Original Article

Histomorphological Spectrum and Trend of Spinal Neoplastic Lesions: A Single Institutional 40-year review

Salami Akeem Ayodeji[1], Nwadiokwu John Ifeanyi[2],Iwuagwu Emmanuel Ifeanyi[3], Ajani Mustapha Akanji[1], BalogunAyokunle James[4], OyemoladeAyofe Toyin[5], Adeolu Abiodun Augustine[4]

[1]Department of Pathology, College of Medicine, University of Ibadan, Ibadan, Nigeria, West Africa
[2]Department of Pathology, University College Hospital, Ibadan, Ibadan, Nigeria, West Africa
[3]Department of Surgery, Division of Neurological sciences, University College Hospital, Nigeria, West Africa
[4]Department of Neurological Sciences, College of Medicine, University of Ibadan, Nigeria, West Africa
[5]Division of Neurosurgery, Department of Surgery, Federal Medical Centre, Owo, Nigeria

ABSTRACT

Objectives: Spinal tumours are known to be much less common compared to brain neoplasms. In our setting, due to poor data gathering, under reporting and probably lack of presentation to medical facilities, studies on spinal tumours are sparse. Thus, there is a lack of data on the frequency of spinal tumours in a predominantly black population. The few previous studies done in our environment had reported spinal tumours to be infrequent and extramedullary tumours to be more common. This study examines the histomorphological spectrum of spinal tumours in an African setting, comparing it with previous observations to determine possible changes over the decades.

Methods: Data was obtained from the hospital records of patients over a forty-year period. These include the patients' age, gender and histomorphological data of all the neoplastic spinal lesions. The data was analysed using SPSS 20 statistical software.

Results: Ninety four cases were seen during the study period. The tumours were more common between the third to the sixth decades of life. There was a slight male preponderance with a male to female ratio of 1.2:1. Meningiomas were the commonest tumours seen during the study period which is in contrast to previous studies that had shown Burkitt lymphoma. The data also showed a steady rise in the number of cases during the study period suggesting an increase in patients' presenting to the hospital and more surgical cases.

Conclusion: The index study showed a difference in patients demographics and the histological tumour types seen over the study period compared to the data from previous studies. This is probably due to better awareness and better diagnostic facilities.

INTRODUCTION

Spinal neoplastic lesions arise from the spinal cord, its covering meninges, surrounding blood vessels, vertebrae or from a distant tissue with secondary deposit in the spine.[1] These lesions are less common than cranial neoplasms.[2] They are classified as extradural and intradural, the latter being subdivided into extramedullary and intramedullary.[3,4,5] Extradural tumours are much more common than

Corresponding author:
Dr Ayodeji Salami.
Department of Pathology, College of Medicine, University of Ibadan, Ibadan, Nigeria, West Africa
Email: ayodejisalami@gmail.com
Tel: +2348057072670

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intradural neoplasms with latter being mostly glial and vascular tumours.[5,6]

Spinal tumours are ten times less common compared to brain tumours according to several studies.[3,5,7] Recent CBTRUS reports of cancer registries in the US shows spinal cord tumours to constitute three percent of all central nervous system tumours.[8] Studies done in Africa have mostly focused on infective and degenerative causes of spinal diseases with a paucity of data on neoplastic diseases.[9]

In Nigeria, the true burden of spinal neoplasms is most likely under reported; probably due to poor population based statistics and poor patronage of orthodox health care[10] as well as paucity of relevant diagnostic tools, such as magnetic resonance imaging and axial computerized tomography (CT) in addition to inadequate number of trained medical personnel. This may also account for the dearth of information on the histomorphological characteristics as well as trend of spinal neoplasms in Nigeria. The earlier study by Odeku *et al* from the same study centre had shown extramedullary tumours to be more common in our environment similar to reports from other places.[11] However, their study had shown a high percentage of the tumours being due to haematolymphoid tumours, particularly, Burkitts lymphoma. Thus, a significant percentage of these tumours were in the young and paediatric patients. The more recent study by Ogun *et al*[12] showed a significant decline in the number of patients with Burkitts lymphoma and a relative increase in the diagnosis of other nervous system based tumours. They attributed this change to possible more efficient diagnostic facilities and increase in the number of trained personnel as well as reduction in malaria transmission and better nutrition. There is, thus, a need for reevaluation of our data to know the actual demography of spinal neoplasms in our environment, a predominantly black population.

