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Case Report

A Rare Case of Chondroma of Falx Cerebri

Nadir Bir Falks Serebri Kondromu

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ABSTRACT

The chondroma originated in falx cerebri and dural convexity is very rare, less than 30 cases reported so far. Here, we report a case of 26-year-old male, with a huge mass at fronto-parietal falx cerebri, who was misdiagnosed as parafalcine meningioma on preoperative MR imaging. After surgery, the diagnosis of chondroma was confirmed pathologically. By reviewing the MR images of the patient, we find that the peripheral ring-like enhancement and intratumoral partial slight coral-like enhancement on contrast-enhanced T1 images might be the valuable MR features to differentiate from parafalcine meningioma. In addition, the tumor's pathogenesis and pathological characteristics were briefly discussed.

KEYWORDS: Intracranial chondroma, Falx cerebri, MR imaging

ÖZ

Falks serebri ve dural konveksiteden köken alan kondromlar çok nadirdir ve şu ana kadar 30'dan az olgu bildirilmiştir. Burada preoperatif manyetik rezonans (MR) görüntülemede parafalsin menenjiyom şeklinde yanlış tanı konmuş, frontopariyetal falks serebride büyük bir kitle bulunan 26 yaşında bir erkek olguyu bildiriyoruz. Cerrahiden sonra patolojik olarak kondrom tanısı kondu. Hastanın MR görüntülerini gözden geçirdiğimizde, periferal halka benzeri kontrast tutma ve intratümoral hafif mercan benzeri kontrast tutmanın kontrastlı T1 ağırlıklı görüntülerde parafalsin menenjiyomdan ayırd edilmesinde, önemli MR özellikleri olabileceği saptandı. Ayrıca, tümörün patogenezi ve patolojik özellikleri kısaca tartışıldı.

ANAHTAR SÖZCÜKLER: İntrakraniyal kondrom, Falks serebri, MR görüntüleme

INTRODUCTION

The intracranial chondroma is a kind of rare benign tumor which incidence is about 0.2-0.3% of the primary intracranial tumors (4). In general, the epidural skull base is its predilection site, however in rare cases, chondromas could arise in dura mater such as dural convexity or falx cerebri, and are easily misdiagnosed as other pathological tumors (1). To our knowledge, the patients with intracranial chondroma originating from dural convexity or falx cerebri reported in literatures are less than 30 cases. Here, we report a case of chondroma of falx cerebri confirmed surgically and pathologically.

CASE REPORT

A 26-year-old young man, with a one-week history of persistent headache and numbness of limbs, was admitted to our hospital. The neurological examination revealed the decrease of limbs' muscle tone, while others were normal and pathological signs were all negative. The preoperative MRI showed a giant space-occupying mass, about 10x7x7 cm in size, locating at the fronto-parietal falx, with well-defined circumscription, pushing bilateral cerebral lobes. The topside of tumor was against the dural convexity and superior sagittal sinus, and pressed the parietal inner table. The lesion appeared as heterogeneous hypointense on T1-weighted imaging (T1WI), and non-uniform hyperintense with patchy and stripy hypointense inside on T2-weighted imaging (T2WI) and Fluid attenuated invertion recovery sequence (FLAIR). On contrast enhanced T1WI, the mass appeared peripheral rim-like enhancement and central mild enhancement areas, which presented multilobulated pattern with dot-like increasing signal intensity, just like coral shape. On MR venography, local superior sagittal sinus was occluded due to the space occupying effect of the tumor (Figure 1A-E). According to the preoperative MR imaging, the diagnosis of parafalcine meningioma was considered and the neurosurgery was arranged immediately. The transparietal craniotomy of tumor resection was performed. As was intraoperatively noted, a well-circumscribed multilobular lesion with hard texture and intact capsule, attached to the falx cerebri, extended into bilateral cranial cavity and pushed the brain tissues. The tumor as well as the involved dura and falx were totally resected. Postoperative pathological examination confirmed the lesion as chondroma (Figure 2). After operation, the patient's symptoms were mostly alleviated and he was discharged on 7th-day after surgery. The postoperative MRI, on the 24th day after operation, showed the tumor and involved falx completely disappeared (Figure 3).

