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Case Report

Fibrous granulation mimicking cranial intraosseous tumor ☆,☆☆

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ABSTRACT

A cranial intraosseous lesion is a rare disease with a limited number of subtypes. We report a case of a cranial intraosseous fibrous granulation that mimicked an intraosseous tumor. A 57-year-old man was incidentally found to have a cranial intraosseous lesion on brain computed tomography. Total resection was performed to establish a pathological diagnosis and to achieve cosmesis, and the pathological diagnosis was fibrosis and fibrous granulation in the medullary cavity. Fibrous granulation tissue occurs in the calvarium due to bone defects secondary to acquired factors, including trauma. Since its pathological diagnosis is established through surgery, surgery should be carefully considered based on the patient's chief complaint, location of the lesion, and suspicion of malignancy based on imaging findings.

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A cranial intraosseous lesion is a rare disease, with a small number of subtypes. It often presents asymptotically and is often only discovered incidentally [1]. Therefore, understanding the characteristic imaging findings of each subtype is vital in establishing an accurate diagnosis. We present a case study of a cranial intraosseous fibrous granulation that mimicked an intraosseous tumor. The differential diagnosis and operative procedures for cranial intraosseous tumors are also discussed in this report.

Case Report

A 57-year-old man presented with a thyroid tumor. Two months prior to admission, he underwent facial nerve decompression surgery for right facial nerve palsy. He was referred to our department due to a cranial intraosseous lesion incidentally found on brain computed tomography (CT).

On examination, the patient was alert and asymptomatic.

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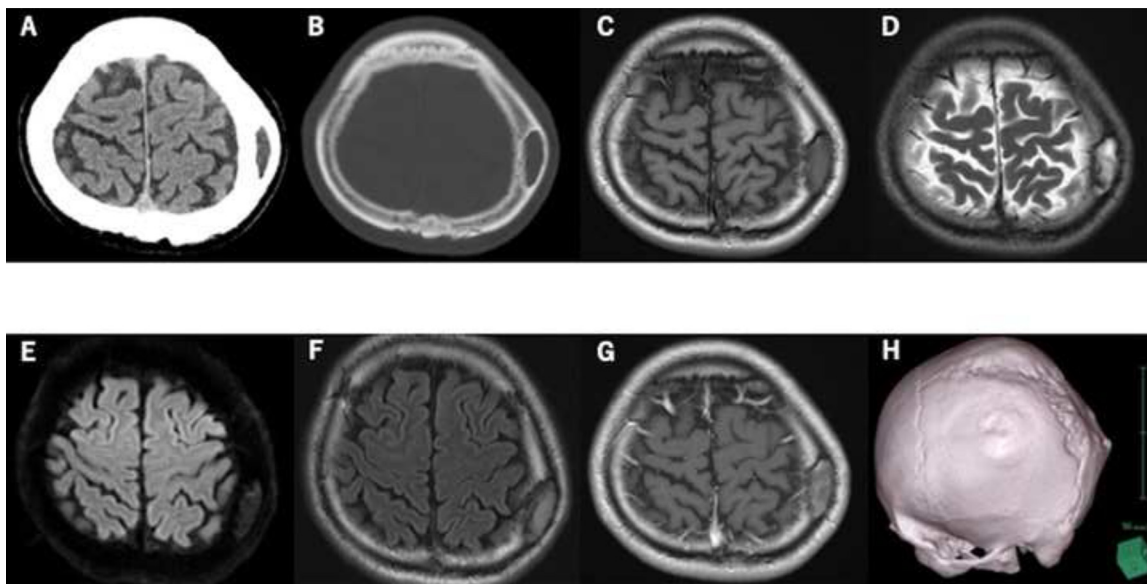


Fig. 1 – Preoperative imaging findings: Brain computed tomography imaging (A, B), brain magnetic resonance imaging T1-weighted imaging (C), T2-weighted imaging (D), diffusion-weighted imaging (E), fluid-attenuated inversion recovery image (F), gadolinium-enhanced T1-weighted imaging (G), and three-dimensional computed tomography image (H) revealing a cranial intraosseous lesion.

A hard solid protuberance was palpated on the skin over the left calvarium. No skin discolorations, hair loss, or hirsutism were observed in the lesion area. Blood examination, including tumor markers, was unremarkable. Brain CT revealed a 3 cm iso-dense lesion in the parietal bone. It exhibited a uniform and faint contrast on magnetic resonance imaging (MRI) (Fig. 1). Total resection was performed to establish a pathological diagnosis and to achieve cosmesis.

Intraoperatively, a small violaceous protrusion of the parietal bone with microvascular confluence was observed (Figs. 2A and B). A craniotomy was performed, and the tumor was removed as a mass wrapped in the bone. The resected mass was divided, and a white and elastic tumor was identified. No infiltration of the cortical bone or dura mater was noted (Figs. 2C and D). The bone defect was covered with titanium mesh, and the operation was completed. The patient had an unremarkable postoperative course and was discharged on the ninth postoperative day.

The pathological diagnosis was fibrosis and fibrous granulation in the medullary cavity. There were no findings suggestive of fibrous dysplasia or malignancy (Fig. 3).

