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Original Article

Extramedullary Spinal SOL – Outcome of Surgery

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Abstract

Spinal space occupying lesions (SOL) cause compression over the spinal cord or roots and develop myelopathy or radiculopathy and leads to Paraplegia or quadriplegia with sphincteric involvement i.e. urinary or fecal incontinence or retention. We have operated 17 cases of spinal SOL (12 were neoplastic and 5 were inflammatory i.e. tuberculous), all the patients had weakness of different grade, 0 to 4. 5 patients had urinary incontinence or retention. After operation 16 patients were improved of weakness and sphincteric function.

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Introduction

Spinal space occupying lesions (SOL) are mostly neoplastic. But some SOL may be inflammatory like Pott's disease or traumatic like hematoma. 15% of primary CNS tumors are intraspinal. Most primary CNS spinal tumors benign[(1)]. Spinal tumors or lesions are classified according to their relation with dura and spinal cord. These are –

1. Extradural- Arises from vertebra, epidural tissues or secondary. Examples-Chondroma, osteoid osteoma, osteogenic sarcoma, multiple myeloma, plasmacytoma, abscess, hematoma etc
2. Intradural extramedullary- Meningioma, schwannoma, neurofibroma etc.
3. Intramedullary- Astrocytoma, ependymoma, epidermoid, dermoid.

Spinal schwannomas account for about 25% of intradural spinal cord tumors in adults. Most are solitary schwannomas, which can occur throughout the spinal canal. Most schwannomas are firm, encapsulated neoplasm that are composed principally of neoplastic Schwann cells. Microscopically, schwannomas are characterized by high cellularity, and relative lack of an Antoni B pattern. The "multiple" form of neurofibromas is known as von Recklinghausen's disease[(2)]. Meningiomas are the second most common tumor in the intradural extramedullary location, second only to tumors of the nerve sheath. Meningiomas account for approximately 25% of all spinal tumors. Approximately 80% of spinal meningiomas are located in the thoracic spine, followed by cervical spine (15%), lumbar spine (3%), and the foramen magnum (2%)[(3)].

Resection of spinal meningiomas can result in excellent recovery, even in patients with notable preoperative deficits. The surgical morbidity rate is low because surgical resection of a meningioma can easily be accomplished by means of simple laminectomy. The recurrence rate is substantially lower than that seen in an intracranial lesion[(3)].

The spine is the third most common site for cancer cells to metastasize, following the lung and the liver. Approximately 60-70% of patients with

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systemic cancer will have spinal metastasis; fortunately, only 10% of these patients are symptomatic. Approximately 94-98% of these patients present with epidural and/or vertebral involvement. Intradural extramedullary and intramedullary seeding of systemic cancer is unusual; they account for 5-6% and 0.5-1% of spinal metastases, respectively[4]. About 70% of symptomatic lesions are found in the thoracic region of the spine, particularly at the level of T4-T7. Of the remainder, 20% are found in the lumbar region and 10% are found in the cervical spine[4].

In Pott's disease the extradural mass caused by an abscess, sequestrated bone and disc or granulation tissue, fills the epidural space and spreads around the dural space, thus causing the compression over the cord[5].

The goals of surgery for spinal tumors include: (i) Remove the spinal tumor, or as much of it as possible (ii) Reduce pain and improve function and life (iii) Restore spinal stability[7].

Materials and method

This is a prospective study. 17 patients were included in this study. 02 patients having intra-medullary lesion refused operation after counseling about the consequences of operation, were excluded from the study. Operations were done in Rajshahi Medical College Hospital and Islami Bank Medical college Hospital, Nawdapara, Rajshahi during the period of Jan.'08 to Oct.'09. All the patients had spinal space occupying lesions either neoplastic or inflammatory and causing compression over the spinal cord. Inflammatory lesions were due to tuberculosis (Pott's disease). Diagnoses were made by taking history, physical examination and by investigation. All patients had MRI for confirmation of preoperative diagnosis. Histological diagnoses were confirmed after operation by sending tissue for histopathology in all the cases.