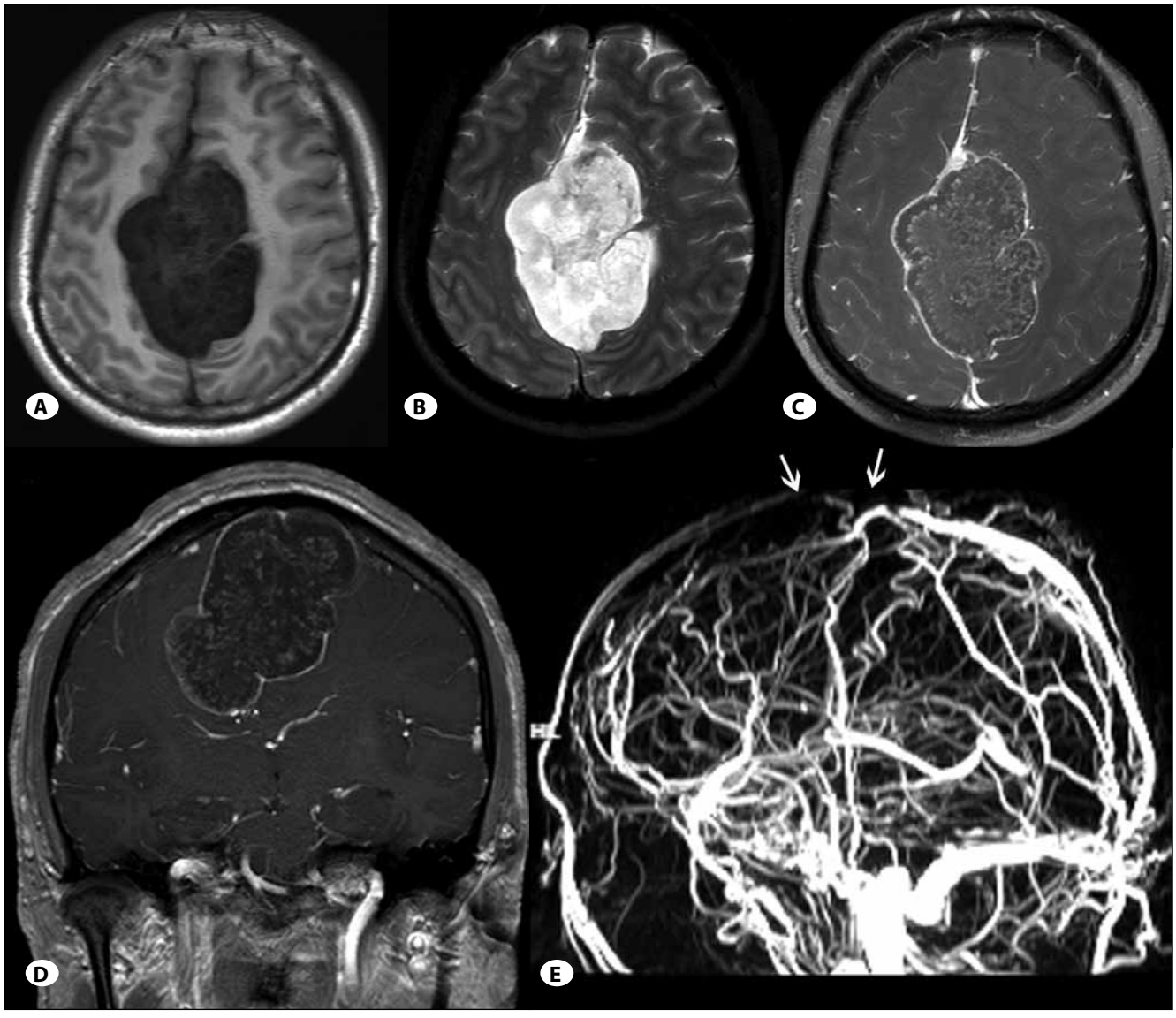

Figure 1: MR images of a 26-year-old male with chondroma of falx cerebri showed a huge mass located at falx cerebri pressing bilateral brain tissue. The lesion appeared as **A)** heterogeneous hypointensity with extremely low spotted signals inside on axial T1-weighted imaging, and **B)** non-uniform hyperintensity with patchy and stripy hypointensity inside on axial T2-weighted imaging. On **C)** axial and **D)** coronal contrast enhanced T1WI, the mass appeared as peripheral rim-like enhancement and central mild enhancement areas, which presented a multilobulated pattern with dot-like increasing signal intensity, just like a coral shape. **E)** On MR venography, the local superior sagittal sinus was occluded due to the space-occupying effect of the tumor (arrow).

DISCUSSION

Intracranial chondroma is an infrequent tumor that accounts for 0.2-0.3% of primary intracranial tumors (4). It is inclined to occur in the spheno-ethmoidal, spheno-occipital and petro-occipital synchondroses, however in rare cases, it can originate from the dural convexity, falx and choroid plexus (5). To our knowledge, chondromas of the falx or dural convexity are very rare, and less than 30 cases have been reported in the literature.

As to the pathogenesis of skull base chondroma, many scholars believe it derives from residual embryonic chondrocytes along the baseline synchondrosis (2). However, in contrast to the skull base with a chondral component, the dural convexity and falx cerebri lack cartilage tissues, and the pathogenesis of chondromas in these regions has been controversial. Some assumptions as follows have been proposed in the literature: 1) metaplasia of meningeal fibroblasts or perivascular mesenchymal cells; 2) originating from the dural ectopic chondrocytes during the embryonic period; or 3) development from traumatic displacement of chondrocytes or activated meningeal fibroblasts by inflammation (1).

