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STROKE AND SURPRISES- UNVEILING INCIDENTAL DISCOVERIES OF PERICALLOSAL LIPOMAS IN STROKE PATIENTS

Radio-diagnosis

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ABSTRACT

This report details two cases of pericallosal lipomas, both discovered incidentally during imaging for unrelated neurological issues. Case 1 involves a 32-year-old female with a prior stroke history, who presented with involuntary movements and upward eye rolling. MRI findings indicated acute infarcts affecting the bilateral anterior and middle cerebral artery territories, along with chronic ischemic changes. An incidental 10 mm tubulo-nodular pericallosal lipoma was identified, associated with a corpus callosal dysgenesis and a suspected azygous anterior cerebral artery. Case 2 features a 45-year-old woman who presented with a 4-hour history of unresponsiveness. CT imaging revealed an acute intraparenchymal haemorrhage in the right capsulo-ganglionic region, extending into the bilateral lateral ventricles. Initial CT and follow-up MRI showed a 4 mm curvilinear pericallosal lipoma adjacent to the posterior body and splenium of an otherwise normal corpus callosum. Retrospective inquiries revealed a history of seizure episodes. These cases underscore the incidental identification of pericallosal lipomas, highlighting the necessity for comprehensive imaging assessments in patients with neurological symptoms.

KEYWORDS

Pericallosal lipomas, Tubulo-nodular, Curvilinear, Congenital malformations, Acute stroke.

INTRODUCTION:

Pericallosal lipomas are rare congenital malformations characterized by the presence of fatty tissue located adjacent to the corpus callosum. These lesions constitute approximately 0.1% to 0.5% of all intracranial tumours and are believed to arise from an abnormal resorption process of the meninx primitive, a mesenchymal tissue that typically undergoes resorption between the 8th and 10th weeks of gestation. When this process fails, adipose tissue develops, resulting in pericallosal lipomas.

These lipomas are classified into two main types: tubulo-nodular and curvilinear. The tubulo-nodular type is generally larger, often exceeding 2 cm, and is frequently associated with significant structural anomalies of the corpus callosum, such as agenesis or hypo genesis. In contrast, curvilinear lipomas are smaller, usually under 1 cm, and tend to be asymptomatic, though they can occasionally cause headaches or seizures.(1)(2)

The incidental discovery of pericallosal lipomas during imaging for unrelated neurological conditions is not uncommon. This report presents two cases highlighting this phenomenon, with each case revealing different types of pericallosal lipomas. These findings emphasize the importance of thorough imaging assessments in patients presenting with neurological symptoms, as pericallosal lipomas may coexist with other significant intracranial conditions.

Case Reports:

Case 1:

A 32-year-old female with a past history of stroke (though the related documents and treatment details were unavailable) presented to the emergency department with complaints of involuntary movements in the right upper and lower limbs, accompanied by upward rolling of the eyes, for the past hour.

An MRI brain revealed extensive areas of subtle T2/FLAIR hyperintensities involving the bilateral frontal lobes, left capsulo-ganglionic region, and left insular cortex showing restricted diffusion on DWI with corresponding signal drop on ADC-Suggesting acute infarcts involving bilateral ACA and MCA territories (Figure 1).

Additionally, chronic infarcts were observed involving the right frontal operculum and right capsulo-ganglionic region, exhibiting encephalomalacia and gliosis, leading to ex-vacuo dilatation of the right lateral ventricle and right Sylvian fissure. Wallerian degeneration was also noted involving the right cerebral peduncle (Figure 2).

Apart from the acute and chronic ischemic changes, an incidental finding of a nodular, curvilinear, well-circumscribed T1 hyperintense lesion, measuring 10 mm in thickness, was identified in the interhemispheric fissure. This lesion was intimately wrapped around the somewhat hypo/dysplastic corpus callosum, extending into the bilateral lateral ventricles (Figure 3 and 4). The lesion showed a T2 blackout phenomenon on DWI/ADC, signal suppression on fat-suppressed sequences, and chemical shift artifacts at the fat-water interface on susceptibility-weighted imaging (Figure 5). These features pointed towards a tubulo-nodular type of pericallosal lipoma associated with a corpus callosal dysgenesis.

