Parietal sinus pericranii with bilateral emissary veins

Clinical History:

A 7-month-old infant presented to the hospital with a lump in the parietal region adjacent to the sagittal suture that increased in the supine position and disappeared when standing up. The lump had grown during the past month.

Imaging Findings:

Doppler sonography (Fig. 1-3) demonstrated an extracranial vascular structure that communicated with the superior sagittal sinus (Fig. 1: venous flow in the spectral analysis) via two feeding veins through two transcranial defects. The colour Doppler sonogram showed turbulent flow with shades of yellow, red and blue.

Axial (Fig. 4) and sagittal (Fig. 5) T1W SPGR C+ sequences demonstrated prominent emissary veins traversing cranial defects to supply a scalp venous mass.

Fig. 4 and 6 confirm bilateral emissary veins receiving venous blood from the underlying superior sagittal sinus to supply the scalp varicose vein.

Discussion:

BACKGROUND: Sinus pericranii (SP) is a rare anomaly which shows abnormal communications between the intracranial and extracranial venous systems, representing an alternative pathway of drainage [1]. The aetiology of SP remains unclear [2].

CLINICAL PERSPECTIVE: Most SPs appear as nonpulsatile soft-tissue masses that are usually located in the frontal region, along or close to the midline, connecting pericranial veins with the superior sagittal sinus (SSS) through a bony defect [3]. An SP typically enlarges during crying, the Valsalva manoeuvre, and when supine. The condition is often asymptomatic and the main complaint is cosmetic. However, symptoms such as headache, nausea, dizziness, vertigo or localised pain may occur.

The age at diagnosis varies from birth up to the third decade of life, with no gender predilection. SP can be isolated or associated with other malformations such as craniosynostosis or dural sinus hypoplasia [1, 2].

IMAGING PERSPECTIVE: Imaging tests are essential to diagnose this entity. Colour Doppler ultrasonography (CDUS) is a first-line diagnostic tool that shows the vascular nature of the lesion, usually with bidirectional and
turbulent flow between the superficial veins and the dural sinus [4]. Brain MRI should be performed if CDUS confirms a vascular anomaly, in order to characterise it and exclude possible associated anomalies [5]. MRV detects the typically congested epicranial veins and the transcranial communication with an intracranial dural venous sinus. On unenhanced CT scans, SP has slightly increased attenuation compared with brain and the mass enhances with intravenous contrast to the same degree as intracranial venous structures. A bone defect should be identified. Digital subtraction angiography (DSA) is the gold standard for the diagnosis of SP, not only does it detect the location, size, and course of the venous anomaly, but it also provides information on the flow dynamics of the lesion.

OUTCOME: Treatment is often unnecessary, although endovascular embolization or surgical ligation may be carried out for cosmetic reasons or neurological symptoms related to the SP. If treatment is proposed, DSA is mandatory to exclude that a dominant SP is the main outflow of the intracranial venous system and therefore must be preserved [1, 2, 6]. The prognosis of SP is good. There is low risk of spontaneous or traumatic bleeding and thrombosis. Spontaneous involution has been reported.

TAKE HOME MESSAGE: SP is a rare anomalous communication between the intracranial and extracranial venous circulation. Imaging tests are essential for diagnosis.

Differential Diagnosis List: Sinus pericranii, Atretic encephalocele, Haemangioma, Epidermoid and dermoid cysts, Growing fractures, Scalp abscesses, Langerhans cell histiocytosis, Rhabdomyosarcoma, Neuroblastoma metastases

Final Diagnosis: Sinus pericranii

References:


Description: Colour Doppler ultrasound with spectral analysis shows vascular flow along both the intracranial superior sagittal sinus (venous flow in spectral analysis) and extracranial vessels with direct communication through the cranial defect. Origin: Iglesias J, Department of Radiology, Miguel Servet University Hospital, Zaragoza, Spain.
Figure 2

Description: Colour Doppler ultrasound depicts extracranial vessels and two abnormal transosseous feeders with turbulent flow. Origin: Iglesias J, Department of Radiology, Miguel Servet University Hospital, Zaragoza, Spain.
**Description:** Colour Doppler ultrasound shows a transcranial vessel in communication with a dilated vascular structure that resembles a varicose vein. **Origin:** Iglesias J, Department of Radiology, Miguel Servet University Hospital, Zaragoza, Spain.
Description: Axial T1W SPGR C+ MR shows bilateral prominent emissary veins feeding the dilated scalp vein. Origin: Iglesias J, Department of Radiology, Miguel Servet University Hospital, Zaragoza, Spain
Description: Sagittal T1W SPGR C+ MR shows a prominent emissary vein traversing a cranial defect to supply the scalp venous mass. Origin: Iglesias J, Department of Radiology, Miguel Servet University Hospital, Zaragoza, Spain.
Description: Coronal oblique reconstruction
3D volume rendering MR depicts two emissary veins connecting the superior sagittal sinus with an extracranial varicose vein. Origin: Iglesias J, Department of Radiology, Miguel Servet University Hospital, Zaragoza, Spain.