Discussion

A cranial intraosseous lesion is a rare disease with a few subtypes. Escoda et al. [1] classified focal calvarial lesions into four categories: (1) pseudolesions: arachnoid granulations, meningo and/or encephaloceles, vascular canals, frontal hyperostosis, parietal thinning, parietal foramina, and sinus pericrani; (2) lytic lesions: fibrous dysplasia, epidermal inclusion and dermoid cysts, eosinophilic granuloma, hemangioma, aneurysmal bone cyst, giant cell tumor, metastasis, and

myeloma; (3) sclerotic lesions: osteomas, osteosarcoma, and metastasis; and (4) transdiploic lesions: meningioma, hemangiopericytoma, lymphoma, and metastasis, along with other less common entities. Imaging tests, such as CT, MRI, magnetic resonance spectroscopy, and positron emission tomography, are helpful in differentiating cranial intraosseous tumors [1]. In our case, the lesion presented as an iso-dense on brain CT with a dissolved bone appearance. Therefore, it was classified as a lytic lesion. The lesion was isointense on T1, hyperintense on T2, and hypointense on diffusion-weighted imaging. Moreover, it exhibited a uniform and faint contrast on MRI. Thus, it was essential to differentiate it from fibrous dysplasia, eosinophilic granuloma (currently Langerhans cell histiocytosis), and metastatic tumors. In particular, Langerhans cell histiocytosis has a similar clinical presentation to this lesion [2,3].

The pathological diagnosis was fibrosis and fibrous granulation in the medullary cavity. There were no findings suggestive of fibrous dysplasia or malignancy. This was the first report of fibrous granulation in the calvarium. Fibrous granulation tissue occurs in the calvarium due to bone defects secondary to acquired factors, including trauma. The granulation tissue grows to fill in the defects [4]. According to previous reports, intraosseous granulomas have been caused by fracture repairs and foreign bodies [5,6]. Likewise, the development of apical periodontitis, which pertains to granulation tissue formation after an infection of the jawbone, has also been reported [7]. Apical periodontitis occurs when a root canal infection causes a jawbone defect, later filled up by fibrotic granulation tissue. The patient was asymptomatic, with no history of trauma or infection that may have caused bone defects. Cranial intraosseous granulation should be considered in patients with a notable medical history, such as trauma, foreign bodies, or infections.

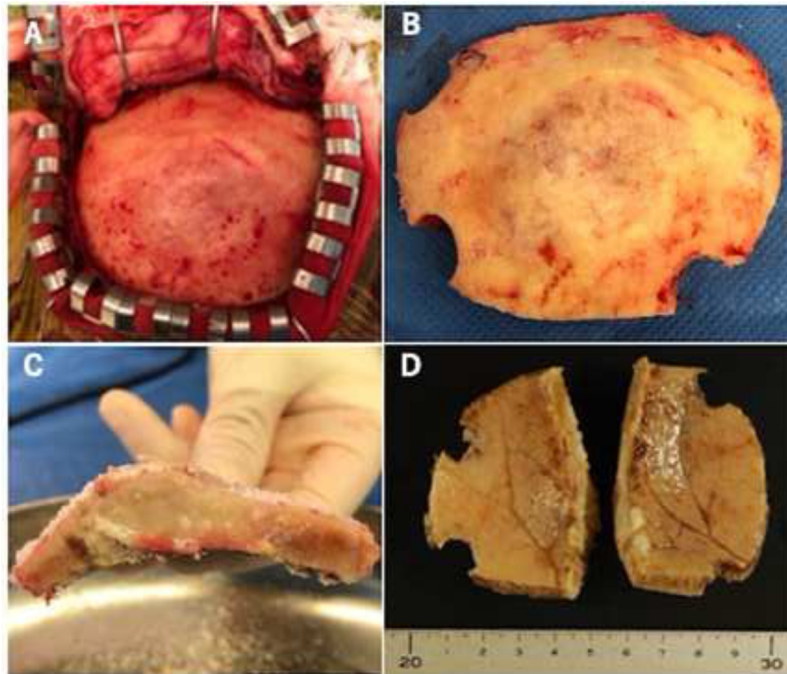


Fig. 2 – Intraoperative tumor findings: A 3 cm white and elastic tumor was identified.

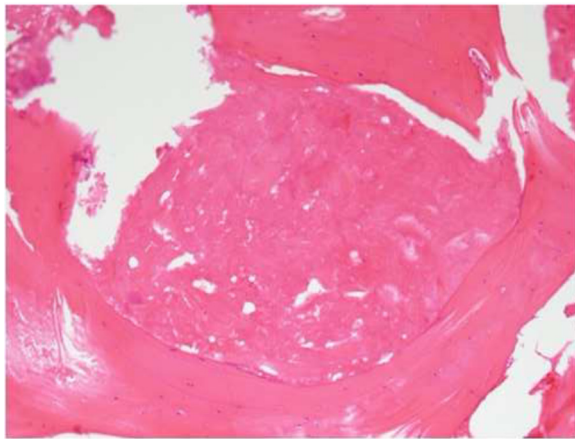


Fig. 3 – Pathological findings of the tumor: Fibrous granulation in the bone marrow was identified (hematoxylin-eosin staining, \times 100).

Management options for cranial intraosseous lesions include total resection, partial resection, biopsy, and follow-up [8–11]. In cases indicated for total or partial resection, a simultaneous repair of the bone defect is commonly performed [8,11]. A customized artificial bone is prepared preoperatively using a three-dimensional CT scan, and it is transplanted to address the defect [8]. In this case, the lesion was removed entirely, and the bone was covered with a titanium mesh to prevent malignant transformation and achieve cosmesis. Patients preoperatively diagnosed with a benign lesion may undergo follow-up without surgery. However, a pathological diagnosis is established via surgery alone. Thus, surgery should

be carefully considered based on the patient's chief complaint, location of the lesion, and suspicion of malignancy based on imaging findings.

We report a rare case of cranial intraosseous fibrous granulation. Understanding the characteristic imaging findings of each subtype is critical in considering the surgical indications.

Patient Consent Statement

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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