For neoplastic lesions laminectomy followed by removal of tumors were done. Durotomy needed for intradural lesions. For Pott's disease Costotransversectomy and laminotomy were done followed by drainage of pus and removal of granulation tissues were done. In one case of Pott's disease anterior decompression of pus and granulation tissue were done. All the patients were discharged with advice for physiotherapy. All the patients were followed-up for 2 months to 17 months and outcome i.e. recovery were recorded.

Results

Age range of the patients is from 26 yrs. to 60 yrs. Both male and female with female (60%) predominance was noted. Neoplastic lesions were 12(70%) and Pott's were 5(30%).

Table-I : Location of lesions in relation to duramater

Location	No.	Percentage(%)
Extradural	06	35
Intradural extramedullary	08	47
Extra and intradural	03	18

Fig: Intradural extramedullary spinal schwannoma

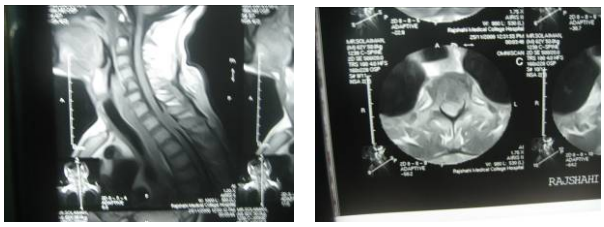

Fig: Intradural extramedullary spinal meningioma

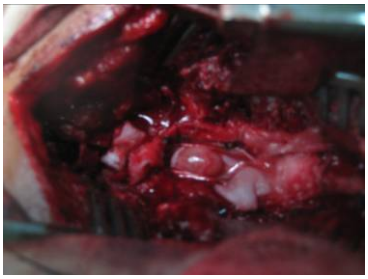

Fig: Peroperative picture of spinal schwannoma

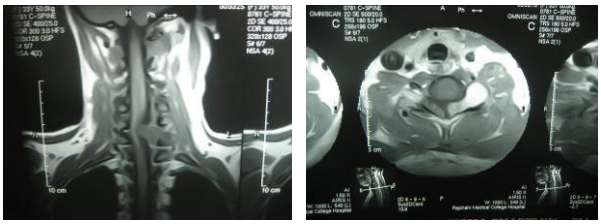

Fig: Spinal schwannoma involving extraspinal and intraspinal both extradural & intradural compartments

One patient had a lesion involving both extraspinal and intraspinal extradural and intradural compartment. Another lesion is dumble shaped i.e. Extraspinal and intraspinal extradural compartments are involved. All the tuberculous and metastatic lesions were extradural.

Tumors according to region involved-
1. Cervical- 06
2. Dorsal- 10
3. Lumber- 01

Table-II: Histological types of the lesions

Histological types	No.	Percentage(%)
Schwannoma	08	47
Meningioma	02	11.5
Ependymoma	01	06
Secondary(from thyroid)	01	06
Pott's disease	05	29.5

Commonest type is Schwannoma (47%) followed by Pott's disease.

Presenting features:

- Pain- 17
- Weakness- 17
- Spasticity- 16
- Exaggerated tendon reflex- 16
- Sensory level found - 10
- Sphincter involved- 05 (Urinary retention)

One patient who had ependymoma at conus medullaries level had flaccid type weakness. In 06 patients definite sensory level were not found.

Table-III: Improvement of muscle power grade after operation

Muscle power grade	Preoperative	Postoperative
5	00	12
4	06	02
3	03	01
2	04	01
1	01	00
0	03	01

Recovery after operation:

- Complete- 12(70%)
- Incomplete- 04(24%)
- No recovery- 01(06%)

All patients had improvement of sphincteric function except one. Those patients who had incomplete recovery, are still in the phase of recovery. Hoping that they will recover more.

