Intraosseous Meningioma Mimicking Osteosarcoma in an Adolescent: A Case Report

Bir Adolesanda Osterosarkomu Taklit Eden İntraosseöz Menenjiom: Olgu Sunumnu

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ABSTRACT

Intraosseous meningiomas (IM) are the one of the less frequent benign tumors of the skull. The etiology of IM has not been cleared yet. The frontoparietal and orbital regions are the most common locations for IM. The average age for IM diagnosis is 50.5. A 16-year-old girl with a right frontoparietal mass was referred to our outpatient clinic. Cranial CT revealed a mass lesion which resulted in expansion in the right parietal and posterior frontal bone, having lytic and sclerotic regions inside with accompanying irregular cortex in inner and outer tables of the calvarium. Prediagnosis was osteosarcoma according to the imaging studies and after the performed biopsy and consecutive surgery, the lesion was diagnosed as IM. Though CT with bone windows is often useful, it is not always diagnostic. Biopsy plays an important role in calvarial vault lesions for planning the treatment. In our case, malignant criteria in radiology did not match the benign histology revealed. Radiological preoperative misdiagnosis of meningioma is possible.

KEYWORDS: Intraosseous meningioma, Osteosarcoma, Adolescent

INTRODUCTION

Meningiomas are the most common benign intracranial neoplasms. Primary intraosseous meningioma (IM) is a subtype of the extracranial form that likely represents the rarest manifestation of meningiomas. They are mostly seen in adults. McGuire et al, in their analysis of the literature, have stated that the average reported age presenting with extracranial IMs was 50.5 (ranging from 10 to 80 years) (9). According to the cases included in this review, there had been only four patients reported younger than 18 years old and their tumor locations were frontoparietal, frontal, frontoorbital, and temporal bone.

We report a 16-year-old girl who had a right frontoparietal mass and underwent surgery, and was diagnosed as IM.

CASE REPORT

A 16-year-old girl with a right frontoparietal mass was referred to our outpatient clinic. Her chief complaint was the mass localized on right side of her head. She had noticed the hard, painless mass for about two months and had no other complaints other than esthetic consideration. She had no trauma history or a past medical history. On physical examination a 4x5 cm bony protuberance which was hard, non-tender and painless in origin, was observed on right frontoparietal region. It was not attached to the skin, and there were no skin changes on examination. Her remaining physical examination was normal, and no neurological deficits were found on admission. Blood tests, including full blood count, electrolytes, biochemical parameters, erythrocytes sedimentation rate were all in normal limits.

Cranial CT revealed a mass lesion which resulted in expansion in the right parietal and posterior frontal bone, and included lytic and sclerotic regions inside with irregular cortex in inner and outer tables of the calvarium. The medial part of the mass had a relation with adjacent soft tissue with mild compression of the frontal lobe and obliteration in the sulcus.
The right lateral ventricle had a partial obliteration and a 4 mm right to left shift was noted (Figure 1A,B). Post-contrast cranial MRI showed heterogeneous contrast enhancement and noticed thickness and contrast enhancement in adjacent dura underlying the right frontoparietal region (Figure 1C). The radiological preoperative diagnosis was osteosarcoma as the mass lesion with expansion in right frontoparietal region had malign radiological criteria.

A bone biopsy was performed and pathology revealed IM of the skull. After the biopsy, we planned a total resection. We performed a frontoparietal craniectomy under general anesthesia. After reflecting the scalp, haemorrhagic tumor was noticed in the outer tables of the right parietal bone. A right frontoparietal craniectomy was performed (Figure 2B). The tumor seemed to originate from the diploic space and had expanded mainly inside but also outside. Underlying dura was infiltrated. After the invaded dura was removed, the dural defect was patched with an otologous fascia lata graft. Cranioplasty with methyl methacrylate was performed. The postoperative course was uneventful. Histological examination showed meningiomatous infiltration between bone trabeculae and accompanying active chronic nonspecific inflammation. Meningioma was reported to be the transitional type (WHO Grade 1). The tumor showed medium hypercellularity and pleomorphism (Figure 2A). Mitotic index of Ki 67 was 3-4 % and 5-10 % of the cells had progesterone receptor positivity.

**DISCUSSION**

The etiology of IM has not been cleared yet. However, proposed theories include some presumed ectopic arachnoid cap cells in an extradural location, entrapment/detachment of displaced pacchionian bodies during embryonic development, displacement of arachnoid islets by a traumatic event or cerebral hypertension or a separate origin from...
Peripheral nerve origin (2). Biopsy plays an important role in the diffuse diagnosis of tumors originating from the very spectrum of soft tissue spindle cell tumors—especially those of the vast and can include osteosarcoma, hemangiopericytoma, and fibrillary sarcoma. Likewise, the histological differential diagnosis may also be challenging. Radiological imaging may further help in making a differential diagnosis. Radiological imaging may further help in making a differential diagnosis. Radiological imaging may further help in making a differential diagnosis.

The radiographic differential diagnosis is case dependent and often vague, as these tumors can often be mistaken for a number of other osseous lesions, including osteosarcoma, bone metastases, fibrous dysplasia, Paget’s disease, ossifying fibroma, and osteoma (9). The differential diagnosis for a primary lytic calvarial lesion includes lytic metastasis, epidermoid tumor, multiple myeloma, eosinophilic granuloma, fibrous dysplasia, Brown tumor, skull dermoid,ytic intraosseous meningioma, giant cell tumor, hemangiopericytoma, and hemangioma. Though CT with bone windows is often useful, it is not always diagnostic. Radiological preoperative misdiagnosis of meningioma is possible (8, 10). The characteristic MR imaging appearance of the intraosseous meningioma, demonstrating homogeneously dense Gd enhancement of the tumor within the skull, may help distinguish this lesion from meningioma en plaque, as well as from other osteoblastic skull lesions such as osteoma (nonenhancing), osteosarcoma (irregular contours, heterogeneous signal, and enhancement) and Paget disease (heterogeneous signal, nonenhancing) (5). The characteristic MR imaging appearance of the intraosseous meningioma, demonstrating homogeneously dense Gd enhancement of the tumor within the skull, may help distinguish this lesion from meningioma en plaque, as well as from other osteoblastic skull lesions such as osteoma (nonenhancing), osteosarcoma (irregular contours, heterogeneous signal, and enhancement) and Paget disease (heterogeneous signal, nonenhancing) (5). Likewise, the histological differential diagnosis may also be vast and can include osteosarcoma, hemangiopericytoma, and soft tissue spindle cell tumors—especially those of peripheral nerve origin (2). Biopsy plays an important role in calvarial vault lesions for planning the treatment. In our case, malignant criteria in radiology did not match the benign histology revealed.

In the review of McGuire et al, there has been limited number of case studies reporting patients under 20 year old having IM (9) and the localizations were frontal bone, frontoorbitonasal, frontoparietal bone, and temporal bone. Our patient was one of the rare young patients diagnosed to have this rare tumor. Maximal tumor resection and cranial remodeling are important aspects of treatment for intraosseous meningiomas. Adjuvant therapy may be considered in cases in which patients have unresectable tumors causing neurological deficit or demonstrating malignant or atypical features histologically (5).

REFERENCES