Falx Chondroma with Hyperostosis of the Scull: A Case Report

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INTRODUCTION

Chondroma is one of the most common benign cartilaginous bone tumors arising from the long bones, pelvis or scapulae [1]. Intracranial chondromas, on the contrary, are very rare tumors with an incidence of 0.2% to 0.3% of all intracranial tumors. The first case of intracranial chondroma was reported in 1851 by Hirschfield [2] and the first surgical resection was reported by Nixon [3] in 1982. Since then 127 cases of intracranial chondromas were reported, mostly involving the base of the skull originating from residual rests of primordial cartilage in basilar synchondroses, with a predilection for the sphenoid-ethmoidal region [4]. In very rare instances, chondromas arise from the falx [5-19]. According to our best knowledge only 15 cases were reported in the literature.

In this article we report the case of a patient with chondroma involving one side of the falx extending to the right parietal area.

CASE REPORT

A 38-year-old male was admitted to our hospital with a history of intermittent headaches lasting one year. He reported few head traumas while working as a miner. Three months ago he was referred to our institution due to headaches resistant to analgesics. A month before admission, he was experiencing hypoesthesia of the right side of the head that lasted for two weeks and disappeared spontaneously. General and neurological examinations were completely normal and his past medical history was unremarkable.

A computer tomography (CT) scan revealed a 3×4×4 cm, solid, well-circumscribed, hyperdense mass involving the left side of the falx in the parietal area.

Magnetic resonance imaging (MRI) of the brain showed a solid, calcified, ring-shaped, well-defined tumor at the posterior falx. The tumor involved one side of the falx and extended to the parietal area with no perifocal edema (Figure 1).

Cerebral intra-arterial digital subtraction angiography (DSA) was performed and revealed an avascular mass with a patent sagittal sinus.

The patient underwent surgery and left parietal craniotomy was performed under general anesthesia. Surgery revealed a 3×4×4 cm solid mass, calcified, with white lobulated surface, involving one side of the falx and the lateral wall of the superior sagittal sinus, and extending into the parietal area with no adhesion between the tumor and the brain tissue. CT and MRI showed no perifocal edema. The tumor was completely removed with its attachment to the falx.

Patho-histological examination revealed chondroma, with cartilaginous lobules in the hyaline matrix and calcifications. Neither nuclear atypia nor mitoses were found (Figure 2).

Postoperative CT scans showed no residual tumor and the patient was discharged on the 9th operative day (Figure 3).

DISCUSSION

Intracranial chondromas are rare lesions with an incidence of 0.2-0.3% of all intracranial tumors and can occur as solitary lesions or as a...
part of polysystemic enchondromatosis (Ollier’s disease) or multiple enchondromatosis associated with soft tissue angiomas (Maffucci syndrome) [20]. The first case of intracranial chondroma was reported in 1851 by Hirschfield [2] and the first surgical resection was reported in 1982 by Nixon [3]. Since then 127 cases of intracranial chondromas were reported occurring at the base of the skull and originating from sphenopetral, sphen-occipital and petro-occipital synchondroses. Extremely rare, chondromas arise from the falx. According to our best knowledge, only 15 cases were reported in the literature [5-19]. The results of published falx cerebri chondroma cases are summarized in Table 1.

In the literature, the reported age of patients ranged between 14 and 50 years with a peak in the third decade and no preference for either sex [12].

The etiology of falx chondromas is not clearly established. There are several theories of the origin of the intracranial falx chondromas. They are considered to develop due to heterotrophic chondrocytes, metaplasia of perivascular mesenchymal cells or meningeal fibroblasts or migration caused by trauma or inflammatory process. Trauma is an etiological factor that is connected with tumor-like meningiomas [21]. Only a few cases described a possible connection between intracranial chondroma and trauma [22]. Hong et al. [22] supported that theory with a case of convexity chondroma at the site of a previously depressed skull fracture. However, our patient had a history of previous head traumas when working as a miner; he is the case with trauma as a possible etiological factor for falx chondroma with hyperostosis of the parietal bone. We can speculate that this is the cause of later head trauma or by migration of mesenchimal dural cells. However, we cannot prove this theory.

The clinical presentation of falxine chondromas mostly depends on anatomic location and it is non-specific. They can be clinically silent and the symptoms may not appear for many years since the tumors are slow-growing. Patients may have, depending on the location, focal neurological signs and personality changes, but most of the reported cases had symptoms of high intracranial pressure and seizures. In our case, the patient had focal signs due to the local compression of brain tissue with intermittent headaches and the feeling of hypoesthesia on the right side of the head.

For the detection of falx chondromas CT and MRI are very important and usually show well-circumscribed and demarcated, isodense, extra-cerebral avascular lesion with different extent of calcification, with no hyperostosis and no perifocal edema. Chondromas of convexity may show evidence of hyperostosis of the internal table of the skull. According to the reported data, no falx chondroma was
found with hyperostosis of the skull [23, 24]. This is the first reported falx chondroma with hyperostosis of the parietal posterior bone. Lacerte et al. [25] proposed the classification of chondromal tumors in two types. First, most common type which on CT scan appears as an isodense and homogenous mass. Type two appears with a central hypodense area and constitutes a degenerative cyst. Falcine chondromas, in most cases, appear as isointense lesions on T1-weighted images (T1W1) and on magnetic resonance images T2W1; they have mixed hypo- and hyper-intense images. Falcine chondromas usually do not have calcifications [23]. Differential diagnosis of falcine lesions mostly indicates falx meningiomas but is limited to oligodendroglioma, chondrosarcoma, glioblastoma multiforme. It should be differentiated from falx meningioma by using contrast-enhanced imaging and angiography because chondromas and any recurrence should raise suspicion for chondrosarcoma [16, 18]. Falx chondromas can be attached to the dura matrix and venous sinuses, as in our case, and their extirpation should be prepared with extra caution and eventual management of sinus venous hemorrhage.

Treatment for these tumors is total tumor resection with removal of attached falx [2, 12]. For the description of surgical resection, the Simpson resection grading scale can be used, as in falx meningiomas [27]. Otherwise, after extirpation these tumors show no recurrence and the long-term outcome is excellent [5, 12]. Any recurrences should raise suspicion for chondrosarcoma [16, 18]. Falx chondromas can be attached to the dura matrix and venous sinuses, as in our case, and their extirpation should be prepared with extra caution and eventual management of sinus venous hemorrhage.

Radiation therapy is not advised since chondromal tumors are radio-resistant and can undergo a malignant transformation [18, 28, 29].

Falx chondromas are extremely rare, slow-growing, intracranial lesions. To the best of our knowledge, only 15 cases of intracranial chondromas derived from the falx have been reported. Extra-cerebral falx lesions with no perifocal edema, the lack of enchantment and hyperostosis of the skull, should also make us suspect falx chondromas. Complete extirpation is a long-term treatment for falx chondromas and any recurrence should raise suspicion for malignant degeneration into chondrosarcomas.

**REFERENCES**


