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Original Research Paper

Pathology

HISTOMORPHOLOGICAL SPECTRUM OF SKULL TUMOURS – A TEN YEARS ANALYSIS

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ABSTRACT

Introduction: Skull tumours are rare (1–2% of all bone tumours) and the diagnosis requires multidisciplinary approach.

Aims: To study the histo-morphological spectrum of skull tumours and to find out its frequency, sex and age predilection.

Method: Histopathology of tumours and tumour-like conditions of skull were analysed from a tertiary care Government medical college hospital, over a period of 10 years. 61 patients were included in the study.

Results: Benign tumours constituted a total of 28 cases (46%), malignant tumours constituted 31 cases (51%) and intermediate grade tumours were 2 cases (3%). Benign tumours preferred vault and malignant tumours preferred the base.

Conclusion: The most common tumour of skull is metastatic deposit. Benign tumours were common in young females and malignant tumours in elderly males. Frontal bone is the most common site followed by parietal bones.

KEYWORDS : skull tumours, benign tumours, malignant tumours.

INTRODUCTION

The tumours of skull bones are rare, accounting for only 1–2% of all bone tumours. The diagnosis requires multidisciplinary approach. As they are uncommon lesions, majority of published studies are of single case reports. We conducted this study on histo-morphological spectrum of skull tumours, to analyze the various tumours encountered and to correlate it with their clinico-pathological features.

AIMS AND OBJECTIVES

To study the histo-morphological spectrum of the tumours of skull and to find out their site, sex and age distribution and to compare them with statistics reported in the literature.

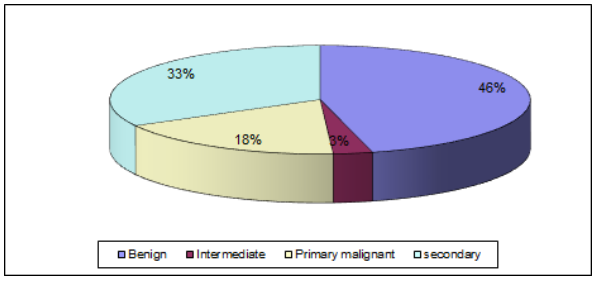
MATERIAL AND METHODS

61 Patients with tumours and tumour like conditions of skull admitted in a tertiary care Government medical college hospital in Tamilnadu, India, over a period of 10 years were included for the study. The specimens were processed and hematoxylin and eosin stained slides were analysed based on WHO classification of bone tumours. The lesions were categorized into benign, intermediate and malignant tumours. Then the clinico-pathological features were correlated.

OBSERVATIONS AND RESULTS

A total of 61 cases of tumours of skull were studied. Benign tumours constituted 28 cases (46%), malignant tumours, both primary and secondary, constituted 31 cases (51%) and intermediate grade tumours were 2 cases (3%) Chart-1.

Chart-1. Distribution of skull tumours.



Regarding the age distribution, in this study, the tumours of skull were more common between 21 years and 60 years of age (66.2%) with a peak age of occurrence between 21 years and 40 years (33.8%). Benign tumours were more common before 40 years of age (23 out of 28 benign tumours) and malignant tumours were more common after 40 years of age (15 out of 31 malignant tumours). With respect to sex distribution, tumours of skull show female preponderance (54%). Primary malignant tumours of skull have preponderance for males (7 out of 11 cases of primary malignant tumours).

Regarding site distribution, 62% of the tumors occurred in the vault. Benign tumours preferred vault (19 cases out of 28 cases of benign tumours) whereas primary malignant tumours preferred the base of skull (7 out of 11 cases).

Among individual bones of vault, frontal bone carries the maximum number of tumours in this study (14 of 39 tumours occurring in the vault) followed by parietal bone (10 cases). Benign tumours of vault also prefer frontal bone (9 out of 19 cases). Primary malignant tumours of vault involve frontal and parietal bones with equal frequency. Secondary deposits involve multiple bones of vault simultaneously (6 out of 13 cases).

Table-1. Distribution of primary tumours of skull.

Tumours	Benign (16 cases)	Intermediate (2 cases)	Malignant (11 cases)
Bone forming tumours	7 (18 %)	_	2 (4.5 %)
Cartilage forming tumours	2 (4.5 %)	-	2 (4.5%)
Giant cell tumours	-	1 (2.5 %)	-
Round cell tumours *	-	-	4 (10 %)
Vascular tumours	4 (10 %)	-	1 (2.5 %)
Connective tissue tumours	1 (2.5 %)	1 (2.5 %)	-
Others	2 (4.5 %)	-	2 (4.5 %)

* includes Ewing's sarcoma and Lymphomas

Table-2. Distribution of tumour-like lesions of skull.

