IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 12 Ser.5 (December. 2020), PP 57-60
www.iosrjournals.org

Functional Outcome after Resection of High Cervical Spinal Cord Tumours: A Case Series

Kh Vyas[1], M Amit[2]
[1]*Associate Professor, Neurosurgery Unit, Department of Surgery, Jawaharlal Nehru Institute of Medical Sciences, (JNIMS), Imphal, Manipur, India*
[2]*Consultant Neurosurgeon, Neurosurgery Unit, Department of Surgery, Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Imphal, Manipur, India*
Corresponding author: Kh Vyas, Associate Professor, Neurosurgery Unit, Department of Surgery, Jawaharlal Nehru Institute of Medical Sciences, (JNIMS), Imphal, Manipur, India

Abstract:
Primary spinal cord tumours comprises 5-10% of all central nervous system tumours, which are characterised into separate entities depending on its anatomic location such as intradural extramedullary (IDEM), intradural intramedullary (IDIM) and extradural. Patients of high cervical spinal cord tumours of long duration have great morbidity. This case series analysis is done to assess the functional outcome in patients after surgical removal of these tumours.

Key Words*: Spinal cord tumours, Surgical outcome.*

Date of Submission: 28-11-2020 Date of Acceptance: 13-12-2020

I. Introduction

Primary tumours involving spinal cord or nerve roots are somewhat identical to intracranial tumours in histological type[1]. According to its anatomic location spinal cord tumours are distinguished as intradural and extradural with some having a propensity for both. Intradural spinal cord tumours consists of intradural extramedullary (IDEM) and intradural intramedullary (IDIM) types. Intradural spinal cord tumours accounts for 0.3% per 100,000 per year.[2,3] Thoracic location are found more often than cervical location.[3,4,5] Nerve sheath tumours are the most common spinal cord tumours such as schwannoma and neurofibroma, both (30%) followed by meningioma (25%).[6,7] Presentations are usually motor disturbances in the form of spasticity and weakness, sensory disturbances, bladder bowel involvement. Predictors of outcome are age of the patients, associated comorbid conditions, duration of symptoms, extent of tumour associated with cord compression, position of tumour in relation to spinal cord, extent of removal, histological grade of tumour, preoperative functional status, postoperative complications like CSF leak, venous thromboembolism, and infections. Which of these predictors is of utmost importance is a matter of much debate. This 6 series compilation is to see the surgical outcome after complete removal of high cervical spinal cord tumour.

II. Case Series

Case 1: A 70 year male presented with neck pain, weakness in both the upper limbs and lower limbs (more on the left side) of duration 2 years with sensory involvement and sparing sphincters function. There was no comorbid history of diabetes and hypertension. On examination power of both upper and lower limbs were grade 3 in all muscle groups. Vital parameters are all within normal limits. Investigation with Magnetic resonance imaging (MRI) of cervical spine and screening of whole spine along with contrast study revealed an enhancing mass extending from C2 to C3 on the left side, with cord compression posterolaterally. (Figures 1A, 1B). Preoperative diagnosis of schwannoma or neurofibroma was kept in mind. Preoperative workup was done and duly post for elective surgery with informed consent and after explaining the risks involved. Under general anesthesia patient was placed in a prone position with head fixed in a Sugita 4 pin frame, chest and pelvis supported with bolsters keeping the abdomen free. A midline skin incision was given slightly extending above C1 to C3 and then C2 to C3 laminae was removed. Dura was opened in the midline. Tumour was located posterolaterally on the left side, it was dissected out and complete excision was done under microscopic guidance. Dura closed in a water tight fashion so as to prevent CSF leakage, other anatomic layers were also closed in layers. Histological findings was found to be **Schwannoma.**

Case 2: A 35 year male, (immunocompromised patient on ART since last 3 years, Hepatitis B) presented with neck pain, weakness in both the right upper limbs and right lower limbs of duration more than 3 years with sensory involvement but without sphincters involvement. History of fever, headache, loose stools

were also present. No history of diabetes and hypertension. On examination, power of right upper limbs grade 1 and right lower limbs grade 2 were found. Vital parameters were all within normal limits. Investigation with Magnetic resonance imaging (MRI) of cervical spine, brain and screening of whole spine along with contrast study revealed an enhancing mass at C3 level on the right side, posterolaterally with shifting of cord. Preoperative workup was done with consultation from Physician and duly post for elective surgery. Under general anesthesia patient was placed in a prone position with head supported in a horse shoe frame, chest and pelvis supported with bolsters keeping the abdomen free. A midline skin incision extending from C2 to C4 with removal of laminae was done. Dura was opened in the midline. Tumour was located posterolaterally on the right side, separated and excised completely under microscopic guidance. Dura was closed in a water tight fashion and other anatomic layers were also closed in layers. Histological finding was found to be **Schwannoma.**

