ORIGINAL ARTICLE

OUTCOME OF INTRAMEDULLARY SPINAL CORD TUMOURS: EXPERIENCE WITH 18 PATIENTS OPERATED AT AYUB TEACHING HOSPITAL, ABBOTTABAD

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Background: Intramedullary spinal cord tumours (IMSCT) are among the uncommon lesions at spinal cord. They can present with a vast array of symptoms and cause severe neurological deficits. With advent and frequent use of MRI more and more patients with IMSCT are picked up. By using modern microsurgical techniques better surgical outcome is achieved. The Objective was to analyse the surgical outcome of the patients with intramedullary Spinal Tumour operated at Ayub Teaching Hospital (ATH), Abbottabad. **Methods:** Eighteen patients with IMSCT who presented at Neurosurgery Unit, ATH, Abbottabad during 2000–2010 were included in this study. Patients were diagnosed on the basis of MRI. They were operated using standard microsurgical techniques. Patients were followed up for a mean duration of 18 months after surgery and their preoperative and postoperative neurological status was analysed. **Results:** Patients with age group ranging from 15–50 (37.72±8.94) years with IMSCT were operated. Sixty-one percent of the patients were male and 39% were female. The region most commonly affected was cervical (44%) followed by conus medullaris (33%), cervicothoracic and thoracic each had frequency of 11%. Gross total removal (>95%) was possible in 72% of cases while in rest of 28% cases resection of 80–95% was possible. Histologically 38.9% of the lesions were ependymomas, 27.8% were astrocytomas and 22.2% were teratomas. Neurofibromas and Primitive Neuroectodermal Tumours (PNET) each accounted for 5.5% of the cases. Overall postoperative neurology improved in 10 (55%) of patients, remained unchanged in 5 (27%) of cases, and deteriorated in 3 (16%) patients. One patient was lost in follow-up. Surgery on tumours in cervical and thoracic region carried a relatively poor outcome as compared to the lesion of conus. There were no deaths due to surgery. **Conclusion:** Surgical removal of IMSCT is beneficial to patients with acceptable surgical risk. Better outcome is expected if the patients with good Frankel grade are diagnosed and operated early the course of disease.

Keywords: Spinal tumours, Intramedullary spinal tumour, Ependymoma

INTRODUCTION

Spinal tumours are among the uncommon lesions affecting the spinal cord. They cause significant morbidity rendering patients in poor neurological status.[1] Spinal cord tumours account for 6–8% of all central nervous system (CNS) tumours in children and adults. This approximately correlates with the proportion of mass of spine as compared with CNS. Spinal Cord tumours have no typical clinical presentation and can present in a variety of signs and symptoms ranging from sudden onset of severe symptom or gradual deterioration over days.[2] Before the advent of modern neuro-imaging tools spinal myelography remained the diagnostic tool to detect spinal cord lesions. Nowadays MRI, and if necessary, angiography are applied routinely in the diagnosis of spinal cord tumours.[3] IMSCT account for 2–4% of CNS glial tumours. In adults IMSCT comprise 20% of all intraspinal spinal tumours while in children 35% of tumours are IMSCT.[4] Spinal cord like the brain is composed of mixture of neurons, astrocytes, oligodendrocytes, ependymal cells lining the central cord; blood vessels with endothelim, pericytes; and smooth muscles covered by leptomeninges having fibroblasts, vessels and arachnoidal cells. It is not surprising that a vast array of neoplasms like astrocytomas, ependymomas, oligoderogliomas, mixed gliomas, PNET can occur in spinal cord.[5]

The management of IMSCT remained controversial in the past, when these were often treated with biopsy or subtotal removal followed by radiotherapy but this therapy mode was usually associated with early tumour recurrence and progressive neurological deterioration.[6] This protocol was based on assumption that astrocytomas are infiltrative tumours and that radical resection poses higher chances of causing more neurological injury to the patients.[7–10]

With advent and later improvement of microsurgical procedures, complete or near total resection of IMSCT is possible with much better outcome and very less chances of reoccurrence and late neurological deterioration.[3,12]

This study was conducted in order to analyse the outcome of patients with IMSCT and to access the factors which may affect the functioned outcome.

