefully separated and those penetrating the tumor were excised. Closure of dura matter was performed with vicryl 4-0 wound close in layer and drain was put in few cases.

The collected information were entered in Statistical Package of Social Sciences (SPSS) version 10 and were analyzed. All results were presented as graphs and tables.

RESULTS

A total of 56 patients presenting with spinal intradural extramedullary tumors were included in the study. There were 32 (57.14%) were males and 24(42.86%) were females. Male to female ratio was 1.33:1.

Average age of the patients was 34 years+ 11.02SD with range 5-63 years. Patient's age was divided in four categories, out of which most common age group for presenting with spinal intradural extramedullary tumors were was more than or equal to 51 years. There were 11(19.6%) patients were of the age less than or equal to 30 years, 14(25%) patients were in the age range of 31-40 years, 13 (23.2%) were of age range 41-50 years, 18(14.3%) presented at age more than 50 years of age.

Common complication show that Meningitis was found in majority of patients which was found in 18(32.1%) patients, followed by Neurological Deficit 17(30.4%) cases, Wound Infection was found in 11(19.6%), CSF leak was noted in 13(23.2%) patients and mortality was found in 2(3.6%) of the cases. (Fig 1)

Table No: I Age Wise Distribution of Common Complication (n=56)

		age (years)							
		<= 30.00		31.00 - 40.00		41.00 - 50.00		51.00+	
		number	%	number	%	number	%	number	%
Neurological Deficit	Yes	1	9.1%	3	21.4%	6	46.2%	7	38.9%
	No	10	90.9%	11	78.6%	7	53.8%	11	61.1%
Wound Infection	Yes	5	45.5%	0	.0%	4	30.8%	2	11.1%
	No	6	54.5%	14	100.0%	9	69.2%	16	88.9%
Meningitis	Yes	5	45.5%	2	14.3%	5	38.5%	6	33.3%
	No	6	54.5%	12	85.7%	8	61.5%	12	66.7%
CSF Leak	Yes	1	9.1%	4	28.6%	3	23.1%	5	27.8%
	No	10	90.9%	10	71.4%	10	76.9%	13	72.2%
Mortality	Yes	0	.0%	0	.0%	0	.0%	2	11.1%
	No	11	100.0%	14	100.0%	13	100.0%	16	88.9%

Table No: 2 Gender Wise Distribution of Complication

		Gender			
		Male		Female	
		number	%	number	%
Neurological Deficit	Yes	12	37.5%	5	20.8%
	No	20	62.5%	19	79.2%
Wound Infection	Yes	8	25.0%	3	12.5%
	No	24	75.0%	21	87.5%
Meningitis	Yes	12	37.5%	6	25.0%
	No	20	62.5%	18	75.0%
CSF Leak	Yes	7	21.9%	6	25.0%
	No	25	78.1%	18	75.0%
Mortality	Yes	2	6.2%	0	.0%
	No	30	93.8%	24	100.0%

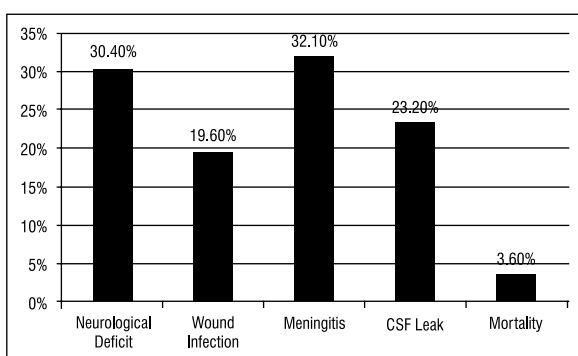


Fig: i. Common short term complication after spinal intradural tumors surgery (n=56)

Age wise distribution of common complication shows that infection was observed in majority of proportion in ages group of less than or equal to 30 years and 41-50 years. Neurological Deficit was found in majority of cases having age 41-50 years of age. Meningitis was frequently occur in less than 30 years of age group. CSF leak was noted in age group of 31-40 years. Finally mortality found in old ages of more than 50 years of age. Table 1

Gender wise common complications in patients presenting with spinal intradural extramedullary tumors shows that gender have some role over them except CSF leak. There were 7(21.9%) CSF leak in male and 6 (25%) in female patients. Table 2

DISCUSSION

Intradural extramedullary spinal tumours account for only a small proportion of central nervous system tumours, with an incidence of 0.3 per 100,000 per year¹². Despite their rarity, there is an extensive literature on the management of these tumours. Over the past 30 years, the approach towards management of these tumours has become more aggressive in an attempt to preserve

or improve neurological function¹³⁻¹⁶

The first successful surgical removal of an intradural extramedullary spinal tumor is credited to Victor Horsley in 1887¹⁶. The tumor was a fibromyxoma and removed via laminectomy. More than 100 years later, despite vast improvements in imaging, anesthetic care, and surgical instruments, the technique remains basically the same. Intradural extramedullary spinal cord tumors are relatively rare lesions and are thought to have an incidence of up to 10 per 100,000 people^{17,18}. These lesions are broadly divided into two categories based on location: intramedullary and extramedullary. In adults, extramedullary tumors comprise approximately 70% of intradural spinal tumors. In the pediatric population, the distribution of intramedullary and extramedullary tumors is roughly even^{19,20}. In the adult population, the most common intradural, extramedullary spinal tumors arise from the nerve sheath (approximately 30%) and from the meninges (approximately 25%)¹⁸.

Most of these lesions are benign and patients typically benefit from surgical decompression and resection. Traditional surgical resection most often entails a posterior midline approach to the lesion with stripping of muscles and ligaments off of the underlying lamina and spinous processes. A bilateral laminectomy is usually performed from one level above the lesion to one level below the lesion to facilitate access and visualization. In the past century, surgeons have reported excellent results in resecting intradural-extramedullary spinal neoplasms. Sepalla et al.²¹ reported a series of 187 patients that underwent surgical resection for spinal schwannomas. In this large series, 90% were completely resected with a 10% surgical complication rate and 1.5% surgical fatality rate. Levy²² also reported similar results on 66 patients with a 9% surgical complication rate and a 1.5% mortality rate. Potential complications (aside from neurological injury during resection) include pain, spinal instability, and cerebrospinal fluid leak.

In terms of mortality, our result correlate well with other series, with a reported range between 0-4.4%²⁵⁻²⁸. Approximately 20% of patients in this study experienced residual focal deficits, none of which were disabling. Others report similar outcomes among patients with similarities to our patient sample, with significant improvement in 62-88% of cases and clinical worsening in only a minority of patients (1-5%)²⁵.

Kucia EJ, Bambakidis et al. Reported a series of 67 patients that underwent resection for spinal schwannoma, gross total resection was done. CSF leak was observed in 13% to 23% which correlate with our studys. csf leak is treated with either lumbar puncture, lumbar drain , or re-exploration of wound.^{2,7,9}

Yadla,Maloe-j et al. reported a series of 248 patients that underwent spinal surgery, total complication rate was 53.2% . wound infection was observed in 9% to 13% which again correlate with our study, may need intravenous antibiotic and or debridement for treatment.^{7,10,11} There are few limitation in our study ,first the sample size is small, second intraoperative neuromonitoring was not done in any case, which may interfere the result. So randomize control trial should be done in order to prove our result.

CONCLUSION

The most common short term complication of intradural extramedullary spinal cord tumor were Meningitis followed by neurological deficit, wound infection and CSF leak. Early diagnosis of complication and prompt treatment will save many lives and limit morbidities.

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