This study is aimed at adding to the availableinformation on the histomorphology of spinal neoplasms and highlighting possible demographic and histopathological changes in tumour types over the decades in a developing, resource-poor setting.

MATERIALS AND METHODS

We reviewed patients' age, gender and histomorphological data of all the neoplastic spinal lesions from the patients' hospital records over a 40-year period. The age distribution, sex distribution and frequency patterns of all the neoplastic spinal lesions seen within the study period were determined by frequency statistics using Statistical Package for Social Sciences (SPSS), version 20. The trend in decades was also determined using a simple frequency bar chart.

RESULTS

Ninety-four cases of neoplastic spinal lesions were seen over the four decades of study. The male to female ratio was approximately 1.2:1 as shown in table 1.The mean age was 34.88 ± 18.94years with a peak incidence in the 5th decade (Figure1). There were more benign tumours seen in the spinal cord during the duration of study (Table 1). The primary neoplastic spinal lesions comprise 85.1% of the spinal lesions seen in this study while the secondary or metastatic neoplastic spinal lesions comprise 14.9%. The male to female ratio of the primary spinal lesions was 1.2:1 while it was 1.3:1 for the metastatic spinal lesion. There were more intradural spinal lesions in this study comprising 54% while extradural spinal lesions were 46% (Figure 2). Overall, there was a steady rise in the number of reported cases from the second to the fourth decade; the highest being in the fourth. The number of cases in the fourth decade were more than in the second and third decades combined (Figure 3).

Meningiomas and peripheral nerve sheath tumours had the highest occurrences (16% each), while germ cell tumours (GCTs) had the least occurrence (2.1%) (Table 2). Other spinal tumours seen include metastatic tumours (14.9%), soft tissue tumours (14.9%), haemato-lymphoid tumours (9.5%), glial tumours (8.5%), bone tumours (7.5%), Vascular

tumours (5.3%) and neuronal tumours (5.3%) (Figure 4 and 5).

Table 1: Demographic data of patients and tumour characteristics

Study characteristic	Value
SEXMale	51(54.3%)
Female	43(45.7%)
TUMOUR GRADING Benign	51(54.3%)
Malignant	43(45.7%)
TUMOUR ORIGIN Primary	80(85.1%)
Secondary	14(14.9%)

Table 2: Histomorphological patterns of neoplastic spinal lesions

Tumour histology	Percentage (%)
Meningioma	16
Peripheral Nerve Sheath Tumours (PNSTs)	16
Metastases	14.9
Soft Tissue Tumours	14.9
Haemato-lymphoid Neoplasms	9.5
Glial Tumours	8.5
Bone Tumours	7.5
Vascular Tumours	5.3
Neuronal Tumours	5.3
Germ Cell Tumours	2.1