Further, on non-contrast 3D TOF MR-angiography, the bilateral anterior cerebral arteries (ACAs) were not visualized, raising suspicion for the possibility of an azygous ACA, commonly associated with tubulo-nodular pericallosal lipomas. The rest of the intracranial arteries in the anterior circulation demonstrated reduced calibre, with more pronounced narrowing on the right side (Figure 6).

Case 2:

A 45-year-old woman presented to the emergency department with a 4-hour history of unresponsiveness. She was a known hypertensive on irregular treatment. A CT brain was performed, which revealed an acute intraparenchymal bleed in the right capsulo-ganglionic region, with intraventricular extension into the bilateral lateral ventricles. There was evidence of mass effect, including mild compression of the right lateral ventricle and a 3.7 mm midline shift towards the left. Incidentally, a thin, elongated curvilinear fat density lesion, measuring 4 mm in thickness (HU = -100), was noted along the posterior body and splenium of the corpus callosum, though the corpus callosum itself appeared unremarkable (Figure 7 and 8).

A follow-up MRI demonstrated a thin, well-circumscribed curvilinear hyperintense lesion on the midline sagittal T1-weighted image, wrapped around the posterior body and splenium of an otherwise normal-appearing corpus callosum. This finding was suggestive of a curvilinear type of pericallosal lipoma (Figure 9). After noting the pericallosal lipoma, the patient's family was retrospectively questioned, revealing a history of several episodes of seizures in the past.

DISCUSSION:

Pericallosal lipomas are rare congenital malformations characterized by the presence of fatty tissue located adjacent to the corpus callosum. These lesions constitute approximately 0.1% to 0.5% of all intracranial tumours [1, 2].

These lipomas typically form near the corpus callosum, leading to their

designation as "pericallosal lipomas." The formation of these lipomas is believed to be due to an aberration in the resorption process of the meninx primitive, a mesenchymal tissue derived from the neural crest. Under normal development, this tissue is resorbed between the 8th and 10th weeks of gestation, However, in cases of intracranial lipomas, this process fails, and tissue develops into fat deposits [3, 4].

Pericallosal lipomas are categorised into two primary types: **Tubulo-nodular and Curvilinear.** The Tubulo-nodular type, generally located at the front of the brain, is more rounded or lobulated and tends to be larger, often exceeding 2 cm in diameter. This subtype is more frequently linked to abnormalities of the corpus callosum. Such as hypo genesis or agenesis, and may also be associated with ocular anomalies, deformities of the frontal lobe, and calcifications. In contrast, the curvilinear type is typically smaller, usually less than 1 cm in size, and positioned at the back of the brain. This type follows the contours of the corpus callosum and is less commonly linked to significant anomalies of midline structures [5]. T**able 1.** outlines the distinguishing features between tubulo-nodular and curvilinear pericallosal lipomas. Most patients with pericallosal lipomas are asymptomatic, and the lesions are often detected incidentally during imaging conducted for unrelated conditions. However, in cases where symptoms do occur, they are usually caused by associated anomalies, Symptoms can include seizures, headaches, and, in some instances, psychomotor delays or cognitive impairments. Seizures are a particularly common presenting feature in symptomatic cases [6].

On imaging, the features of intracranial lipoma are distinctive. On CT scans these lesions appear as well-circumscribed, hypodense masses, with density values -40 and -120 Hounsfield units, characteristic of fat tissue, MRI scans provide more detailed information, showing these lipomas are hyperintense on T1- and T2- weighted sequences, with signa loss on fat-saturated sequences. Crucially, the lipomas do not enhance following the administration of gadolinium contrast. The differential diagnosis includes other fat containing lesions, such as intracranial teratomas or lipomatous transformation of other tumours.

Treatment for pericallosal lipomas is usually conservative, as most cases are asymptomatic and do not require intervention. Surgical removal is generally avoided due to the high risk of complications, given the lipoma's rich vascularity and close adherence to underlying corpus callosum, in cases where seizures are present, antiepileptic medications are the first line of treatment. Surgery is reserved for patients with uncontrolled seizures or hydrocephalus, Regular imaging follow-up is not typically necessary unless new symptoms arise.

CONCLUSION:

In summary, the incidental discovery of pericallosal lipomas in our reported cases highlights the need for meticulous imaging evaluations in patients presenting with neurological symptoms. Both cases illustrate distinct types of pericallosal lipomas—tubulo-nodular and curvilinear—each associated with unique imaging characteristics. These findings emphasize that pericallosal lipomas, while often asymptomatic, can coexist with significant neurological conditions, necessitating a comprehensive understanding of their implications.

