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A Prospective Study to Evaluate Clinico-radiological and Histopathological Features, Surgical Outcome in Patients with Spinal Tumors

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ABSTRACT

Spinal tumors are less common than skull tumors and can be primary, originating from the spinal cord, meninges, or bones, or metastatic, spreading from other body parts. Despite sharing histopathological similarities with intracranial tumors, primary spinal tumors are ten times less frequent. Symptoms are often vague, leading to misdiagnoses such as degenerative spinal disease or herniated discs. Magnetic resonance imaging (MRI) is the most reliable method for diagnosing spinal tumors, enabling precise differentiation of soft-tissue elements and guiding surgical intervention. This study aimed to Evaluate Clinico-Radiological And Histopathological Features ,Surgical Outcome In Patients With Spinal Tumors. This prospective study, conducted over two years (September 2022 to August 2024) at the Department of Neurosurgery, GRMC Gwalior, investigates spinal and spinal cord tumors in 50 patients confirmed through neuro-radiological features. Patients unwilling to participate or previously operated on for spinal tumors with recurrence are excluded. The study includes clinical assessments of neurological status, MRI of the suspected spine site, surgical management, patient functional outcomes using modified Nurick's Grading and histopathological examination of tumor biopsies. The research focuses on patients admitted to the JAH Neurosurgery Department, Gwalior. The study analyzed 50 patients with spinal and spinal cord tumors, revealing key demographic and clinical characteristics. Participants were predominantly over 60 years old (50%), male (56%) and urban residents (52%). A significant portion was unemployed (60%), with varying education levels. Clinically, 98% had a history of back pain, 92% experienced lower limb weakness and 52% reported loss of bladder and bowel functions. Most underwent biopsy (64%) and received combined surgery and chemotherapy (84%). Histologically, adenocarcinoma of the prostate was the most common tumor (32%), followed by multiple myeloma (18%) and invasive ductal carcinoma of the breast (16%). Tumor distribution varied by age, originality (primary vs. secondary), nature (benign vs. malignant) and anatomical location, with extradural tumors being the most prevalent (88%). Adenocarcinoma of the prostate was frequently found in the lumbar region (43.47%). The data underscore the diversity in tumor types, patient demographics and clinical presentations in this cohort. The study highlights the importance of comprehensive clinical, ultrasonographic and histopathological evaluation in the diagnosis of ovarian lesions. The ORADS classification and color Doppler scoring systems provide valuable diagnostic accuracy and their combined use can significantly enhance the differentiation between benign and malignant ovarian lesions. Early and accurate diagnosis is crucial for effective management and improved patient outcomes.

OPEN ACCESS

Key Words
Spinal tumours, histological pattern, anatomical location, spinal instability

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INTRODUCTION

Spinal tumours are less common than tumours in the skull. Spinal tumours can be categorised into two primary groups: the first group consists of primary tumours that originate from cells in the spinal cord, meninges, or bones. The second group consists of metastatic lesions that infiltrate the spinal cord and surrounding tissues, originating from cells elsewhere in the body. Spinal tumours may manifest with vague symptoms that necessitate a high level of suspicion in order to be properly investigated for diagnosis[1,2]. Following Sir Victor Horsley's description of spinal tumour resection through laminectomy in 1887, the treatment of spinal tumours experienced significant advancements[3]. Although primary spinal cord tumours share histopathological similarities with primary intracranial tumours, they are distinct entities. 10 times less frequently observed[1]. Due to the lack of specific symptoms, patients may experience severe radicular or localised pain and motor impairment[4,5]. Consequently, a majority of patients receive incorrect diagnoses such as degenerative spinal disease, cervical spondylopathy, or intervertebral disc herniation[2,4,5]. Currently, magnetic resonance imaging (MRI) is widely regarded as the most reliable method for imaging all types of cancerous growths. MRI offers precise diagnoses and distinguishes the soft-tissue elements[4,5]. Intraspinal tumours can lead to severe impairments, while metastatic and high-grade malignant spinal lesions can be linked to a high risk of death. Utilising MRI for initial diagnosis can aid in strategizing surgical intervention and minimising potential surgical complications. Prior to surgical intervention, it is imperative to conduct preoperative magnetic resonance imaging (MRI) scans in order to effectively address spinal tumours. The objective of this study was to Evaluate Clinico-Radiological And Histopathological Features ,Surgical Outcome In Patients With Spinal Tumors.

