Spectrum of Skull Lesions in Pediatric Population: A Single Institutional Experience

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ABSTRACT

Background: *Pediatric skull lesions are rare. Here, a single institutional experience dealing with such lesions is presented.*

Methods: *A retrospective review of 18 consecutive pediatric patients was done, who were treated for a variety of skull lesions at Department of Neurosurgery, King Faisal Specialist Hospital and Research Centre, Riyadh from 2010 to 2015. The clinical and pathological features, diagnosis, management and outcome were noted and analyzed.*

Results: *In this study, eighteen skull lesions were identified in 10 male (55%) and 8 female (44%) patients, with a mean age at diagnosis of 9.5 years. These lesions were usually benign and most commonly presented as a painless mass (n = 11). Fronto-orbital (n = 6) was the most frequent site encountered in this study followed by temporo-parietal (n = 3) and parieto-occipital area (n = 2). Gross total resection achieved in 15 patients (83.3%) and reconstruction of skull defect was possible in 11 (61.1%) of them. Excluding the malignant lesions, no recurrence was found in this study cohort for a mean follow up time of 2.8 years.*

Conclusions: *Majority of the skull lesions in children are benign. Pre-operative angiography and embolization is helpful to reduce the intraoperative blood loss. Gross total resection with reconstruction is the treatment of choice. Recurrence is uncommon after gross total resection.*

Keywords: *Skull lesions, pediatric, painless mass.*

INTRODUCTION

Pediatric skull lesions are not always malignant rather congenital, post traumatic and inflammatory lesions are more prevalent.[1,2] Simply wide range of pathology can occur in calvarium. However, interestingly the presentation is similar as palpable mass on scalp, pain in swelling or increase in head size, regardless of underlying pathology.[3,4] Careful neurological evaluation is extremely helpful. Time of onset of symptoms, progression of symptoms, local calvarial examination and neurological examination are beacon for making diagnosis. For final diagnosis and strategic treatment, the skull x-rays, computerized tomogram and magnetic resonance imaging are mandatory.[5]

Unfortunately literature regarding pediatric skull lesions is quiet scarce mainly due to rarity of pediatric skull lesions or probably interest to present individual rare cases rather than review of overall clinicopathological spectrum of lesion.[2] At the same time there is paucity of literature on surgical treatment of pediatric skull lesions.

In fact the pediatric skull lesions are markedly different from adults due to growing age of children. To deal with the pediatric skull lesions specially the skull base is really a complex and technical challenge for neurosurgeons. The growth of calvarium is dependent on brain growth while skull base is a template for growth and formation of facial structures.[1-3]

We are presenting a single centre experience of pediatric skull lesions.

Over a period of five years, including the clinico-pathological spectrum of lesions are well as how they were dealt surgically.

OBJECTIVES

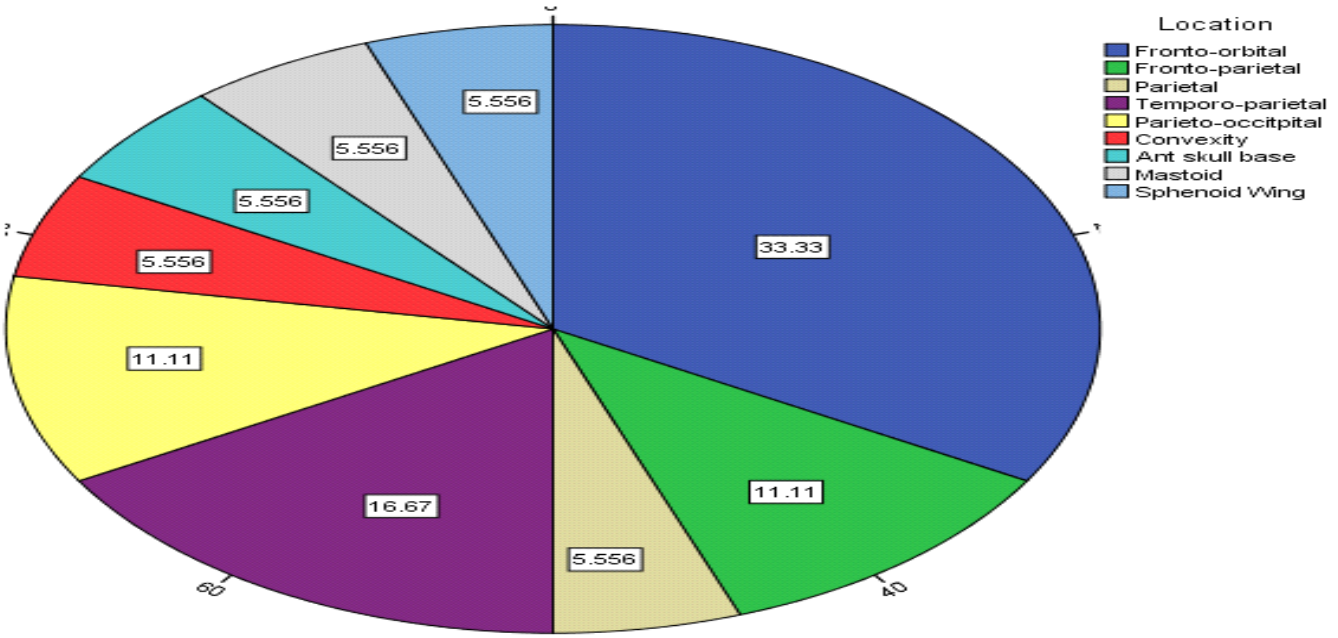
To present a review of clinicopathological features, surgical management and outcome of skull lesions in children at a tertiary care hospital during past five years.

