

Original Research Article

AN INVESTIGATION ON TUMOURS OF THE SPINAL CORD

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ABSTRACT

Background: Primary spinal tumours, in contrast to cerebral tumours, are predominantly benign. The majority of spinal cord tumours manifest through compression rather than invasion. The objective is to examine the relationship between the clinical symptoms and the microscopic examination of spinal cord tumours.

Materials and Methods: Primary spinal tumours, in contrast to cerebral tumours, are predominantly benign. The majority of spinal cord tumours manifest through compression rather than invasion. The objective is to examine the relationship between the clinical symptoms and the microscopic examination of spinal cord tumours.

Results: The surgeon often uncovers surprises in the operational field following a comprehensive clinical and radiological examination of spinal cord tumours. This study examined the relationship between clinical, radiological, and pathological spinal cord tumour diagnosis. Clinical diagnosis matched radiological findings at the time for all tumours. Clinical and radiological concordance exceeded for schwannomas. The association of lesion levels in the 30–45 age range was around. Due to nerve root involvement, these tumours were located at the right level. The 45 to 60 age group and the under 15 age group had the lowest tumour correlation. Clinically, lesions matched radiological findings for intramedullary tumours.

Conclusion: The aforementioned study indicates that clinical examination is crucial in diagnosing spinal cord tumours, even in the current era of advanced investigations.

Keywords: Clinical, radiological, pathological, and spinal cord correlation.

INTRODUCTION

Spinal tumours located in the central nervous system (CNS) account for 15% of all tumours that originate in the CNS. Primary spinal tumours, in contrast to cerebral tumours, are predominantly benign. The majority of spinal cord tumours manifest through compression rather than invasion. Spinal cord tumours can be classified as either extradural or intradural.^[1] Intradural tumours can be categorised as either extramedullary or intramedullary. The intradural to extradural tumour ratio is 3:2. The incidence of intramedullary tumours in children is as high. The prevalence rate is 30% among the adult population.^[1,2]

Spinal cord tumours can develop within the tissue of the cord, within the thecal sac but outside the cord, or outside the thecal sac. The symptoms associated with the growth of a tumour differ according on its location. These symptoms may include myelopathy, numbness, loss of pain and temperature sensitivity, and radiculopathy if the tumour affects the nerve roots as they depart the spinal canal.^[4,5] For the majority of patients with spinal cord tumours, the preferred treatment is a combination of surgical resection and radiotherapy. This is because tiny trials involving a limited number of patients have not shown any substantial increase in survival rates when chemotherapy is used as the sole treatment. Due to the limited effectiveness of chemotherapy,

there is an urgent need for carefully planned treatments for spinal cord tumours.

Spinal cord tumours primarily manifest in individuals within the middle age demographic. With the exception of a higher prevalence among females in the case of meningiomas, the ratio of males to females is about equal.^[6] Spinal cord tumours predominantly manifest in the thoracic area. Following that is the cervical area. Lumbosacral tumours are infrequent. Nerve sheath tumours are the predominant type of intradural extramedullary tumours, accounting for around 30% of cases. Meningiomas constitute around of cases. Astrocytomas and ependymomas are the most prevalent types of intramedullary tumours. Additional intramedullary tumours include hemangioblastomas, dermoids, epidermoids, lipomas, and secondary tumours. Ependymomas can occur not only in the intramedullary site but also in the conus medullaris. It can have both an extra and intramedullary presence, with an exophytic component that extends into the cauda equine.^[7,8]

Spinal cord tumours cause a range of indications and symptoms that depend on the location and extent of the lesion, which help in determining the exact location of the tumour. Interestingly, this meticulous clinical localization is sometimes not directly associated with the radiological results, particularly those generated from several MRI sequences currently accessible. Furthermore, there are discrepancies between the observations made during the surgery and the results obtained from the examination of tissue samples.^[9,10]

This study aims to examine the diverse factors that impact the clinical, radiological, and pathological characteristics of individuals with spinal cord tumours. The study aimed to investigate the relationship between the clinical presentation and histopathology of spinal cord tumours.

MATERIAL AND METHODS

There were a total of 40 patients with spinal cord tumours that participated in this study. A study like this one was carried out at the Department of Neurosurgery, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India. The research for this study was carried out during the months of November 2022 to October 2023.

Inclusion Criteria

- Every instance of spinal cord tumours
- Every patient with spinal compressive myelopathy who may have a spinal cancer

Exclusion Criteria

- Compressive spinal cord lesions associated with disc disease;
- Compressive spinal cord lesions following trauma;
- Compressive spinal cord lesions following inflammation.

RESULTS

There were forty cases of spinal cord tumours that were treated at the Department of Neurosurgery, Andhra Medical College. The study was conducted throughout this time period. [Table 1]

he studies found that spinal cord tumours were most commonly observed in individuals aged 31 to 45 years, whereas the lowest incidence was observed in individuals aged above 60 years. The survey revealed a significant predominance of females in terms of sex distribution. [Table 2]

The incidence of spinal cord tumours was highest among those aged 31 to 45 years, regardless of gender. The sex distribution in the age range under 15 years was nearly balanced. [Table 3]

Relationships between various age groupings

Age Group under 15 years:

When comparing the clinical and radiological data, 92% of the cases show full agreement about the level of the lesion. It has a high level of statistical significance. Regarding the clinical and radiological assessment of the lesion's plane, there is a 98% consensus that they are completely aligned. The data shows a significant statistical difference. In the context of clinical and histopathological examination correlation, a total of 60% exhibit full concordance. Regarding the association between radiological and histopathological examinations, 75% of them exhibit full agreement. The data shows a significant statistical difference.