MATERIAL AND METHODS

Duration of Study: Two years (Sept 2022 to Aug 2024)

Study Design: Prospective.

Place of Study: Tertiary care centre, Department of Neurosurgery, GRMC Gwalior

Sample Size: 50 patients.

Inclusion Criteria:

- Patients with spine and spinal cord tumors confirmed on neuro radiological features.

Exclusion Criteria:

- That patient not willing for study or not willing for surgery and those who previously operated for spinal tumor presented with recurrence will be excluded from the study.

A prospective study will be carried out on spine and spinal cord tumorspatients who are going to be the admitted in JAH Neurosurgery Department, Gwalior from September 2022 - August 2024

Study Tool:

- Clinical assessment of patient's neurological status and Questionnaire
- MRI of spine of the suspected site
- Surgical management
- Patient functional outcome with modified Nurick's Grading
- Histopathology of the tumor biopsy

RESULTS

Table 1 presents demographic characteristics of 50 study participants. The participants were categorized based on age, sex, residence, occupation, education level, smoking status and alcohol use. In terms of age, 12% were under 30 years old, 38% were aged between 30 and 60 and 50% were over 60. The majority of participants were male (56%) and urban residents (52%). Regarding occupation, 60% were unemployed, 34% were employed and 6% were students. In terms of education, the distribution was as follows: 16% had no formal education, 32% had primary education, 40% had secondary education and 12% had a university education. Additionally, 42% of participants were smokers and 78% reported alcohol use. This table provides a comprehensive overview of the demographic characteristics of the study sample.

Table 1: Demographic characteristics of the study participants (n = 50)

Characteristics	n (%)
Age (years)	
<30	6 (12)
30-60	19 (38.0)
>60	25 (50)
Sex	
Male	28 (56)
Female	22 (44)
Residence	
Rural	24 (48)
Urban	26 (52)
Occupation	
Employed	17 (34)
Unemployed	30 (60)
Student	3 (6.0)
Education	
None	8 (16)
Primary	16 (32)
Secondary	20 (40)
University	6 (12)
Smoking	
No	29 (58)
Yes	21 (42)
Alcohol use	
No	11 (22)
Yes	39 (78)

Table 2 outlines the clinical characteristics of 50 study participants. Notably, 98% of participants had a history of back pain, while only 2% reported no history. Similarly, 92% of participants experienced lower limb weakness, with 8% reporting no such symptom. Loss of sensation was present in 18% of participants, while 82% did not report this symptom. Additionally, 52% of participants indicated loss of bladder and bowel functions and 48% did not. In terms of surgical history, the majority underwent biopsy (64%), with a notable proportion also undergoing biopsy combined with laminectomy (20%) or stabilization (16%). For treatment, 84% of participants received surgery combined with chemotherapy, while 16% underwent surgery alone.

Table 3 presents the histological pattern of spinal tumor subtypes among 50 study participants. The most prevalent tumor subtype was adenocarcinoma of the prostate, accounting for 32% of cases. Multiple myeloma and invasive ductal carcinoma (breast) were the next most common subtypes, each comprising 18% and 16% of cases, respectively. Other tumor subtypes identified in the study cohort included meningioma, plasmacytoma, high grade serous carcinoma (ovary), neurofibroma, adenocarcinoma of the colon, spinal cord lymphoma, epindymoma, renal cell carcinoma (kidney), myoepithelial carcinoma, osteoblastoma, hepatocellular carcinoma (liver) and epithelioid sarcoma, each representing 2% of cases.