Case 3: A 42 year male presented with neck pain, weakness in both the upper limbs and lower limbs (more on the left side) of duration more than 1 and half year. On examination power of both upper and lower limbs were grade 4 at all muscle groups. Investigation with Magnetic resonance imaging (MRI) of cervical spine and screening of whole spine along with contrast study revealed an enhancing mass extending from C1/2. After fully work up of the patient it was then posted for surgery. A midline skin incison is given from inion to C3, posterior arches of C1 and C2 was removed with partial laminae of C3. After opening the dura in the midline, tumour was located posterolaterally on the left side, dissected and completely excised using microscope. Dura closed in a water tight fashion so as to prevent CSF leakage, other anatomic layers were also closed in layers. Histological finding was **Schwannoma.**

Case 4: A 44 year female presented with neck pain, numbness and weakness of both the upper limbs and lower limbs since 1 year. Had history of fall 2 years back. On examination, tone increased in all the limbs and power of both upper and lower limbs are grade 4 at all muscle groups. Investigation with MRI of cervical spine and screening of whole spine along with contrast study revealed an enhancing mass extending from C1 to C2 posterolaterally with cord compression. Under general anesthesia patient was placed in a prone position with head fixed in a Sugita 4 pin frame, chest and pelvis supported with bolsters keeping the abdomen free. A midline skin incison is given slightly extending above C1 to C4, laminae removal from C1 to C3 was done. After opening the dura in the midline, it was seen that the tumour was located posterolaterally on the left side. It was dissected and excised completely under microscopic guidance. Histological findings was **Neurofibroma**.

Case 5: A 50 year female presented with neck pain, weakness in both the upper limbs and lower limbs of duration 1 year. On examination power of both upper and lower limbs are grade 4 at all muscle groups. Investigation with MRI of cervical spine and screening of whole spine along with contrast study revealed a homogeneously enhancing mass extending from C1 to C4 on the left side, broad based posterolaterally with cord compression (Figures 2A, 2B). Preoperative diagnosis of Meningioma was made. Operated in prone position using horse shoe frame, chest and pelvis supported with bolsters keeping the abdomen free. A midline skin incison is given from C1 to C4 and laminectomy was done from C2 to C4. After opening the dura in midline, tumour was found to be located posterolaterally on the left side, attached to the dura. Excised in total, by removing piecemeal, base was well coagulated. Dura closed in a water tight fashion so as to prevent CSF leakage. Histological findings was **Meningothelial Meningioma**.

Case 6: A 27 year female presented with neck pain, weakness in both the upper limbs and lower limbs with duration more than 2 year with sensory and sphincteric involvement. No comorbid history of diabetes and hypertension. On examination power of both upper and lower limbs are grade 3 at all muscle groups. Vital parameters are all within normal limits. Investigation with MRI of cervical spine and screening of whole spine along with contrast study revealed an intradural intramedullary mass, heterogenously enhancing on contrast, extending from C1 to C4. Preoperative workup was done and posted for elective surgery after taking informed consent and also explaining about worsening of symptoms. Under general anesthesia patient was placed in a prone position with head fixed in a sugita 4 pin frame, chest and pelvis supported with bolsters, keeping the abdomen free. A midline skin incison is given slightly extending above C1 to C4. Laminectomy from C2 to C4 was done. After opening the dura in midline, cord was also entered in the midline, tumour was found to be mildly vascular, soft, greyish white and complete removal was done under microscopic guidance. Dura closed in a water tight fashion so as to prevent CSF leakage. Other anatomic layers were also closed in layers. Intraoperative histopathology was glioma. Histological findings was found to be **malignant glioma**. (There was necrosis, hyperchromasia, hypercellularity, pleomorphism, endothelial proliferation, with fibrillary background).

Table 1:
FRANKEL SCALE

A	**Absent motor and sensory functions.**
B	**Sensation present, absent motor function.**
C	**Sensation present, motor function present but not useful (grade 2-3/5).**
D	**Sensation present, motor function present and useful (grade 4/5).**

E	**Normal motor and sensory function.**

Table 2:

Case series	Age/ Sex	DS	Symptoms	Signs/ grade	MRI	HPE	FUP 6mths-1 year	RIS within 1 week	Scale
1	70/M	>2	NP/MD/SI	MN/S/SL/PCI/3	C2-4/PL	S	grade 1 plus	Yes	C
2	35/M	>3	NP/MD/SI	MW/S/SL/PCI/ 1-2	C3/PL	S	grade 1 plus	Yes	C
3	42/M	1.6	NP/MD/SI	MW/S/SL/PCI/ 4	C1-2/PL	S	grade 1 plus	Yes	D
4	44/F	>1	NP/MD/SI	MW/S/SL/PCI/ 4	C1-2/PL	NF	grade 1 plus	Yes	D
5	50/F	>1.6	NP/MD/SI	MW/S/SL/PCI/ 4	C3-4/PL	M	grade1 plus	Yes	D
6	27/F	>2	NP/MD/SI/BB I	MW/S/SL/PCI/ 3	C1-4/IM	MG	grade 1 plus	Yes	C

DS-Duration of symptoms (in years), MRI- Magnetic resonance imaging, HPE- Histopathology examination, FUP- Follow up period, RIS- Relief in spasticity, MD- Motor disturbances, SI- sensory involvement, SD- sphincter disturbances, MW- Muscle weakness, S- Spasticity, PCI- Posterior column involvement, NP- neck pain, MW- Motor weakness, S –Spasticity, SL- sensory level, PL- posterolateral, IM- intramedullary, BBI- bladder bowel involvement.