Informed Consent: Written informed consent obtained from the patient for submission of this manuscript for publication.

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Abbreviations:
MRI- Magnetic Resonance Imaging
CT - Computed Tomography
DWI - Diffusion-Weighted Imaging
ADC - Apparent Diffusion Coefficient
ACA - Anterior Cerebral Artery
MCA - Middle Cerebral Artery
HU - Hounsfield Units
TOF- Time of Flight
FLAIR - Fluid-Attenuated Inversion Recovery

Figure Legends:

Figure 1:
Axial Diffusion weighted imaging-DWI (A) and Apparent diffusion co-efficient-ADC (B) shows symmetrical extensive areas of true diffusion restriction involving bilateral ACA and MCA territory. Also note made of Hypointense midline lesion corresponding to the location of peri-callosal lipoma showing T2 black-out phenomena

Figure 2:
Coronal T2 weighted image (A) shows chronic infarct with encephalomalacic changes involving right MCA territory and ex-vacuo dilatation of right lateral ventricle suggesting old Cerebro-vascular insult. Axial FLAIR image (B) showing Wallerian degeneration of right cerebral peduncle.

Figure 3:
Sagittal MP-RAGE (A) showing well defined hyperintense lesion similar in signal intensity to subcutaneous fat wrapped around entire corpus callosum with associated Callosal dysgenesis. Coronal T2 weighted image (B) showing bilateral ventricular extension of peri-callosal lipoma (Solid yellow arrows).

Figure 4:
Series of Coronal Inversion recovery (IR) images showing well defined hyperintense peri-callosal lipoma (A) with intraventricular extension (B); Also note persistent cavum septum pellucidum (C).

Figure 5:
Axial Susceptibility weighted imaging-SWI (A) with peri-callosal lipoma showing chemical shift artefact at fat-water interface. Magnified cropped image (B) of the same with chemical shift artefact being pointed by curved yellow arrows.

Figure 6:
MR-3D-Time of flight (TOF) axial MIP image shows non visualisation of bilateral ACAs

Figure 7:
Axial non contrast CT (A, B) shows a well-defined posterior midline hypodense lesion with attenuation values of fat (-17 to -112 HU; Mean= -76 HU). Also note right Capsulo-ganglionic haemorrhage causing effacement of frontal horn of right lateral ventricle.

Figure 8:
Sagittal reformatted CT image shows thin curvilinear hypodense lesion wrapped around posterior body and splenium of corpus callosum

Figure 9:
Sagittal T1 weighted images (A, B) show thin hyperintense lesion wrapped along body and splenium of relatively normal looking corpus callosum

Figures:

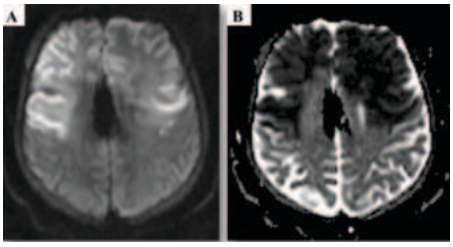
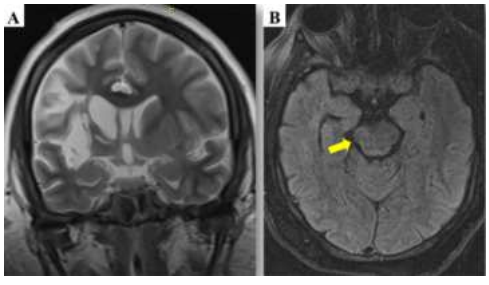


Figure 1:



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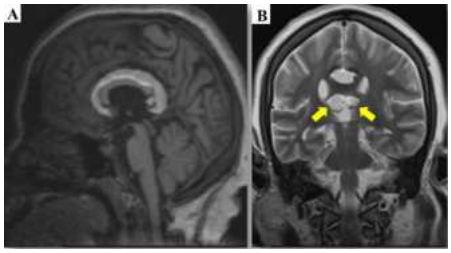

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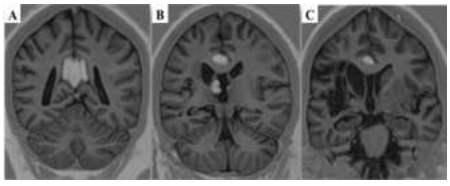