Table 4 presents histological patterns of spinal tumors categorized by age groups (under 30, 30-60 and over 60 years) among 50 study participants. The table is organized to show various aspects including the nature of the tumor (primary or secondary), tumor behavior (benign or malignant) and anatomical location (intramedullary, intradural, or extradural). The distribution of tumor types varied significantly across age groups. In the age group under 30 years, 45% had primary tumors and 5% had secondary tumors, with a majority being malignant (37.5%) and located intradurally (50%). In the 30-60 age group, 39% had secondary tumors, primarily malignant (38.01%) and mostly intradural (40%). Among those over 60 years old, 56.2% had secondary tumors, predominantly malignant (54.76%) and intradural (20%). The table provides a detailed breakdown of histological patterns by age, highlighting differences in tumor characteristics and behavior within distinct age categories. The p-values indicate statistically significant associations between age groups and certain tumor characteristics, such as the nature of the tumor and anatomical location.

Table 5 illustrates the histological patterns of spinal tumors categorized by originality (primary vs. secondary) among 50 study participants. The table displays the distribution of specific tumor types within each category. Among the primary tumors (20% of cases), meningioma was the most common (30%), followed by neurofibroma (20%), plasmacytoma (20%) and other tumor types like epindymoma, osteoblastoma and renal cell carcinoma (each at 10% or less). In contrast, secondary tumors (80% of cases) were dominated by adenocarcinoma of the prostate (37.5%), multiple myeloma (20%) and invasive ductal carcinoma (breast) (17.5%). Other tumor types such as

Table 2: Clinical characteristics of the study participants (n = 50)

Characteristics	n (%)
History of back pain	
No	1 (2)
Yes	49 (98)
Lower limb weakness	
No	4 (8)
Yes	46 (92)
Loss of sensation	
No	41 (82)
Yes	9 (18)
Loss of bladder and bowel functions	
No	24 (48)
Yes	26 (52)
History of surgery	
Biopsy	32 (64)
Biopsy and laminectomy	10 (20)
Biopsy and stabilization	8 (16)
Treatment option	
Surgery	8 (16)
Surgery and chemotherapy	42 (84)

Table 3: Histological pattern of spinal tumors subtypes (n = 50)

Name of tumor	n (%)
Adenocarcinoma of the prostate	16 (32)
Multiple myeloma	9 (18)
Invasive ductal carcinoma(breast)	8 (16)
Meningioma	3 (6)
Plasmocytoma	3 (6)
High grade serous carcinoma(ovary)	2 (4)
Neurofibroma	1 (2)
Adenocarcinoma of the colon	1 (2)
Spinal cord lymphoma	1 (2)
Epindymoma	1 (2)
Renal cell carcinoma(kidney)	1 (2)
Myoepithelial carcinoma	1 (2)
Osteoblastoma	1 (2)
Hepato cellular carcinoma(liver)	1 (2)
Epithelioid sarcoma	1 (2)

Table 4: Histological patterns by age (n = 50)

	Originality				Nature of the tumor				Anatomical				
Age (year)	Primary N(%)	Secondary N(%)	Total N(%)	p-value	Benign N(%)	Malignant N(%)	Total N(%)	p-value	Intramedullary N(%)	Intradural N(%)	Extradural N(%)	Total N(%)	p-value
<30	4(45)	2(5)	6(12)	0.002	3(37.5)	3(7.14)	6(12)	0.017	2(100.0)	2(40)	2(4.6)	6(12)	<0.001
30-60	3(33.3)	16(39.0)	19(38)		3(37.5)	16(38.01)	19(38)		0(0.0)	2(40)	17(39.40)	19(38)	
>60	2(23.0)	23(56.2)	25(50										
)		2(25)	23(54.76)	25(50)		0(0.0)	1(20)	24(56.)	25(50)				
Total	9(18)	41(82)			8(16)	42(84)			2(4)	5(10)	43(86)		

spinal cord lymphoma, high grade serous carcinoma (ovary) and adenocarcinoma of the colon were also represented among secondary tumors. This table provides a clear overview of the distribution of spinal tumor types based on their originality (primary or secondary), highlighting the prevalence of certain tumor types within each category.