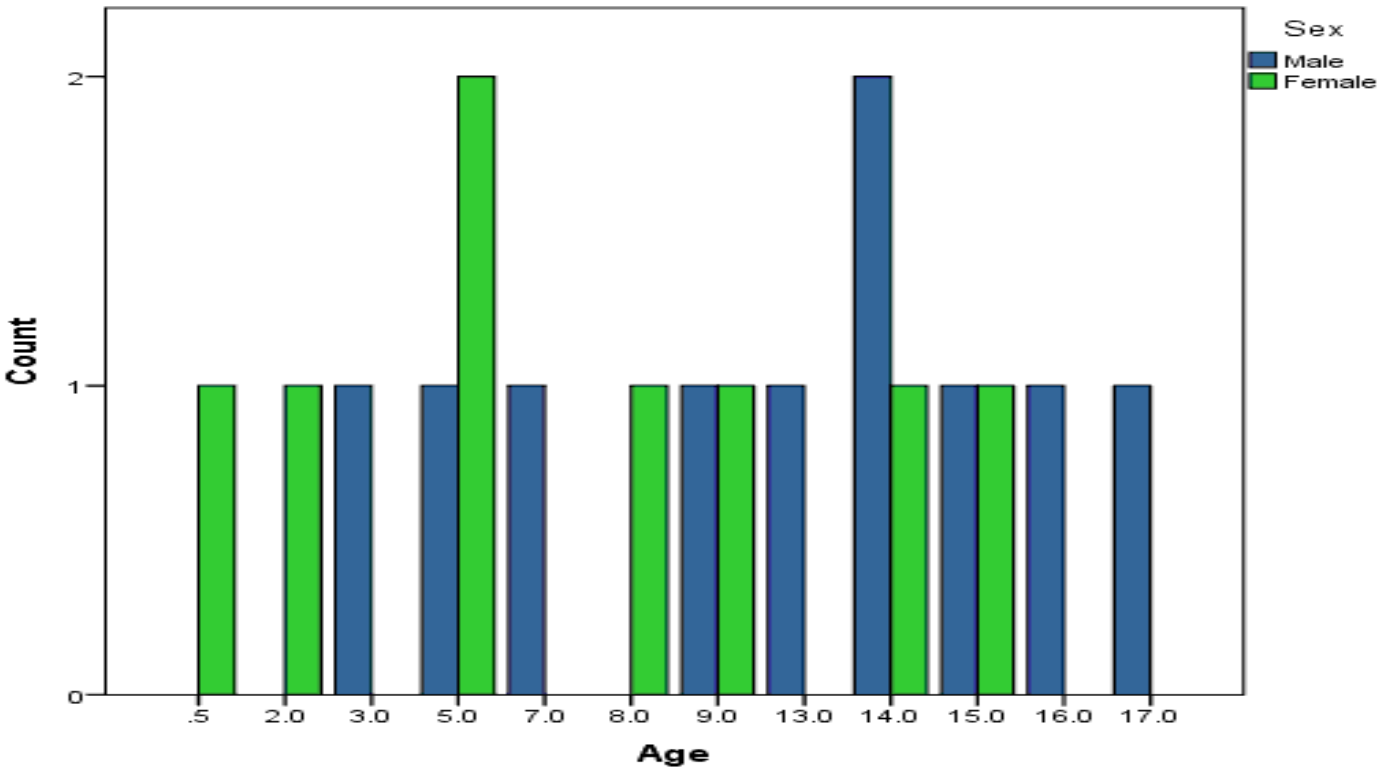
MATERIALS AND METHODS

After obtaining approval from the ORA (Office of research affairs), a retrospective review of medical records was done to identify 18 consecutive pediatric patients treated for skull lesions (both primary and secondary) from 2010 to 2015. The clinical information including age, gender, presenting symptoms, medical history, imaging studies, treatment and recurrence was analyzed. The original histologic slides were available for all 18 patients. Statistical analysis of data was done using SPSS version 22. All the variables were identified. Demographic variables of the patients were analyzed using simple descriptive statistics. Mean and Standard deviation were calculated for age. Frequency and percentages were determined for qualitative variables i.e. gender, location and nature of lesion, extent of excision and recurrence.