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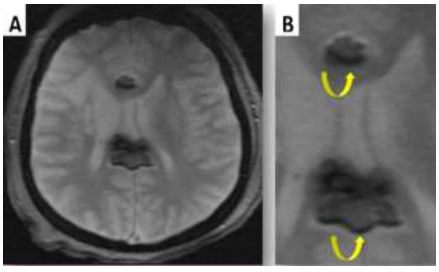

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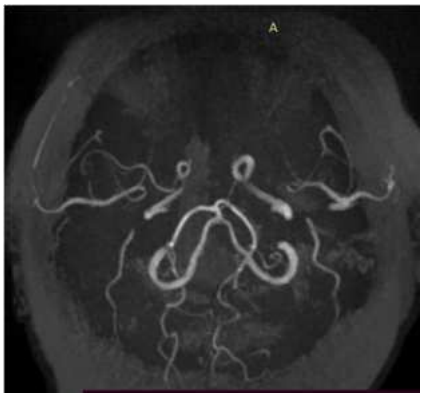

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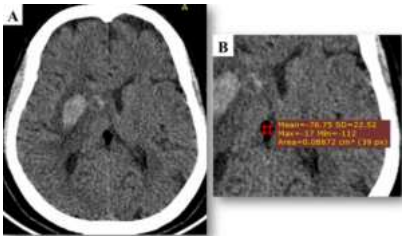

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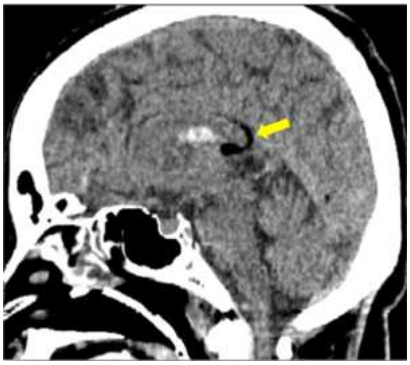

Figure 8

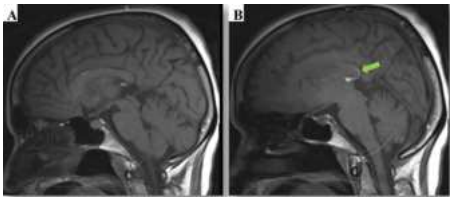

Figure 9:

Table:

Table 1: Differentiating two major morphological types of Peri-callosal Lipomas

Tubulo-nodular	Curvilinear
✓ Usually located anterior, rounded or lobulated bulky interhemispheric mass	✓ Usually located posterior, thin pencil-like and curves along the Callosal body and splenium
✓ Typically measures > 2 cm in diameter	✓ Measures < 1 cm in diameter
✓ Frequently associated with hypo genesis or agenesis of Corpus callosum, Frontal lobe deformities and Ocular anomalies.	✓ Less associated with malformations of Corpus callosum
✓ More frequently symptomatic.	✓ Often asymptomatic

REFERENCES:

1. Yilmaz N, Unal O, Kiymaz N, Yilmaz C, Etlik O. Intracranial lipomas—a clinical study. Clinical neurology and neurosurgery. 2006 Jun 1;108(4):363-8.
2. Nasri S, El Aggari H, Afilal I, Aichouni N, Kamaoui I, Skiker I. Pericallosal lipoma: a case report. Radiology Case Reports. 2022 Sep 1;17(9):3094-6.
3. Truwit CL, Barkovich AJ. Pathogenesis of intracranial lipoma: an MR study in 42 patients. AJR. American journal of roentgenology. 1990 Oct;155(4):855-64.
4. Paulus W. Mesenchymal non-meningothelial tumours. Pathology and Genetics, Tumours of the Nervous System, World Health Organization Classification of Tumours.. 2007:173-7.
5. Kassimi M, Guerroum H, Amriss O, Habi J, Moutaouakil K, Chikhaoui N, Mahi M. Curvilinear pericallosal lipomas diagnosed incidentally during evaluation following trauma with corpus callosum abnormalities in two patients. BJR| case reports. 2021 Jan 1;7(1):20200081.
6. Loddenkemper T, Morris HH, Diehl B, Lachhwani DK. Intracranial lipomas and epilepsy. Journal of neurology. 2006 May;253:590-3.