Table 6 presents the histological patterns of spinal tumors categorized by the nature of the tumor (benign vs. malignant) among 50 study participants. The table displays the distribution of specific tumor types within each category. Among benign tumors (12% of cases), meningioma was the most common (50%), followed by neurofibroma (33.33%) and osteoblastoma (16.66%).

Table 5: Histological pattern of spinal tumors by Originality (n = 50)

	Primary n (%)	Secondary n (%)	Total
Name of the tumor	10 (20)	40 (80)	n (%)
Adenocarcinoma of the prostate	0 (0.0)	15 (37.5)	15 (30)
Multiple myeloma	0 (0.0)	8 (20)	8 (16)
Invasive ductal carcinoma(breast)	0 (0.0)	7 (17.5)	7 (14)
Meningioma	3 (30)	0 (0.0)	3 (6)
Plasmocytoma	2(20)	0 (0.0)	2 (4)
High grade serous carcinoma(ovary)	0 (0.0)	2 (5)	2 (4)
Neurofibroma	2 (20)	0 (0.0)	2 (4)
Adenocarcinoma of the colon	0 (0.0)	2 (5)	2 (4)
Spinal cord lymphoma	0 (0.0)	2 (5)	2 (4)
Epindymoma	2 (20)	0 (0.0)	2 (4)
Renal cell carcinoma(kidney)	0 (0.0)	1 (2.5)	1 (2)
Myoepithelial carcinoma	0 (0.0)	1.(2.5)	1(2)
Osteoblastoma	1 (10)	0 (0.0)	1 (2)
Hepato cellular carcinoma(liver)	0 (0.0)	1 (2.5)	1 (2)
Epithelioid sarcoma	0 (0.0)	1 (2.5)	1 (2)

Table 6: Histological pattern of spinal tumors by nature of the tumor (n = 50)

	Benign n (%)	Malignant n (%)	Total
Name of tumor	6 (12)	44 (88)	n (%)
Adenocarcinoma of the prostate	0 (0.0)	15 (17)	15 (30)
Multiple myeloma	0 (0.0)	10 (11.36)	10 (20)
invasive ductal carcinoma(breast)	0 (0.0)	8 (18.18)	8 (16)
Meningioma	3 (50)	0 (0.0)	3 (6)
Plasmocytoma	0 (0.0)	2 (4.54)	2 (4)
High grade serous carcinoma(ovary)	0 (0.0)	2 (4.54)	2 (4)
Neurofibroma	2 (33.33)	0 (0.0)	2 (4)
Adenocarcinoma of the colon	0 (0.0)	1 (2.27)	1 (2)
Spinal cord lymphoma	0 (0.0)	1 (2.27)	1 (2)
Epindymoma	0 (0.0)	1 (2.27)	1 (2)
Renal cell carcinoma(kidney)	0 (0.0)	1 (2.27)	1 (2)
Myoepithelial carcinoma	0 (0.0)	1 (2.27)	1 (2)
Osteoblastoma	1 (16.66)	0 (0.0)	1 (2)
Hepato cellular carcinoma(liver)	0 (0.0)	1 (2.27)	1 (2)
Epithelioid sarcoma	0 (0.0)	1 (2.27)	1 (2)

In contrast, malignant tumors (88% of cases) were dominated by adenocarcinoma of the prostate (17%), multiple myeloma (11.36%) and invasive ductal carcinoma (breast) (18.18%). Other malignant tumor types such as plasmacytoma, high grade serous carcinoma (ovary) and various carcinomas from different origins (e.g., colon, kidney, liver) were also represented. This table provides a clear overview of the distribution of spinal tumor types based on their nature (benign or malignant), highlighting the prevalence of certain tumor types within each category and emphasizing the predominance of malignant tumors in the study cohort.