Postoperative complications:

- Infection- 00
- CSF leak- 02 (transient)
- Deterioration of pre-existing neurological status - 00

Discussion

Spinal SOL either neoplastic or inflammatory causes compression over the spinal cord or roots and develop myelopathy or radiculopathy.

Schwannomas are slowly growing benign tumors occurring at any level and arising from the posterior nerve roots. They are either entirely within the spinal canal or dumbbell shaped through the intervertebral foramen, on occasion presenting as a mass in the thorax or posterior abdominal wall or in the neck[6].Schwannomas tend to occur in the 30-60 yrs. age group[6]. Spinal schwannomas account for about 25% of intradural spinal cord tumors in adults[2].In our series schwannoma is 47%, though our series is small. Meningiomas account for approximately 25% of all spinal tumors. Approximately 80% of spinal meningiomas are located in the thoracic spine[3]. In our series meningioma is about 12% all the two cases located in thoracic region.

In one study, out of 38 cases the locations of spinal canal meningiomas were cervical in six patients (15.8%), the cervicothoracic junction in two (5.3%), thoracic in 28 (73.7 %), lumbar in one (2.6%), and a low thoracolumbar location in one (2.6%)[8].

Approximately 90% of patients with spinal metastasis present with bone and/or back pain followed by radicular pain. About 50% of these patients have sensory and motor dysfunction, and more than 50% have bowel and bladder dysfunction. About 5-10% of patients with cancer present with cord compression as their initial symptom. Among those who present with cord compression, 50% are nonambulatory at diagnosis, and 15% are paraplegic[4].

Spine surgery to remove or resect (partially remove) a benign (non-cancerous) or malignant (cancerous) spinal tumor can help reduce or relieve persistent back or neck pain, balance problems, difficulty walking, and bowel and bladder dysfunction[7].

The outcome varies. Early diagnosis and treatment usually leads to a better outcome. Nerve damage may persist even after surgery. Although permanent disability is likely, treatment may delay the development of major disability and may delay death[9].

Most of our patients (70%) recovered completely. 24% of patients recovered incompletely, but they are in the phase of recovery. One patient did not show any sign of recovery in one year time. This patient had metastatic lesion and could be removed incompletely.

In one study a retrospective review of 67 operative IESCT (Intradural extramedullary spinal cord tumor) cases between 1974 and 2001 was performed. Outcomes were scored at one month and at mean follow-up of 8.5 months There were 31 men and 36 women (mean age 48 y/o, range 18-87 y/o). Men presented at a younger age than women (44 vs 53 y/o, $P<0.02$). Fifty-seven (85%) patients presented with severe radiculopathy and/or myelopathy. There were three primary tumor types: schwannomas (36/67), meningiomas (21), and myxopapillary ependymomas (10/67) At mean follow-up of 8.5 months (range 1.5 to 36 months), overall outcomes improved significantly. Forty-one patients (61.2%) had Excellent results, 32.8% (22/67) had Good results, and 6.0% (4/67) had Fair results.None of the patients had Poor results[10].

In one study of Surgical outcome of spinal canal meningiomas, surgical results showed out of 38 cases, improvement in 30 cases (78.9%), no change in six cases (15.8%), and deterioration in two cases (5.3%) due to the surgery induced spinal cord injury and syrinx formation[8].

In one study of spinal secondaries, the most commonly encountered histopathological type was lung cancer with 17 (% 63) patients, followed in order of frequency by breast, gastrointestinal system and thyroid cancers. It was found that, of 13 (% 76.5) patients with lung cancer and neurological deficit, improvement was seen in 11 (% 84.6) patients. Of these 11 patients with neurologic deficit, 2 had partial and 9 had complete neurologic improvement[11]. In our study, we could operate only one case of metastatic lesion from thyroid, with no improvement. In this case we were able to remove the lesion incompletely due to excessive bleeding.

Conclusion

From this study, though the series was small, we can conclude that any extramedullary spinal lesion should be removed by operation whatever may be the grade of weakness and sphincteric involvement. Recovery time varies with preoperative status. Many patients can return to meaningful working life.

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