The clinical manifestations of an intracranial chondroma lack of specific characteristics, and the symptoms are related to the tumor's location and increased intracranial pressure leading to headache, neurological impairment and psychiatric symptoms (1). Due to its slow growth, clinical symptoms are often ignored till the tumor grows to a large size, as in our reported case. According to the literature, the occurrence of the tumor is within a wide age range peaking at the third decade, without gender preference (3,4). Pathologically, the tumor is a lobulated mass with an envelope capsule formed by fibrous connective tissue. Intratumorally, the tumor parenchyma is composed of lobulated well-differentiated cartilage tissue. Numerous chondrocytes without nuclear atypia and mitotic active events are distributed in the rich cartilage matrix. Irregularly shaped calcifications and cystic areas have generally been found (2,4). The postoperative pathological examination of our case is consistent with these pathological features that determine the diagnosis of chondroma.Neuroimaging is the main method to discover chondroma of dural convexity and falx. The tumor is lobulated with a clear boundary on both CT and MRI. On plain CT, it appears as a heterogeneous density mass. Sporadic high-density areas indicating amorphous calcifications are often found. Erosion or proliferative changes of adjacent skull bone can be seen on the bone window. On enhanced CT, there is a slightly delayed enhancement. On MRI, the tumor shows heterogeneous hypointensity on T1WI, and heterogeneous hyperintensity with a locally irregular low-signal band on T2WI and FLAIR. On contrast-enhanced T1WI, the tumor often appears as a thin layer of ring-like enhancement at the edge, but inside it shows partial slight enhancement associated with partial non-enhancement that suggests its pathological features of rich cartilage matrix and lack of blood supply. The attachment site of the tumor always lacks the dural tail sign. Our patient did not have CT data preoperatively, but his MR findings are consistent with those of other cases reported in the literature (2,4). The spotted low signal shadows on T2WI and FLAIR may suggest local calcifications. On the enhanced T1WI of this case, the numerous slightly enhanced punctate shadows emerging in the lobulated tumor appear as coral shapes, which is a certain characteristic of MRI manifestations.

