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**ORIGINAL ARTICLE**

# Surgical Outcome of Spine Tumor Surgery

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## ABSTRACT

**Aim and objective:** The aim of the study was to assess the outcome of spinal tumor surgery.

**Materials and Method:** The current prospective study was conducted from June 2022 to July 2023 at Jinnah Teaching Hospital after approval from the institutional review board. A total of 72 patients were selected through a convenient sampling technique including both male and female. Every patient has had an MRI as well as an X-ray taken. The posterior midline technique was used in all surgical procedures. All the data were collected from physical records, histopathology, and lab reports and then analyzed by using the latest version of SPSS 24.

**Results:** A total of 72 clients were selected for the current study aged from 10-75 years of age. 44.44 % of them were from 46-60 years and 40.27 % of them were from 61-75 years of age. 58.33 % of them were males and 41.66 % of them were females. 70.83 5% had pain and 15.27 % had motor impairments. 9.71 % had sensory and 4.16 % of them had sphincter impairments. 26.38 % had a muscular weakness. 33.33 % had schwannoma, 12.5 % had lipoma, 9.71 % had an arachnoid cyst and 23.61 % had a meningioma. 6.94 % had instant improvement, 27.77 % had improved after a week, 44.44 % had after a month, and 12.5 % of them had no improvements, furthermore, the rate of mortality was 2.7 %. The post-op complications like infection and leakage of CSF were 11.11 % and 4.16 % respectively.

**Conclusion:** The current study concluded that early surgical interventions are necessary for the patients in order to or the best chance of a full and speedy recovery from both physiological and anatomical handicap caused by a spinal tumor, prompt surgical intervention and complete removal of the tumor are essential. Schwannoma 33.33 % was the most common histopathological finding.

**Keywords:** Schwannoma, Spinal tumor, Cervicothoracic, CSF.

## INTRODUCTION

Tumors that affect the spinal cord are generally infrequent and it is more typically encountered in the young pediatric group compared to adults. The intradural, extramedullary, extradural, or intradural intramedullary regions in the spinal cord are the most common sites of origin of such tumors. Spinal column gliomas constitute over 80% of all intradural intramedullary tumors across the age spectrum[1,2]. Metastatic spine illness is much more prevalent than primary bone cancers of the spine. Basic bone tumors, comprising axial as well as appendicular tumors, are diagnosed at a rate of 0.9 per 100,000 male and female annually in the US, as reported by the SEER database[3]. In this sample, schwannomas were most common within the cervical region 27.3%, followed by the thoracic 66.7%, as well as the lumbar 14.2%. Approximately 4–10% of all new cancers in the CNS occur within the intramedullary space of the spinal cord. Only 20% of all intraspinal tumors have been identified in adults, while 35% are found among youngsters[4]. The spinal column gliomas are made up of 60-70 percent ependymomas as well as 30-40 percent astrocytoma[1,5]. Ganglioglioma, lymphoma (rare), hemangioblastoma (3-8%), as well as melanoma (very rare) are other important players in the overall epidemiologic picture[1,2], but astrocytic as well as ependymal tumors make up the vast majority. Glioblastoma multiforme (GBM) is an aggressive type IV astrocytoma usually referred to as malignant glioblastoma. Other forms of astrocytoma comprise diffuse astrocytoma, anaplastic astrocytoma, and pilocytic astrocytoma. Around 6-8% of spinal cord cancers are primary spine astrocytoma[6,7], including initial spinal GBM making up around 1.5% of all spinal column tumors. Spinal cord astrocytoma is often less serious than brain astrocytoma[8,9]. The annual incidence rate of gliomas involving the spinal cord has been projected to be 0.22% per 100,000 people[7]. 75% being low-grade I and II (WHO). Twenty-five percent of the tumors are classified as high-grade III and IV (WHO)[9]. Among these patients, 92.8% had tumors of lower grades (I or II) according to WHO and 7.2% had higher-grade tumors (III or IV) according to WHO. Lower-grade astrocytoma in youngsters and higher-grade astrocytoma among adults both share a genetic link with neurofibromatosis type 1, a condition that is more common in males. Nevertheless, they are quite uncommon in the elderly[10]. Back pain that isn't mechanical, tingling, numbness, or weakness in the limbs are all symptoms frequently reported by those suffering from spinal astrocytoma[11]. Therefore, due to limited recent studies, the purpose of the study was to assess the outcome of spinal tumor surgery.

