Intracranial Lipomas; Radiographic and Clinical Characteristics.

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Abstract

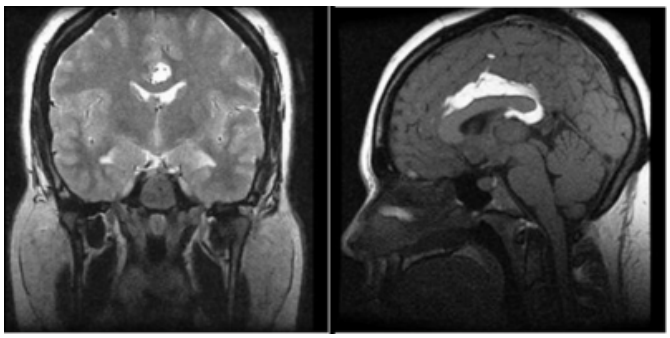
Intracranial lipomas (ICLs) are rare intracranial lesions. They represent a group of congenital malformations of the brain parenchyma, located more frequently in the pericallosal cistern and associated with other parenchymal or brain vascular malformations in up to half of cases.

INTRODUCTION

Intracranial lipomas have a characteristic high signal on T1-weighted images and intermediate/low signal on T2-weighted sequences on Magnetic Resonance Imaging (MRI). Although several reports mention seizures as an associated or presenting feature, this may only represent a higher incidence of intracranial abnormalities compared with the general population. Surgical removal is not recommended because of high complications rate and benign course of these lesions.

Figure 1

Figure 1. Sagittal T1-Weighted and Coronal T2-Weighted MR images. Note the hyperintense lesion in both sequences along the superior aspect of the corpus callosum consistent with an ICL. Note the engulfment of the anterior cerebral arteries within the lipomas.



COMMENTS

Intracranial lipomas (ICLs) are rare lesions that represent congenital malformations resulting from abnormal persistence and mal differentiation of the meninx primitiva during the development of the subarachnoid cisterns [1] . ICLs have a characteristic appearance on unenhanced computed tomography (CT), with low attenuation values ranging between −39 Hounsfield Units (HU) and −80 HU (mean −62 HU). Calcifications are often present in interhemispheric lipomas, most commonly within a fibrous capsule surrounding the lipoma [2] . On MRI, ICL present with a high signal on T1-weighted images and intermediate/low signal on T2-weighted spin-echo sequences [3] . A relatively small number of uncommon intracranial lesions demonstrate these unusual signal characteristics, including dermoid tumors, epidermoid cysts and paramagnetic substances [2,3] .

The most common site for ICLs are the midline cerebral structures, involving the pericallosal cistern in over 50% of cases [4,5] . They represent 5% of all malformations, neoplastic or not in this location. Other locations include the ambien and quadrigeminal cistern (25%), followed by the cerebellopontine angle (9%), superior cerebellar, suprasellar/interpeduncular, and sylvian cisterns (5%) respectively [5,6] .

Pericallosal lipomas can be subdivided into two subgroups; tubulonodular and curvilinear type. The tubulonodular type is characterized by nodular lesions usually measuring less than two centimeters, and affecting predominantly the anterior corpus callosum [2] . Curvilinear lipomas are usually thin, measuring more than one cm long and located posteriorly. They can be either small or fairly extensive, and they are considered asymptomatic. Hypoplasia of the corpus callosum can be observed in this particular type [2] .

ICLs incidence ranges between 0.08% and 0.2 % in autopsy cases and they represents approximately 0.06 to 0.3 % of all

incidental findings on neuroradiologic studies [5] .They are rarely associated with congenital neurocutaneous disorders, including encephalocraniocutaneous lipomatosis [7] , epidermal nevus syndrome, or congenital infiltrating lipomatosis [8] . Approximately half of the cases are associated with other brain malformations of varying degrees, predominantly dysgenesis of corpus callosum. Associated anomalies are more frequent when their location is anterior to the corpus callosum [4] .

A variety of vascular abnormalities have been described in association with ICLs, including distension, kinking, or narrowing of arteries and veins; engulfment of the cerebral arteries, arteriovenous malformation and aneurysms [3,4,9] . ICLs have a low proliferation rate and therefore they do not increase in size [5] . Lipoma cells do not multiply and almost never exert a mass effect on adjacent structures [2] . However, there have been reports of hypertrophy of lipomas cells after steroid treatment [5,10] .

ICL are usually asymptomatic, but they have been associated with seizures (30%) headaches (25%) raised intracranial pressure, dementia and hemiparesis in the past [5,11] . Although several case reports mention seizures as an associated or presenting symptom, the clinical and electrophysiological characteristics of patients with ICLs remained unclear with only rare EEG correlates [12] . Loddenkemper et al [13] analyzed 3500 consecutive video EEG admissions to a tertiary referral center. Only 5 cases of intracranial lipomas were detected and only in one case, epileptic seizures could be linked to the patient's epilepsy. It appears that the increased incidence of epilepsy in patients with ICLS may be related to higher incidence of associated intracranial abnormalities and malformations compared with general population [13] .

ICLs located near the brainstem may cause ataxia, hydrocephalus, gaze palsies and trochlear nerve paralysis [5,10] . In the pediatric population, they are associated with non specific neurological complaints including headache, dizziness, seizures or global psychomotor delay affecting language and gross psychomotor skills [4] .

Management of ICLs is usually conservative, as the risks of surgical intervention outweigh the potential benefits in most cases [5,6] . Surgical removal of these lesions has been unsuccessful in previous series, leading to significant morbidity and mortality [4,12,14] . Complete extirpation will almost invariably result in neural or vascular damage due to strong attachment of tumor to surrounding structures. Furthermore, the majority of the tumors are asymptomatic. The only exception and indication for surgical treatment is decompression of near structures (particularly in cases of posterior fossa ICL) requiring placement of ventriculo-peritoneal shunt for treatment of hydrocephalus [4,14] .

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