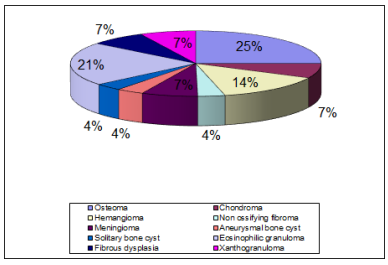
Tumour like lesions	No. of cases (% of primary tumours)
Aneurysmal bone cyst	1 (2.5 %)
Solitary bone cyst	1 (2.5 %)
Eosinophilic granuloma	6 (15 %)
Fibrous dysplasia	2 (4.5 %)
Xanthogranuloma	2 (4.5 %)

In this study, the most common tumour of skull was metastatic deposit (20 cases) which constitutes 33% of all tumours of skull.

Among the benign tumours, osteomas were the commonest

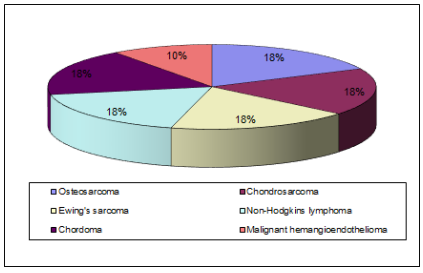
tumour (7 cases), constituting 25% of all benign tumours and tumours like conditions of skull. This is followed by eosinophilic granuloma (6 cases) constituting 21.5%.

Chart-2. Distribution of benign tumours and tumour-like lesions



Regarding primary malignant tumours of skull, in this study, osteosarcomas, chondrosarcomas, Ewing's sarcoma and chordomas show equal distribution (2 cases each).

Chart-3. Distribution of primary malignant tumours of skull.



DISCUSSION

Skull bones are rare sites of primary bone tumours, accounting for about 1% of all bone tumours. [1] Tumours of skull were divided into primary and secondary tumours. The primary tumours belong to either benign, intermediate grade or malignant tumours. In this study, metastatic deposits were the commonest skull tumours. Malignant tumours were slightly more common in skull, forming 51% of all tumours occurring in the skull. In a study of a series of patients with skull tumours at Mayo clinic, 19% were benign and 81% were malignant.

The age distribution of tumours of skull in this study was between 3rd and 6th decade of life (66.2%). Benign tumours were more common below 40 years of age (23 out of 28 benign cases). The mean age for benign tumours was 41.9 years in the study conducted by Tucker WS, et al. [2] Malignant tumours of skull were more common in the 5th to 6th decade (13 out of 31 cases) in this study. In the study conducted by Dorfman HD, et al [3] malignant tumours were common above 50 years of age.

Skull tumours showed slight predilection for females (54%). Benign tumours showed significant female predilection. (M : F = 11:17 cases). This finding correlates with the study of Tucker WS et al (M : F = 6:25 cases).[2]

In correlation with the results of Dorfman HD et al, [3] (57% males against 43% of females) our study showed male predominance (7 males against 4 females) for primary malignant tumours.

The most common complaints of patients with skull tumours in this study were headache and swelling (29 cases and 27 cases respectively). This finding correlates with the reports of Emmanuel Gay et al. [4]

Vault tumours were predominantly benign (19 cases) in this study, but in the study by Aanchal Kakkar et al [5] benign and malignant tumours occurred equally in the vault. Skull base tumours were predominantly malignant (7 cases) which correlates with Rosenberg AE et al [6] study. Metastatic disease involved multiple bones of vault simultaneously in this study.

In this study osteoma forms 25% of benign skull tumours which is 63% in Tucker WS et al [2] study. Consistent with Aanchal Kakkar et al study our study also showed osteoma as the most common benign tumour of skull. Of the seven cases of osteomas, 3 cases occurred below 20 years of age.

In this study, eosinophilic granulomas were the second most common primary tumour of skull (6 cases). Debois et al, [7] in their study of 12 cases showed eosinophilic granuloma as one of the commonest vault tumour (3 cases). Out of 6 cases of eosinophilic granuloma of skull, 3 cases occurred below 20 years of age.

In this study, hemangiomas form 10 % of all primary skull tumours and third most common primary tumour of skull (4 cases). Hemangiomas constituted 1.6% all primary tumour of skull in the study by Aanchal Kakkar et al.