**Aim and objective:** The aim of the study was to assess the outcome of spinal tumor surgery.

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## MATERIALS AND METHOD

The current prospective study was conducted from June 2022 to July 2023 at Jinnah Teaching Hospital after approval from the institutional review board. A total of 72 patients were selected through a convenient sampling technique including both male and female. Every patient has had an MRI as well as an X-ray taken. The posterior midline technique was used in all surgical procedures. Clinical examinations were performed on everyone for a minimum of 6 months afterward. Individuals having spinal tumors (primary and secondary) confirmed by MRI were included in the study and those who had Potts spine, without proper record, and vascular malformation were excluded from the study. Imaging records, in- and OPD physical assessment notes, and patient medical histories were all reviewed. MRI with contrast of the vertebral column spine was performed on every single patient. Throughout the examination, adequate radiography was performed to evaluate the degree of excision, and any complications were observed. All the data were collected from physical records, histopathology, and lab reports and then analyzed by using the latest version of SPSS 24.

## RESULTS

A total of 72 clients were selected for the current study aged from 10-75 years of age. 44.44 % of them were from 46-60 years and 40.27 % of them were from 61-75 years of age. 58.33 % of them were males and 41.66 % of them were females. Table 2 highlights the early symptoms and clinical signs of the patients. 70.83 5% had pain and 15.27 % had motor impairments. 9.71 % had sensory and 4.16 % of them had sphincter impairments. 26.38 % had a muscular weakness, 43.05 % had spasticity, 18.05 % impairment of position and sense vibration, and 20.83 % impairment of two-point differences.

Table 1 Demographic Characteristics

| Age(years) | Number | Percentage |
|---|---|---|
| 10-30 | 3 | 4.1 % |
| 31-45 | 9 | 12.5 % |
| 46-60 | 32 | 44.44 % |
| 61-75 | 29 | 40.27 % |
| Gender | | |
| Male | 42 | 58.33 % |
| Female | 30 | 41.66 % |

Table 2 Symptoms and Clinical Signs

| Early Symptoms of Patients | | |
|---|---|---|
| Pain | 51 | 70.83 % |
| Motor impairment | 11 | 15.27 % |
| Sensory impairment | 7 | 9.71 % |
| Sphincter impairment | 3 | 4.16 % |
| Clinical Signs | | |
| Muscular weakness | 19 | 26.38 % |
| Spasticity | 31 | 43.05 % |
| Impairment of position and sense vibration | 13 | 18.05 % |
| Loss of sensation | 10 | 13.88 5 |
| Impairment of two-point differences | 15 | 20.83 % |

Table 3 Type of Tumor in accordance with MRI

| | Number | Percentage |
|---|---|---|
| Extradural | 23 | 31.94 % |
| Intradural extramedullary | 37 | 51.38 % |
| Extramedullary | 12 | 16.66 % |

Table 4 Location of Tumor

| Location | Number | Percentage |
|---|---|---|
| Cervical | 17 | 23.61 % |
| Thoracic | 26 | 36.11% |
| Lumbar | 12 | 16.66 % |
| Cervicothoracic | 8 | 11.11 % |
| Thoracolumbar | 6 | 8.33 % |
| Lumbosacral | 3 | 4.16 % |

Table 5 Histopathological Findings

| Histopathology results | Number | Percentage |
|---|---|---|
| Schwannoma | 24 | 33.33 % |
| Neurofibroma | 5 | 6.94 % |
| Hemangioblastoma | 3 | 4.16 % |
| Arachnoid cyst | 7 | 9.71 % |
| Lipoma | 9 | 12.5 % |
| Meningioma | 17 | 23.61 % |
| Astrocytoma | 3 | 4.16 % |
| Ependymoma | 4 | 5.55 % |

Table 6 The Percentage of Tumors removed in the Research Group

| | Number | Percentage |
|---|---|---|
| Total | 9 | 12.5 % |
| Gross total | 33 | 45.83 % |
| Near total | 17 | 23.61 % |
| Subtotal | 7 | 9.71 % |
| Only biopsy | 6 | 8.33 % |