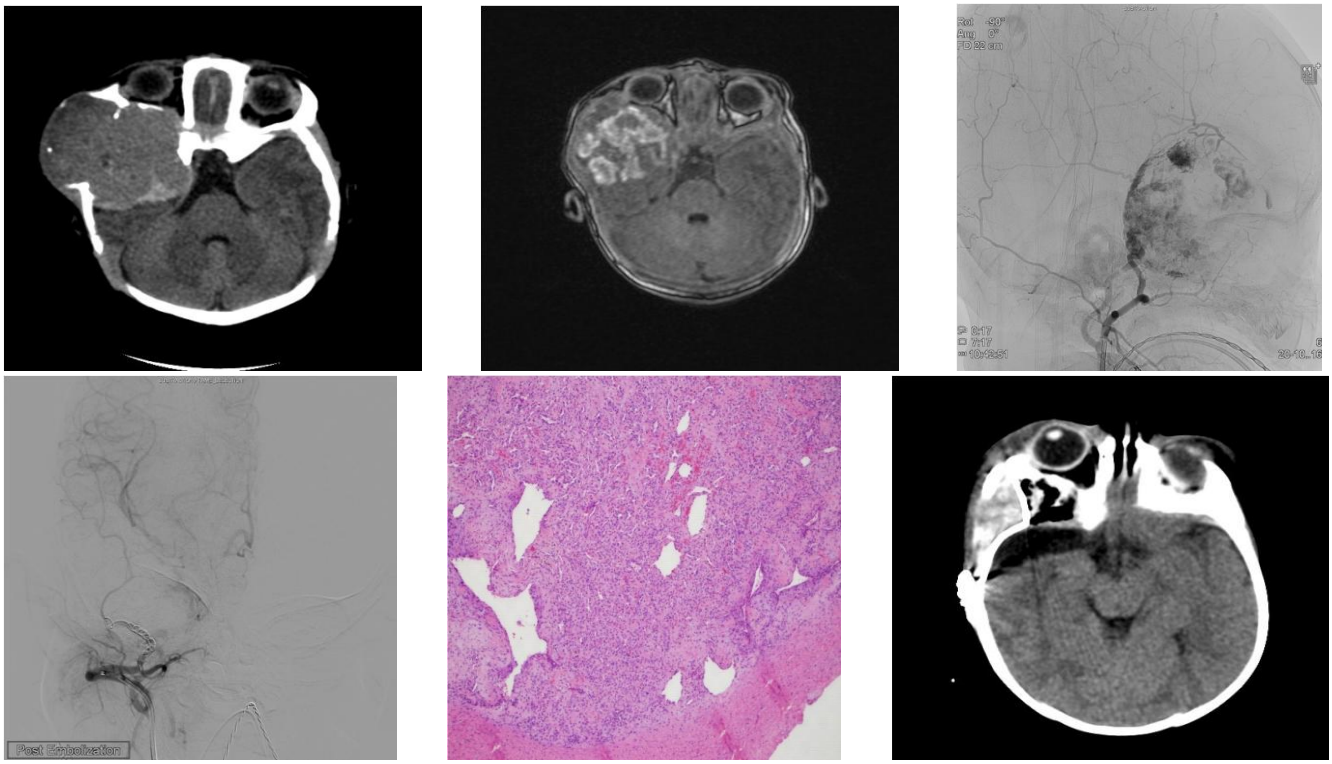
RESULTS

Eighteen pediatric skull lesions were identified in 10 male (55%) and 8 female (44%) patients. The mean age at the time of diagnosis was 9.5 years ± 5.3 (range = 6 months to 17 years). Clinical presentation included a painless mass (n = 11), a painful mass (n = 3), proptosis (n = 3), headache and vomiting (n = 2), or an incidental finding on imaging studies (n = 1). Fronto-orbital (n = 6) was the most frequent site encountered in this study followed by temporo-parietal (n = 3) and parieto-occipital area (n = 2). Treatment involved gross total resection of the lesion in 15 (83.3%) of cases, subtotal in 1 (5.6%) and biopsy in 2 (11.1%) cases. Regarding the nature of lesions in this study, among benign lesions osteoma, juvenile ossifying osteoma and fibrous dyplasia were commonly encountered (n = 2 each), while among malignant lesions metastatic neuroblastoma (n = 2) was found. Other pathologies found were cavernoma, infantile hemangioma, chondromyxoid fibroma, histiocytosis X, myofibroma, fibrosarcoma, Ewing's sarcoma and extra-abdominal desmoid. Reconstruction of skull defect was possible and attempted in 11 patients (61.1%)[7] with titanium mesh and 4 with bone cement. All patients were followed in outpatient clinic on