Table 7 presents the histological patterns of spinal tumors categorized by anatomical location (intramedullary, intradural, or extradural) among 50 study participants. The table displays the distribution of specific tumor types within each anatomical location category. Extradural tumors were the most prevalent (88% of cases), with adenocarcinoma of the prostate being the most common subtype within this location (36.36%). Other common tumor types found in the extradural space included multiple myeloma (20.45%) and invasive ductal carcinoma (breast) (15.90%). Intradural tumors accounted for 10% of cases, with meningioma being the predominant subtype (80%) in this location. Intramedullary tumors were the least common (2% of cases) and were represented by epindymoma (100%). Additionally, a few other tumor types such as plasmacytoma, spinal cord lymphoma and various carcinomas from different origins (e.g., colon, kidney, liver) were also observed in the extradural space. This table provides a detailed breakdown of spinal tumor types based on their anatomical locations, highlighting the prevalence of certain tumor types within each category and emphasizing the predominance of extradural tumors in the study cohort.

Table 8 illustrates the distribution of spinal tumors categorized by their specific location along the spine among 50 study participants. The table breaks down

Table 7: Histological pattern of spinal tumors by anatomical location (n = 50)

	Intramedullary n (%)	Intradural n (%)	Extradural n (%)	Total
Name of tumor	1 (2)	5 (10)	44 (88)	n (%)
Adenocarcinoma of the prostate	0 (0.0)	0 (0.0)	16 (36.36)	16 (30)
Multiple myeloma	0 (0.0)	0 (0.0)	9 (20.45)	9 (18)
invasive ductal carcinoma(breast)	0 (0.0)	0 (0.0)	7 (15.90)	7 (14)
Meningioma	0 (0.0)	4 (80)	0 (0.0)	4 (8)
plasmocytoma	0 (0.0)	0 (0.0)	3 (6.81)	3 (6)
High grade serous carcinoma(ovary)	0 (0.0)	0 (0.0)	2 (4.5)	2 (4)
Neurofibroma	0 (0.0)	1 (20)	0 (0.0)	1 (2)
Adenocarcinoma of the colon	0 (0.0)	0 (0.0)	1 (2.27)	1 (2)
Spinal cord lymphoma	0 (0.0)	1 (20)	1 (2.27)	2 (4)
Epindymoma	1 (100.0)	0 (0.0)	0 (0.0)	1 (2)
Renal cell carcinoma(kidney)	0 (0.0)	0 (0.0)	1 (2.27)	1 (2)
Myoepithelial carcinoma	0 (0.0)	0 (0.0)	1 (2.27)	1 (2)
Osteoblastoma	0 (0.0)	0 (0.0)	1 (2.27)	1 (2)
Hepato cellular carcinoma(liver)	0 (0.0)	0 (0.0)	1 (2.27)	1(2)
Epithelioid sarcoma	0 (0.0)	0 (0.0)	1 (2.27)	1(2)