Table 7 Post-op improvement and complications of patients

| Time | Number | Percentage |
|---|---|---|
| Instant improvement | 5 | 6.94 % |
| After a week | 20 | 27.77 % |
| After month | 32 | 44.44 % |
| No change | 9 | 12.5 % |
| Deteriorated | 4 | 5.55 % |
| Mortality | 2 | 2.7 % |
| Complications | | |
| Infection | 8 | 11.11 % |
| Leakage of CSF | 3 | 4.16 % |

Table 3 highlights the type of tumors. 31.94 % had extradural, 51.94 % had intradural extramedullary and 16.66 % had extramedullary tumors. Table 4 indicates the location of the tumors. 23.61 % had cervical, 36.11 % had thoracic, 16.66 % had lumbar, 11.11 % had cervicothoracic, and 8.33 % had thoracolumbar.

Table 5 represents histopathological findings. 33.33 % had schwannoma, 12.5 % had lipoma, 9.71 % had an arachnoid cyst and 23.61 % had a meningioma. Table 6 the percentage of tumors removed during surgery. 45.83 % had gross total removal, 12.5 % had total, 23.61 % had near total, and 8.33 % only biopsy was taken. Table 7 represents the improvements and post-op complications of the patients. 6.94 % had instant improvement, 27.77 % had improved after a week, 44.44 % had after a month, and 12.5 % of them had no improvements, furthermore, the rate of mortality was 2.7 %. The post-op complications like infection and leakage of CSF were 11.11 % and 4.16 % respectively.

## DISCUSSION

When abnormal tissue forms on or around the vertebral column, it is referred to as a tumor. These types of cells proliferate without being restrained by the same processes that keep healthy cells maintained in check. Tumors of the spine might be either innocuous or malignant. In the current study, 70.83 5% had pain and 15.27% had motor impairments. 9.71% had sensory and 4.16% of them had sphincter impairments. 26.38% had a muscular weakness, 43.05 % had spasticity, 18.05 % impairment of position and sense vibration, and 20.83% impairment of two-point differences. Another comparable study by Mondle S et al Sixty-six percent of patients complained of pain, while another 18 percent experienced motor difficulties. A total of 35 (72.9%) patients had spasticity, making it the most prevalent clinical symptom. In 75.0% of instances, the entire tumor was removed; in 14.5% of cases, a gross complete removal was achieved. The majority of tumors 68.7% were schwannomas, followed by neurofibromas 14.5% and meningiomas 6.2%[12]. In the current study, 31.94 % had extradural, 51.94% had intradural extramedullary and 16.66 % had extramedullary tumors. 23.61 % had cervical, 36.11 % had thoracic, 16.66 % had lumbar, 11.11 % had cervicothoracic, and 8.33 % had thoracolumbar. In a similar study conducted by Dahal A et al Our research found that the thoracic spine was among the most prevalent sites (43.24% of the time). In terms of histology, schwannomas account for roughly 37.83% of all cases. Seventy-seven percent of patients who had a spinal tumor had it removed completely. The majority of patients (54.05%) saw significant clinical improvement in less than a week after surgery. In our analysis, wound infection was the most prevalent consequence overall[13]. Ali G et al reported that the majority of individuals first experienced symptoms including paralysis, numbness, or sphincter dysfunction. Depending to the MRC Grading system, 47% of the individuals showed improvement. Patients improved by 46% while the condition of 7% worsened. Twelve percent of patients had wound infections; 8.9 percent had neurological deficits; 3.57 percent had meningitis; 7.14 percent had CSF leaks; 1.77 percent died[14]. Pettersson-Segerlind J reported that sixty-six percent of patients first presented with motor deficits. Surgical intervention was performed a median of 1.3 months after diagnosis. Tumor development or relapse happened to 4.7% of patients, while 17.8% of patients experienced complications after surgery. Motor and sensory impairment, gait disruption, urinary problems, and discomfort all showed significant improvements after surgery[15].

## CONCLUSION

The current study concluded that early surgical interventions are necessary for the patients in order to or the best chance of a full and speedy recovery from both physiological and anatomical handicap caused by a spinal tumor, prompt surgical intervention and complete removal of the tumor are essential. Schwannoma 33.33 % was the most common histopathological finding.

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