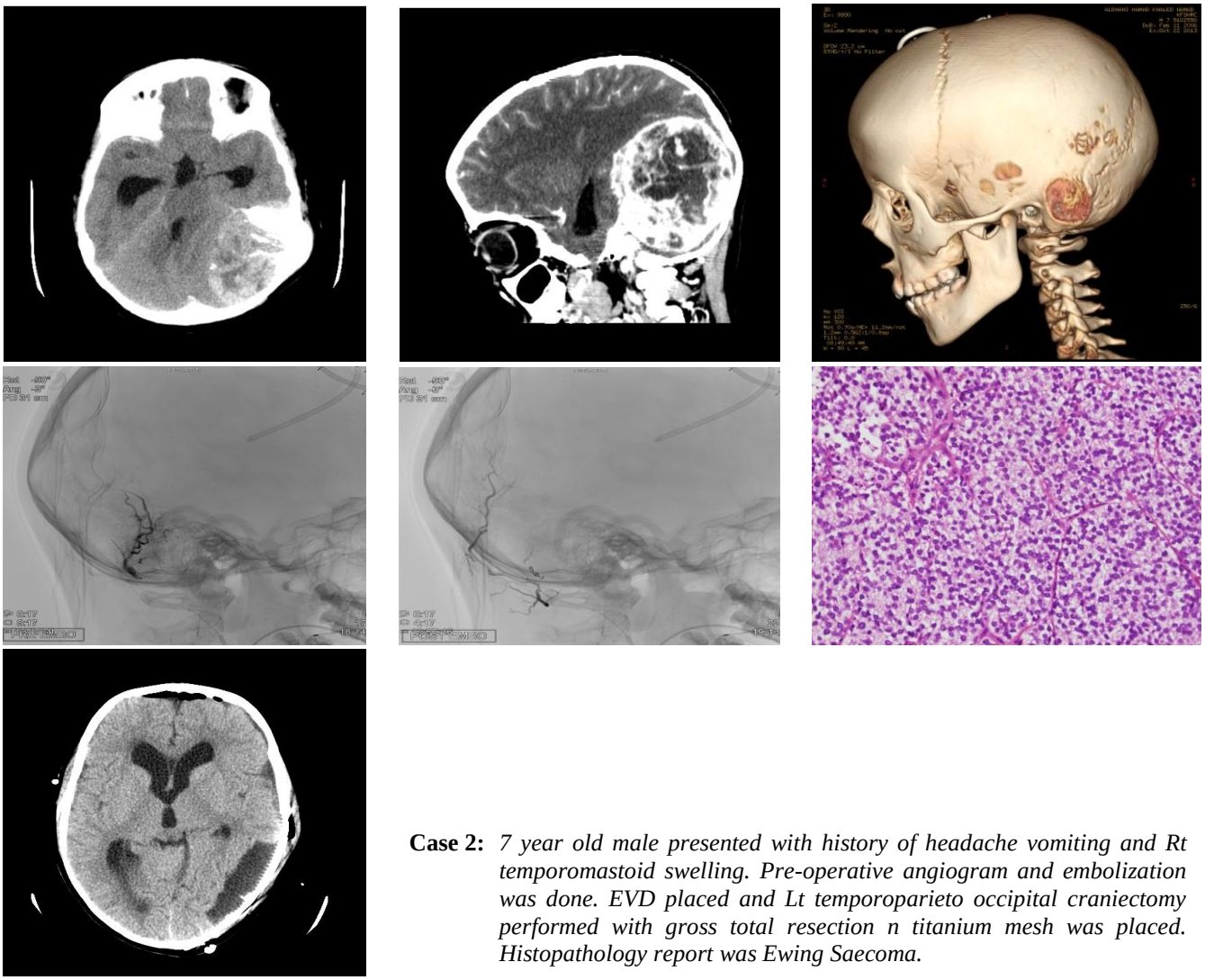




Review of Few Cases:



Case 1: *6 month old Female presented with Painless swelling in right temporal area of skull with palpable thrill. Patient underwent angiogram and embolization of tumor. Right frontotemporal craniectomy and GTR of tumor followed by Cranioplasty. Histopathology report was infantile hemangioma.*



Case 2: *7 year old male presented with history of headache vomiting and Rt temporomastoid swelling. Pre-operative angiogram and embolization was done. EVD placed and Lt temporoparieto occipital craniectomy performed with gross total resection n titanium mesh was placed. Histopathology report was Ewing Saecoma.*

6 monthly basis with a mean follow-up time of 2.8 years (range = 6 months to 3 years). For those who underwent gross total resection no recurrence was found in follow up while 3 (16.7%) had residual and referred to neuro-oncology for further treatment.

DISCUSSION

Skull lesions are rare in paediatric patients. The differential diagnosis is broad ranging from benign congenital to malignant metastatic lesions. Mainly presented as painless skull swelling, proptosis, blindness, nasal obstruction or incidental findings. In our study mostly our patients presented as a painless lump (n = 11, 61%) comparable to international data. Arana and Latorre reported painless lump as most common presentation for skull lesions.[6]

The mean age at time of diagnosis was 9.5 years ± 5.3 (range 6 months to 17 year) in our study, that is compareable to that reported in literature. Likewise predominance of male sex (55%) is comparable to all previous studies.[2]

In our experience lesions encountered are mainly frontal and fronto orbital (n = 6, 33%). In previous reported series epidermoid was most commonaly found lesion mainly at frontotemporal area while second most common pathology was eosinophilic granuloma that was found in parietal and then in frontal area. We most commonly found osteoma, juvenile ossifying osteoma and fibrous dysplasia, almost totally different from many previous published series of skull lesions.[7,8] As alluded earlier documented epidermoid / dermoid cyst and Langerhan cell histiocytosis were common pathologies of previous documentations.[9]