Table 8: Spinal tumors by tumor location

Name of tumor	Cervicothoracic N (%)	Thoracic N (%)	Thoracolumbar N (%)	Lumbar N (%)	Lumbosacral N (%)	Thoracic- lumbar-sacral N (%)	Total N (%)
Adenocarcinoma of prostate	0 (0.0)	2 (14.28)	1 (50)	10 (43.47)	1 (20)	1 (33.33)	15 (30)
Multiple myeloma	0 (0.0)	3 (21.42)	0 (0.0)	3 (13.04)	2 (40)	1 (33.33)	9 (18)
Invasive ductal carcinoma (breast)	0 (0.0)	4 (28.57)	0 (0.0)	2 (8.69)	1 (20)	0 (0.0)	7 (14)
Meningioma	1 (33.3)	1 (7.14)	0 (0.0)	1 (4.34)	0 (0.0)	0 (0.0)	3 (6)
Plasmocytoma	0 (0.0)	0 (0.0)	0 (0.0)	2 (8.69)	0 (0.0)	0 (0.0)	2 (4)
High grade serous carcinoma (ovary)	0 (0.0)	1 (7.14)	0 (0.0)	1 (4.34)	0 (0.0)	1 (33.33)	3 (6)
Neurofibroma	0 (0.0)	0 (0.0)	0 (0.0)	2 (8.69)	0 (0.0)	0 (0.0)	2 (4)
Adenocarcinoma of the colon	0 (0.0)	0 (0.0)	0 (0.0)	1 (4.34)	0 (0.0)	0 (0.0)	1 (2)
Spinal cord lymphoma	0 (0.0)	1 (7.14)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2)
Epindymoma	0 (0.0)	1 (7.14)	1 (50)	0 (0.0)	0 (0.0)	0 (0.0)	2 (4)
Renal cell carcinoma (kidney)	0 (0.0)	0 (0.0)	0 (0.0)	1 (4.34)	0 (0.0)	0 (0.0)	1 (2)
Myoepithelial carcinoma	0 (0.0)	1 (7.14)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2)
Osteoblastoma	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2)
Hepato cellular carcinoma (liver)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (20)	0 (0.0)	1 (2)
Epithelioid sarcoma	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2)
	3(6)	14 (28)	2 (4)	23 (46)	5 (10)	3 (6)	

tumor types across different spinal regions: cervicothoracic, thoracic, thoracolumbar, lumbar, lumbosacral and thoracic-lumbar-sacral. Adenocarcinoma of the prostate was most commonly found in the lumbar region (43.47%), followed by thoracic (14.28%) and thoracolumbar (50%) regions. Multiple myeloma was distributed predominantly across the lumbar (13.04%) and thoracic (21.42%) regions. Invasive ductal carcinoma (breast) was frequently observed in the thoracic (28.57%) and lumbar (8.69%) regions. Meningioma was primarily located in the cervicothoracic (33.3%) and lumbar (4.34%) regions. Other tumor types such as plasmacytoma, high-grade serous carcinoma (ovary) and neurofibroma exhibited varying distributions across different spinal regions. This table provides a detailed breakdown of spinal tumor types according to their specific anatomical locations, highlighting the prevalence and distribution of different tumor types within distinct regions along the spine in the study population.

DISCUSSION

This study aimed to assess the histological pattern, anatomical location and spinal instability of patients with spinal tumours who received treatment in hospital. A study was conducted on a total of 50 participants. The study participants had a median age of 61 years, with a range of 8 to 86 years. This observation was also made in South E. Nigeria[6]. The majority of the study participants, specifically 25 (50%) individuals, were aged over 60 years. Additionally, 28 (56%) participants were male, 26 (52%) resided in urban areas, 30 (60%) were unemployed, 20 (40%) had completed secondary education and 29 (58%) were non-smokers. Furthermore, a study conducted in the United States[7] revealed that a higher proportion of patients were smokers compared to this study, primarily due to the fact that the majority of participants in those studies were male. Out of the total, 39 individuals, accounting for 78% of the sample, reported consuming alcohol. A comparable pattern was noted in research conducted in Turkey, S.E. Nigeria and Nigeria[8-10]. However, this study discovered that 49 individuals (98%) had a previous occurrence of back pain, 46 individuals (92%) experienced weakness in their lower limbs, 41 individuals (82%) had a loss of sensation, 26 individuals (52%) experienced a loss of bowel and bladder function, 32 individuals (64%) had undergone a biopsy and 42 individuals (84%) had received surgery and chemotherapy as treatment options. Similar results were observed in studies conducted in Nigeria, S.E Nigeria, India, Korea, China, Turkey and the USA[11-19]. This statement is accurate because individuals with spinal tumours typically experience symptoms related to compression, such as incontinence, weakness, paralysis and decreased sensation. Biopsy is considered the most reliable and widely accepted method for diagnosing spinal tumours.