Age cohort ranging from 16 to 30 years

The clinical and radiological correlations of the level of the lesion are in total agreement, which is statistically significant. When examining the clinical and radiological correlation of the plane of lesion, it was found that they were in total agreement. The clinical and HPE correlations exhibit perfect agreement, which is statistically significant. Regarding the connection between radiological and histopathological examination, there is a full agreement of cases.

Age range of individuals between 31 and 45 years

Regarding the clinical and radiological connection of the level of lesion, cases demonstrate perfect agreement, which is statistically significant. When examining the clinical and radiological correlation of the plane of lesion, cases show full agreement, which is statistically significant. When comparing clinical findings with histopathological examination, there is a full agreement cases. The radiological and histopathological examination correlations exhibit perfect agreement, which is statistically significant.

Age cohort ranging from 46 to 60 years

When examining the clinical and radiological data, it was found that the cases showed complete agreement on the location of the lesion. The cases show full agreement between the clinical and radiological correlation of the plane of lesion. Regarding the correlation between clinical and

histopathological examination, cases exhibit perfect agreement, which is deemed statistically significant.

Age category exceeding 60 years

The clinical and radiological correlations of the level of the lesion are in full agreement. When

comparing clinical and radiological data, the cases show full agreement. Regarding the connection between radiological and histopathological examination, there is a full agreement in cases.

Table 1: Gender wise distribution

Sr. No.	Gender	Number	Percentage
1.	Male	12	30%
2.	Female	28	70%
	Total	40	100%

Table 2: Age wise distribution

Sr. No.	Age ranges (Yrs.)	Male	Female
1.	<15	4	4
2.	16-30	1	2
3.	31-45	6	6
4.	46-60	4	10
5.	>60	2	1

Table 3: Radiology-clinical agreement correlation

Sr. No.	Parameters	Values
1.	Sample size	40
2.	Correlation coefficient r	0.8544
3.	Significance level	P<0.0001
4.	95% Confidence interval for r	0.9131 to 0.91247

Table 4: Correlation-radiological-clinical type agreement

Sr. No.	Parameters	Values
1.	Sample size	40
2.	Correlation coefficient r	0.8100
3.	Significance level	P<0.0001
4.	95% Confidence interval for r	0.7234 to 0.7452

DISCUSSION

There are numerous instances in which the surgeon discovers surprises on the operating field when dealing with spinal cord tumours, even after doing a comprehensive clinical examination and radiological studies. During the course of this research project, an effort was made to determine whether or not there is a connection between the clinical, radiological, and pathological diagnosis of spinal cord tumours.^[13-15]

For all types of tumours, there was a correlation between the clinical diagnosis and the subsequent radiological findings. The concordance between clinical and radiological findings was greater than the case of schwannomas. After doing an analysis of the correlation between the various levels, it was found that the link between the level of lesion and the age group of 30 to 45 years older was greater than 90 percent. This was made possible as a result of the prominent involvement of nerve roots in these tumours, which assisted in locating the appropriate level of these tumours.^[17-19]

Among the various age categories, the group of people aged 45 to 60 years showed the least correlation for the amount of tumour. This was also the case with the group of people aged less than 15 years. When it came to the diagnosis of the level of intradural extramedullary tumours, 86% of the lesions correlated clinically with the radiological

results. It was shown that there was a low association between clinical and radiological findings in patients of intramedullary tumours. The advantage of magnetic resonance imaging in finding the plane of the lesion is well known in this scenario.^[20-23]

With regard to the pathology of the tumours, the correlation between clinical and histopathological findings was approximately ninety percent. As a result of the fact that the correlation between radiological and HPE was lower in this study compared to the correlation achieved through clinical examination, it is abundantly obvious that clinical examination is superior when it comes to the identification of spinal cord tumours. When it came to the level of the lesions, intramedullary tumours demonstrated a clinical and radiological association that was less than ninety percent.^[24-26] The clinical level of the lesion was found to have a correlation with the pathology of the lesion in intramedullary tumours, which was a surprising finding. In this particular investigation, there were only ten instances of intramedullary tumours. Therefore, a study that includes a greater number of patients will be able to draw more accurate conclusions in this particular population. In addition, the literature suggests that there are just a few trials that are comparable, and additional expertise is required in this category of tumours.^[27-29]

For the purposes of this study, osteoarthritis, degenerative disc disorders, spondylolisthesis, and other similar conditions were not taken into consideration. When it comes to the clinical evaluation of spinal cord tumours, the signs and symptoms that are associated with these disorders are considered to be compounding factors. Patients in the younger age group were unable to cooperate while the clinical examination was being performed to the fullest extent possible. It's possible that the patients' clinical evaluation was affected by secondary deposits in the spinal cord, which were accompanied by primary deposits elsewhere.^[30-32]

CONCLUSION

This study on spinal cord tumour localization and diagnosis found the following. Adults were more accurate than children and old in determining lesion site, extent, and type with clinical and radiographic examinations. The accuracy of clinical and radiographic evaluations for lesions' level and location was higher for cervical cord lesions, followed by lumbar and thoracic cord lesions. Radiology showed a greater correlation than clinical examination in determining lesion plane. Clinical and radiological studies showed that males had a stronger correlation with lesion levels than females. Clinical evaluation is more successful than radiological evaluation in assessing spinal cord tumour pathology. The detailed medical history and clinical evaluation contribute to this. This method has shown the cancers' inherent development, helping predict their pathology before radiological exams. In conclusion, clinical examination is essential for diagnosing spinal cord tumours, especially with modern technology.

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None.

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