However, the similarity is that the benign lesions are most prevalent same as Cummimg and George reported.[4]

We found metastatic Neuroblastoma in two patients, Moron in his research lumps and bumps of head in children reported same results.[10] Willatt in his study Calvarial masses in infants and children found comparable results.[11]

Cavernoma, infantile hemangioma, chondromyxoid fibroma, histiocytosis, myofibroma, fibrosarcoma, Ewing's sarcoma and extra-abdominal desmoid like tumors were our other histopathological findings. Probably slight difference in spectrum of histopathology was encountered, as we conducted this study in state of the art tertiary care centre in central area of Riyadh which received multiple referrals from all over the country, without direct elective admissions. Possibility of referral of complicated cases is there, with surgical management of simple dermoid etc at peripheral centres.

Main treatment is resection followed by reconstructions either by autologus bone graft or titanium plates+ screws, titanium mesh, medpore, ca phosphate cement and PMMA.[1] We achieved gross total resection of the lesion in 15 (83.3%) cases, subtotal in 1 (5.6%) and biopsy in 2 (11.1%) cases. Reconstruction of skull defect was possible and attempted in 11 patients (61.1%), 7 with titanium mesh and 4 with cement.

The recurrence rate is dependent on extent of surgical excision. We did gross total resection in 15 patient (83.3%). For those who underwent gross total resection no recurrence was found in follow up while 3(16.7%) had residual disease, were referred to neuro-oncology for further treatment. Frassica and watrip also demonstrated that recurrence rate correlates with completeness of surgical excision.[12]

CONCLSION

Majority of the skull lesions in children are benign. Pre operative angio and embolization is helpful to reduce the intraoperative blood loss. Gross total resection with reconstruction is the treatment of choice. Recurrence is uncommon after gross total resection.

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