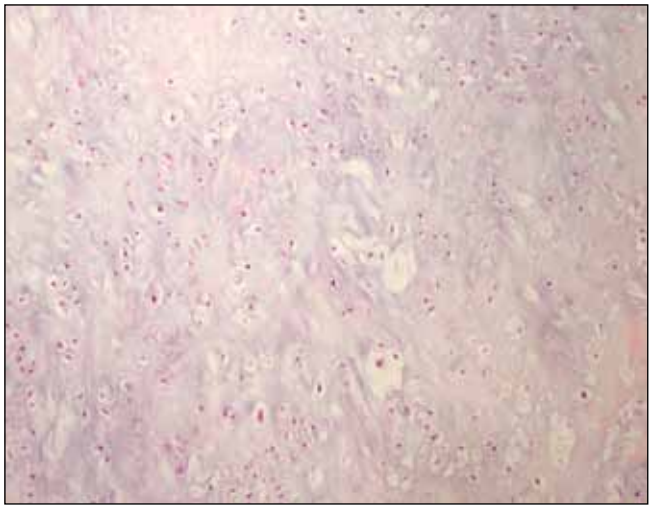

Figure 2: Hematoxylin–eosin staining (x100) of the chondroma. light micrography displays that the tumor has abundant gray-blue cartilage matrix and mature chondrocytes without pleomorphism, atypia or mitosis.

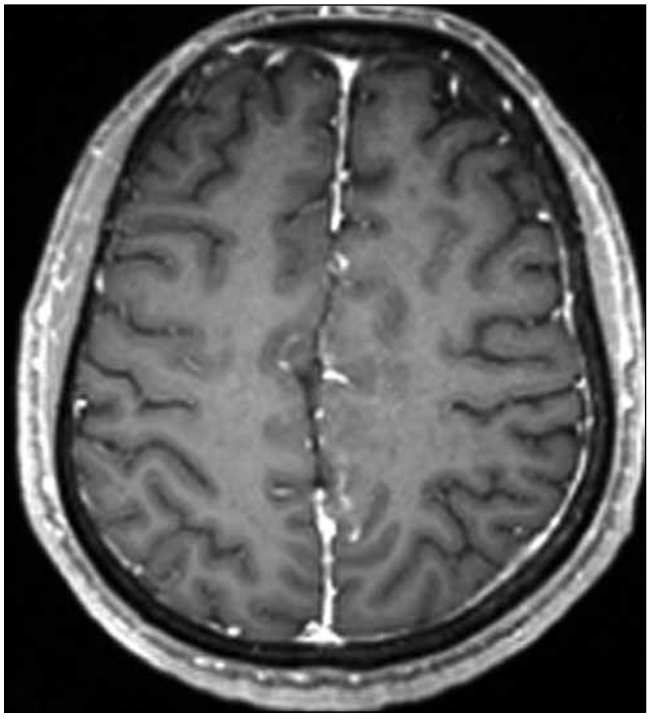

Figure 3: The postoperative MRI, on the 24th day after surgery, showed that the tumor and involved falx were totally resected.

Radiologically, a chondroma of the falx cerebri is always misdiagnosed as parafalcine meningioma due to its infrequent occurrence and similar imaging findings with the latter. Although involving the same location, they still have some differences on contrast-enhanced MRI. The chondroma presents as peripheral rim-like enhancement with interior slight heterogeneous coral-like enhancement. Moreover, it does not have the typical sign of dural tail. These are different from MRI manifestations of meningiomas consisting of homogeneous enhancement and dural tail sign. Attention to the imaging features above might be helpful in the differential diagnosis for clinicians.In brief, intracranial chondroma is a rare benign tumor. A chondroma of the falx or dural convexity is even rarer. So far its pathogenesis is still unknown. The falx chondroma is easily misdiagnosed as parafalcine meningioma on neuroimages. On contrast-enhanced T1WI, its peripheral enhancement and intratumoral coral-like heterogeneous enhancement may be the valuable signs for the differential diagnosis of meningioma. Here we suggest that the possibility of a chondroma should be taken into account when a mass is found in the falx or dural convexity without typical signs of meningioma. At present, the total resection of the tumor is the most appropriate treatment and the long-term prognosis is good (2).

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