MATERIAL AND METHODS

This study was a case series of 18 patients with IMSCT which were operated in the department of Neurosurgery, ATH after their diagnosis on the basis of MRI. Patients were operated in ATH using standard microsurgical techniques after taking informed consents. Gross total removal was defined as removal of at least 95% of the tumour that was indicated by a clean surgical field under microscope at the end of procedure and a clean immediate (within 48 hours) postoperative MRI. If a small piece of tumour was left at the time of surgery it was estimated as 80–95% removal. Partial resections were estimate as <80%.

Patients were followed up for a mean duration of 18 months and their neurological status after surgery was assessed and compared to the pre-operative status on the basis of Frankel classification. One patient was lost in follow-up. Data was analysed using SPSS-15.

RESULTS

Patients' ages ranged from 15–50 years with Mean age 37.72±8.94 years. Eleven (61%) of patients were male and 7 (39%) of patients were female. The most common clinical symptoms that led to diagnosis of spinal tumour were in impaired power in limbs (66%) and gait abnormality (55%). The mean prodrome time was 6.8 months. The most frequently involved location was cervical 8 (44.4%), followed by conus medullaris 6 (33.3%). Cervicothroracic and thoracic constituted each 2 (11.1%) of cases (Table-1).

Gross total removal (>95% resection) was carried out in 13 (72%) of cases. In rest of 5 (28%) cases resection of 80–95% was done. Histologically the most common tumour was ependymoma 7 (38.9%) followed by astrocytomas 5 (27.8%) and teratomas 4 (22.2%). Neurofibromas and PNET each accounted for one case each (5.5%) (Table-2).

Compared to preoperative neurological status, neurological improvement was observed in 10 (55%) of the patients, Neurological status remained unchanged in 5 (27%), while 3 (16%) of patients deteriorated neurologically (Table-3).

One patient was lost in follow-up. No significant complication was attributable to surgery apart from a single case of CSF leak that was successfully managed conservatively. There were no deaths due to surgery. One patient succumbed to bed sores and poor nursing care.

Table-1: Localisation of IMSCTs

Localisation	Number	%
Cervical	8	44.4
Conus Medullaris	6	33.3
Cervicothroacic	2	11.1
Throacic	2	11.1

Table-2: Histological Types of IMSCTs

Histological Type	Number	%
Ependymoma	7	38.9
Astrocytoma	5	27.8
Teratoma	4	22.2
PNET	1	5.5
Neurofiberoma	1	5.5

Table-3: Pre- and Postoperative Neurological Status according to Frankel Classification

Grade	Pre-operative	Post-operative
A. No motor or sensory function below the level	3	2
B. Some preserved sensory function	6	2
C. Some preserved motor functions, unable to walk	5	6
D. Preserved useful motor function, able to walk	3	5
E. Normal motor and sensory function.	1	2

DISCUSSION

The IMSCT are rare tumours, accounting for 2–4% CNS tumours. First ever successful resection of an IMSCT was performed by Anton Von Eiselsberg in 1907, but the first report about such resection appeared in 1911 by Charles Elsberg in New York who explained two-staged plan for surgery for the removal of these IMSCTs.[13] With advent and improvement of microsurgical procedures complete removal of IMSCT has been possible with better surgical outcome. Several authors reported series with complete removal of tumour and good postoperative functional and neurological outcome.[6,12–14] Others have pointed out limitations to complete resection, reason being absence of clear plane of dissection especially astrocytomas that have infiltrative growth.[15]

Ependymomas are recognised easily resectable because of clearly defined plane of dissection.[16] Complete surgical removal in 90% of Ependymomas and 87% of patients with Astrocytomas has been documented by Sandalcioglu *et al*.[3] In our study, in 78% of cases >95% of surgical resection was possible. Tumours of thoracic region and intraoperative findings of arachnoid scarring and cord atrophy have been documented ominous for surgical morbidity.[16] Surgery is generally the main stay of treatment for IMSCT. Kane *et al*[17] reported a series of 54 patients surgically treated for IMSCT. In these patients adjuvant postoperative radiotherapy did not alter the outcome as compared to those who were not given adjuvant radiotherapy. There is evidence that postoperative radiation has deleterious effects.[4] Among our patients 4 patients received radiotherapy, 2 with ependymomas and 2 with teratomas. In these patients 2 improved after adjuvant radiotherapy.

CONCLUSION

Patients with IMSCT can be treated with acceptable surgical risk and outcome. Radical excision is possible in majority of cases with better outcome in terms of

neurological improvement. Preoperative neurological status of patients significantly affects the outcome.

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