DISCUSSION

In this study, we evaluated the data of ninety-four (94) patients out of which fifty-one (51) were males and forty-three (43) were females; giving a male-to-female ratio of 1.2:1. This slight male preponderance, agrees with reports from previous studies.[13,14]However, this gender difference shows an increase in the number of females with spinal tumours in the study population compared to the earlier study by Odeku *et al* which showed a male-to-female ratio of 8: 3.[11] The earlier study by Adeolu *et al*[4] had shown a higher number of females in their cohort although their data included patients from other facilities unlike the index study in which data came only from one tertiary centre. The index study also showed the fifth decade as the peak age of occurrence of spinal tumour in patients, a finding similar to that of Adeolu *et al*[4] but a marked difference with the study by Odeku *et al*which showed the peak age in the first and second decades of life.[11]The earlier study by Odeku *et al*[11] had shown a high number of haematolymphoid tumours, particularly, Burkitt lymphoma cases, which occurred more in the younger age group. Ogun *et al* in their study of central nervous system tumours in the same centre had observed a marked reduction in the number of haematolymphoid cases seen following the Odeku *et al* study, a finding which they postulated may be due to reduced malaria transmission and better nutrition in the paediatric population.[12] This observation may explain the differences in the peak age group between the Odeku *et al* and the index study. The tumours seen in the index mainly meningiomas, peripheral nerve sheath tumours, metastases and soft tissue tumours which presented morecommonly in the older age group. The peak age for the occurrence of spinal tumours, as seen in the index study, was the fifth decade which agrees with findings from some other studies.[15,16,17]The mean age from this study, was 34.88 ± 18.94years which is in keeping with a similar finding by Chikani*et al*.[15]

Benign spinal neoplasms accounted for 54.3% of the total number of cases whereas malignant neoplasms accounted for 45.7% of the total number of cases. This is similar to a study by Bhat et al in which benign spinal neoplasms accounted for more of the cases (67.2%) while malignant spinal neoplasms accounted for 32.58% of the cases.[18] This finding is further corroborated by Sohn*et al*'s study in which benign spinal neoplasms accounted for 76.7% of the cases and malignant spinal neoplasms accounted for 23.3% of the cases.[19]

Among the histomorphological spectrum in this study, meningiomas and PNSTs were the commonest, accounting for 16% each of the total number of cases, followed by metastases and soft tissue tumours. Germ cell tumours were the least common, accounting for 2.1% of the total number of cases. This is similar to findings by Grimm and Chamberlain in which meningioma and PNSTs were the commonest primary spinal neoplasms.[3] Bhat *et al*also found PNSTs (Schwannoma) and meningiomas to be the commonest primary spinal neoplasms in their study, accounting for 38.9% meningioma (24.10%) respectively.[18] Metastases to the spine was reported as the commonest spinal neoplasm by Adeolu *et al*[4] which is in contrast with our finding that showed metastases being the third commonest spinal neoplasm. Many patients with metastasis from carcinoma of the prostate and multiple myeloma often do not get to the attention of the neurosurgeons and the pathologists because their management may be solely by the urologists and haematologists respectively and, thus, may not be included in this cohort. Germ cell tumors have been shown by several other workers to be rare neoplasms of the spine and were also the least common in the index study.[20,21]

Primary spinal neoplasms accounted for 85.1% of the total number of cases whereas secondary neoplasms made up 14.9% of the total number of cases from the index study. This was in contrast to findings by some studies which showed that secondary spinal neoplasms were commoner.[4,16] However, the real incidence of primary spinal neoplasms may not really be known because most of these neoplasms are asymptomatic.[16,22]

Overall, 54% of the neoplasms were intradural in location whereas 46% were extradural. This finding contrasts with that of Adeolu *et al*[4] and Odeku *et al*[11]who both found extradural location of tumours to be more common.However, the study by Krishna *et al*also reported a higher incidence of intradural spinal neoplasms.[23]

The frequencies of spinal neoplasms over the four decades under study showed a steady rise in the number of cases from the second to the fourth decade with the peak in the fourth decade. This suggests that more cases of spinal neoplasms are being diagnosed and managed over the last two decades as previously suggested by Bhat *et al* and Abdus-Salam *et al.*[18,22] The possible reasons for the steady rise in incidence of spinal neoplasms observed in this study may be due to an increase in skilled personnel and improved diagnostic facilities in our health institution in addition to increasing awareness of the disease among the study population.

CONCLUSION

Spinal neoplasms appear to be undergoing changes in demographics with increase in the number of cases seen over the four decades of the study. This may be due to greater awareness in the study population and better diagnostic facilities. The tumour types seen in the index study differ from previous studies with meningioma and PNSTs being the commonest neoplasms. The tumours were mainly intradural and are commonest in the fifth decade of life. The study also showed an increase in the number of female patients with spinal tumours.

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