III. Discussion

Intradural extramedullary spinal cord tumours are the commonest of all intraspinal tumours[8]. Nerve sheath tumours such as schwannoma, neurofibroma are common between 30-50 years of age with a male preponderance[9]. Meningioma have got a propensity in women for the thoracic region[10]. Distribution of schwannoma in all the regions of cervical, thoracic, lumbar evenly have been documented.[8,11,12]Surgical resection of spinal cord tumour such as intradural extramedullary(IDEM) and Intradural intramedullary (IDIM) is the conventional way of standard practice. 5 patients of intradural extramedullary and 1 patient of intradural intramedullary high cervical spinal cord tumours have been analysed in this study. In these 6 patients, histological types are neurofibroma (1), schwannoma (3), meningioma (1), malignant glioma (1). The extent of surgical resection of spinal cord tumour and decompression correlates with a better outcome. The time interval from onset of symptoms till the time of diagnosis and surgical intervention was more than 1& half years to 3 years. Neck pain was present in all the cases. Motor involvement was severe in all the groups with power ranging from grade 1 to 4 with 1 case of sphincter involvement in IDIM. This patient with comorbid conditions (immune compromised and hepatitis B) faired worse in comparison to other patients in the intradural extramedullary (IDEM) group. Long duration of presentation have been found to be associated with no improvement in motor power till 3 months of follow up, even though there was improvement in spasticity. When symptoms have been present for less than 1year, all patients had improvement in spasticity by one grade of motor power. There were no postoperative complications. To conclude, early diagnosis and complete resection of the tumour goes in favour of good outcome in high cervical spinal cord tumour of intradural extramedullary group. It would be advisable to screen all patients with neck pain for more than 1 year duration to detect spinal cord tumours in time. High index of suspicion is necessary to bring about early diagnosis and good outcome of surgical resection..

IV. Conclusion

A Intradural extramedullary spinal cord tumour if detected early and resected completely gives a better outcome. The long standing Intramedullary type of high cervical cord tumour give less beneficial outcome after resection.

References

[1]. Marc C Chamberlain. Trent L Tredway. Adult Primary Intradural Spinal Cord Tumours: A Review.CurrNeurolNeurosci Rep 2011; 111:320-328

[2]. Jenkinson MD, Simpson C, Nicholas RS, Miles J, Findlay G F G and Pigott T J D. Outcome Predictors and complications in the management of intradural spinal tumours. European Spine Journal 2006; 15:203-210.

[3]. Mondle S, Islam J, Rashid H, Ashadullah AT M, Elahi F, Rahman B etal. Surgical Outcomes of Spinal Tumour: Experience of 48 cases at Referral Neurosurgery Hospital in Bangladesh. Open Journal of Modern Neurosurgery, 2016; 6:98-104.

[4]. Parsa AT, Lee J, Parney IF, Weinstein P, McCormick PC and Ames C. Spinal Cord and IntraduralExtraparenchymal Spinal tumours: Current Best Care Practices & Strategies. Journal of Neuro-Oncology 2004;69:291-318.

[5]. McCormick P C, Post K D and Stein B M. IntraduralExtramedullary Tumours in Adults. Neurosurgery Clinics of North America 1990; 1:591-608

[6]. NitinTandra, BidhyaBhusan T, Li Dapeng, Wang Feng, XuXiaofeng. Removal of Intradural_Extramedullary Spinal Cord Tumours with Unilateral Limited laminectomy. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) 2014; 13(6); 62-64.
[7]. Masaryk TJ. Neoplastic disease of the spine: RadiolClin North Am.1991; 29: 829-845.
[8]. Avramov T, Kyuchukov G, Kiryakov n, Obreshkov N, Handjiev D, NedelkoR.Results of Spinal tumours Surgery. Journal of IMAB- Annual Proceeding (Scientific Papers) 2009, book
[9]. Provenzale JM and Taveras JM. Clinical cases in Neuroradiology, Lea and Febiger, Pennsylvania. 1994; 169-174,222-227.
[10]. King AT, Sharr MM, Gullarg RW, and Bartlett JR. Spinal Meningioma: A 20 year review. British journal of Neurosurgery. 1998; 12:521-526.
[11]. Campello C, Le Floch A, Parker F, etal. Neuroepithelial intramedullary spinal cord tumours in adults: Study of 70 cases, in American Academy of Neurology Annual Meeting. 2009
[12]. Nambiar M, and Kavar B. Clinical Presentation and Outcome of Patients with Intradural Spinal Cord Tumours. Journal of Clinical Neuroscience 2012; 14:262-266.

Figure 1A : Sagittal view of C3 level Schwannoma
(Picture to be inserted)

Figure 1B : Axial view of C3 Schwannoma compressing cord from the left side
(Picture to be inserted)

Figure 2A : Sagittal view of Meningioma extending from C1-4
(Picture to be inserted)

Figure 2B : Axial view of C3 level Meningioma
(Picture to be inserted)