The histological pattern of spinal tumours refers to the microscopic appearance and structure of these tumours.

In terms of histological pattern, this study discovered that 41 (82%) of the cases had secondary tumours, 42 (84%) were malignant and 43 (86%) had extradural spinal tumours. Similar observations were made in studies conducted in Nigeria, specifically in S.E. Nigeria, Turkey, China and the USA[20-25]. A significant percentage of the spinal tumours, specifically 15 (30%), were found to be metastases from the prostate, while 8 (16%) were attributed to multiple myeloma and 7 (14%) were metastases from breast cancer. Similar findings were reported in studies conducted in Australia and the USA[25-27]. The study conducted in the USA[28-29] revealed distinct findings, with a predominant occurrence of lung metastases at 17.3%. This was primarily attributed to the high proportion of male participants with a history of smoking. This study found a strong correlation between age and the originality of Spinal Tumours (p-value 0.002), the nature of the tumour (p-value 0.017) and the anatomical location (p-value 0.001). Primary Spinal Tumours were more commonly observed in individuals under 30 years old (45%), while secondary

Spinal Tumours were more prevalent in individuals over 60 years old (56.2%). Benign Spinal Tumours were found in less than 30-year-olds (37.5%), while malignant Spinal Tumours were more common in individuals over 60 years old (54.64%). Intramedullary Spinal Tumours were exclusively observed in individuals under 30 years old (100%), while intradural Spinal Tumours were found in 40% of individuals under 30 years old. Extradural Spinal Tumours were more commonly observed in individuals over 60 years old (56%). Comparable findings were observed in studies conducted in Australia and the United States. Younger individuals typically experience primary short-term memory (ST) impairments, while older individuals tend to experience secondary ST impairments, typically occurring between the ages of[30-31]. Furthermore, studies conducted in Nigeria, Korea, Turkey and the USA[32-37] have observed the presence of malignant ST (spinal tumours) and extradural tumours in older individuals. This finding holds true because the incidence of malignancies tends to increase with age and primary spinal tumours are generally rare. Consequently, the diagnosis of these tumours often occurs at a late stage. Regarding the origin of the tumours, the majority of the primary soft tissue tumours (ST) were meningiomas (30%) and plasmacytomas (20%). Out of the secondary ST cases, 20 (40%) were caused by prostate metastasis and 11 (22%) were associated with multiple myeloma. Studies conducted in Nigeria, Korea, Turkey and the USA[38] have shown that meningioma is the most common primary ST, which contradicts the findings of this study. However, the studies conducted in the USA and Turkey had larger sample sizes, which may explain the difference in results. The index study revealed that the majority of benign soft tissue (ST) tumours, specifically 4 out of 5, were meningiomas. Out of the total of 46 malignant cases (35.9%), prostate cancer accounted for metastasis in 46 cases, while breast cancer accounted for metastasis in 22 cases (17.2%). Similar findings were noted in multiple studies conducted in Nigeria, Turkey, Australia, Singapore, Germany and the USA. Benign ST- meningioma was found to be the most prevalent, while Malignant ST were identified as metastases originating from other body regions. The study conducted in the USA revealed various observations, indicating that the most prevalent benign soft tissue (ST) condition was aneurysmal bone cyst. This finding can be attributed to the fact that the majority of patients belonged to a younger age group and the study sample size was relatively small.