This study reveals 2 cases of chondromas, both of which occurred in male patients at the skull base. The age group in this study was 20–50 years.

In this study, 2 cases of fibrous dysplasia occurred in patients <20 years, one at the skull base in a 13 year old female and the other in parietal bone in a 20 year old male. Lustig et al [8] has reported cases of fibrous dysplasia involving sphenoid, parietal and other bones of vault. Fibrous dysplasia predominantly involved base of skull in this study. In Davies et al [9] review of 18 cases of fibrous dysplasia of skull, 37% of patients had active disease in adulthood with an equal sex distribution. Sharma et al [10] studied 8 cases of fibrous dysplasia in the age group of 10–33 years, with 2 patients showing fibrous dysplasia of sphenoid wing.

This study revealed a solitary case of aneurysmal bone cyst occurring in the skull in a 21 year old female. In Daszkiewicz et al [11] study, 2 out of 10 cases of aneurysmal bone cyst occurred in cranium. Gan YC et al [12] states that only 3% of aneurysmal bone cysts occur in the cranium. In the study conducted by Aanchal Kakkar et al the aneurysmal bone cyst occurred in 3.2% of all primary tumours of skull.

In this study there was a solitary case of non ossifying fibroma in a 27 year old female, occurring in the frontal bone. CT showed bifrontal bone involvement with dural and orbital extension.

In this study, Osteosarcomas were one of the common primary malignant tumours of the skull constituting 4.7% of primary tumours of skull. It was 4% in the study conducted by Aanchal Kakkar et al. According to the study of Bose B, [13] osteosarcomas form 1-2% of all skull tumours.

In this study, chondrosarcomas form 16.5 % of all skull base tumours. According to Kveton JF et al, [14] chondrosarcomas forms 6 % of skull base neoplasms. In the study by Aanchal Kakkar et al, 29.6% of primary tumours of skull were chondrosarcoma, all of which occurred in the skull base. Chondrosarcomas were common primary malignant tumour of skull in equal percentage with osteosarcomas in this study. Whereas the percentage was 29.6% of all primary tumours of skull for chondrosarcomas and 4% of all primary tumours of skull for osteosarcoma in Aanchal kakkar et al study.

In the skull base, chordomas and chondrosarcomas were common in this study. This correlates with the study of Rosenberg AE et al [6] and O'Connell JX et al [15] whereas Aanchal Kakkar et al study showed chondrosarcomas as the most common skull base tumours.

In this study, Ewing's sarcoma forms one of the common primary malignant tumours of skull. According to the literature, it occupies third position only and is preceded by osteosarcoma and chondrosarcoma. In Aanchal Kakkar et al study, Ewings sarcoma constitutes 3.2% all primary tumours of skull.

Chordomas were one of the common neoplasms of skull base (16.5%) in this study.

This study showed 2 cases of primary Non-Hodgkins lymphoma of cranial bones in a 67 years old female occurring at the skull base and 22 years old male occurring in the frontal bone. There are individual case reports of primary NHL of bone in the literature. In the literature review by Jamjoom et al, [16] they found only 9 such cases reported. Dai et al [17] and Kaufman et al [18] have reported cases of NHL affecting vault and base of skull respectively.

Commonest skull tumours are metastatic tumours. In this study, the common age of occurrence of metastatic involvement is 40–60 years. In these cases of secondaries in skull, the site of primary

cancers were found in Thyroid (3 cases), Breast (2 cases), Rhabdomyosarcoma (2 cases), Ewing's sarcoma (2 cases), lung, nasopharynx, melanoma of orbit, carcinoma of cervix (1 case each). The site of primary malignancy was not specified in 7 cases.

CONCLUSION

Malignant tumours were slightly more common in the skull than benign tumours. The most common tumour of skull is metastatic deposit. Benign tumours of skull were common in younger age group and malignant tumours have predilection for older age group. Benign tumours of skull were more common in females whereas malignant tumours show male preponderance. The tumours occupying the vault were predominantly benign, whereas those occurring at the base of skull were predominantly malignant. In the vault, frontal bone is the most common site for both benign and malignant tumours followed by parietal bones. The most common primary tumour of skull is osteomas followed by eosinophilic granulomas and hemangiomas. The most common primary malignant tumours of skull were osteosarcoma, chondrosarcoma, Ewing's sarcoma and chordomas. Chordomas and chondrosarcomas were common tumours of skull base.

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