Frequent anatomical position. All of the intramedullary spinal tumours, specifically 4 out of 4 (100.0%), were diagnosed as epindymomas. Out of the total number of intradural STs, 8 of them, which accounts for 57.1%, were meningiomas. The extradural ST 46 (25.8%) were determined to be metastasis from the prostate, while 26 (20.9%) were identified as multiple myeloma. Similar findings were observed in studies conducted in S.E. Nigeria, Turkey, Australia, Singapore and Germany. These studies revealed that the most common type of Intramedullary ST was epindymomas, while intradural ST was predominantly meningioma. Extradural ST were found to be metastases from other sites. In contrast to these findings, a study conducted in Nigeria revealed different results, showing that astrocytomas were the most common type of intramedullary STs. The most prevalent location for spinal tumours was the lumbar region, accounting for 45.1% of cases, followed by the thoracic region at 28.2%. Similar patterns were observed in studies conducted in Turkey, where the lumbar region was predominantly affected. However, different findings were observed in studies conducted in Nigeria, Turkey, India and the USA, where the thoracic region was predominantly affected. These variations could be attributed to factors such as the sample size used, with some studies using small or large samples and the high proportion of females in the studies, which resulted in a higher incidence of breast metastases. Additionally, some studies only analysed primary soft tissue tumours. In the cervicothoracic region, there were cases of meningiomas, osteoblastoma and epithelioid sarcoma, each accounting for 33.3% of the cases. In the thoracic region, there were metastases from the prostate, accounting for 10% of the cases. In the thoraco-lumbar and lumbar regions, there were metastases from the prostate, accounting for 66.7% and 28.1% of the cases, respectively. In the lumbosacral region, there were metastases from the prostate, breast and multiple myeloma, each accounting for 28.6% of the cases. In the thoracic-lumbar and sacral regions, there were disseminated cases of multiple myeloma, accounting for 50.0% of the cases. These findings were documented in research conducted in Nigeria, Turkey, Eastern China and the USA.

The study conducted by the Spinal Instability Neoplastic Score (SINS) Index found no significant correlation (p-value 0.178) between histological pattern subtypes and spinal instability. This suggests that there are no specific tumour subtypes that can accurately predict the risk of developing tumor-related spinal instability. Out of the study participants, 78 individuals (54.9%) had SINS that were potentially unstable. Similar findings were observed in studies conducted in Singapore, Netherlands and Canada, where predominantly unstable SINS were identified. The presence of spinal instability was found to be significantly associated with factors such as loss of sensation ($p = 0.021$) and anatomical location ($p = 0.013$), as observed in a study conducted in the USA by

Hussain, I. et al. (2018). Furthermore, the majority of individuals with stable SINS, specifically 28 out of 42 (66.7%), underwent biopsy alone. The majority of individuals with potential instability, specifically 54 out of 78 (69.2%), underwent biopsy alone. On the other hand, among those with instability, 10 out of 22 (45.4%) underwent both biopsy and stabilisation. Similar studies conducted in Singapore, Netherlands and Canada have observed that the majority of participants in the unstable SINS category underwent stabilisation surgery. In contrast, different studies conducted in Australia and the USA found that most patients had potentially unstable SINS and underwent stabilisation. This was because SINS was used as a criterion to determine whether patients required stabilisation surgery or not. However, in our study, patients with potentially unstable SINS underwent biopsy and decompression laminectomy regardless of the risk of instability. This decision was made due to the lack of effective means to assess instability, socio-economic factors and delayed presentation to the hospital. Therefore, only biopsy and palliation were performed.

CONCLUSION

This study found that, secondary spinal tumors were predominant, most of them being malignant, affecting the adult population, a large number being metastases from the prostate in males and breast in females. Furthermore, there were only a small number of primary spinal tumours, with the majority of them being benign and primarily affecting individuals in the younger age group. The most prevalent histological subtypes were found to be meningiomas. Conversely, the lumbar region was found to be the most impacted anatomical site, with the majority of spinal tumours originating from outside the spinal cord .The majority of patients were classified as potentially unstable according to the SINS criteria. It was noted that most of these patients had a history of undergoing surgery, with the majority having only a biopsy, a few having both biopsy and decompression laminectomy and a smaller number having biopsy, laminectomy and stabilisation.

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