CASE REPORT

Multiple lateral sinus pericranii – A case report

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Abstract

Introduction. Sinus pericranii is a rare vascular anomaly. It is characterized by abnormal communication between the extracranial and intracranial venous system, usually involving the superior sagittal sinus and occasionally the transverse sinus. Off the midline lesions are extremely rare. Multiplicity, associated venous lakes, venous angioma and lateral location are unusual and unique presentation of sinus pericranii. Case report. A case of multiple congenital off-midline sinus pericranii in the left frontotemporal and parietal region is presented. Magnetic resonance imaging showed an extracranial vascular anomaly connected with the intracranial venous system through abnormal diploic or emissary veins. The lesions were removed completely by surgery. Conclusion. Sinus pericranii is a rare vascular malformation with unique clinical and radiological features. Sinus pericranii may cause fatal complications, and it must be treated by surgical or endovascular procedures.

Key words: sinus pericranii; neurosurgical procedures; diagnosis; treatment outcome.

Introduction

Sinus pericranii (SP) is a rare vascular anomaly. It is characterized by an abnormal communication between the extracranial and intracranial venous system, usually involving the superior sagittal sinus and occasionally the transverse sinus. Lateral sinus pericranii or sinus pericranii of the transverse sinus is exceedingly rare.

The venous collections receive blood from and drain into the intracranial venous sinuses. Usually, this lesion presents as a soft, fluctuant, painless scalp mass that is easily compressed and more prominent with Valsalva maneuvers. In general, sinus pericranii is considered to be a congenital anomaly, but trauma is believed to be a possible causative factor in acquired sinus pericranii. An extremely rare case of multiple congenital and off-midline located sinus pericranii is presented. Multiplicity, associated venous lakes, venous angioma and lateral location are unusual and unique presentation of sinus pericranii.

Case report

A 22-year-old man presented with a round soft swelling, nontender scalp masses in the left frontotemporal and another mass in the left parietal region of the cranium (Figure 1). The masses presented in early childhood and in-
Increased in size in time. On physical examination, there was a large soft scalp mass in the left frontotemporal region, and another mass in the left parietal region. The swelling in the frontotemporal region was larger, dimensions 48 × 40 × 6 mm, whereas another mass dimensions were 30 × 18 × 3 mm. Either mass was easily compressible and increased in size on coughing, and other kind of Valsalva maneuvers. The skin over the masses was normal. According to history he had some minor trauma of the cranium during his sport activities, and he registered increasing in size of masses in time. The computed tomography (CT) scan with angiography revealed a soft tissue isodense lesions in frontotemporal and parietal left region of the skull with a focal bony defect and a small transosseus vascular structure were also detected (Figures 2 and 3). The contrast enhanced magnetic resonance (MR) imaging revealed multiple formations with laminar morphology; they had mixed signal intensity on T1-weighted images and appeared hyperintense on T2-weighted and FLAIR images. MR images also detected small transosseus vascular structures which appear like emissary/diploic vein and connect extracranial mass with intracranial venous structures, usually with venous sinuses, in our cases with sphenoparietal sinus in frontotemporal located lesion and with intracranial cortical vein and superior sagittal sinus in parietal region (Figures 4 and 5). MR angiography did not detect any other intracranial vascular anomaly. According to the history, physical examination and MR images, we concluded that it was the epicranial vascular venous anomaly of the sinus pericranii type. Due to the risk of future complications the patient elected to undergo surgery. The operation was performed under general anesthesia. The anomaly was resected by soft tissue and emissary vein dissection, without craniectomy, and bone venous channels, including emissary vein, was closed with bon wax (Figures 6 and 7). The same procedure was performed in both anomalies. Histopathology examination was made and cavernous vascular channels with thin vascular endothelium were detected, which is typical for congenital sinus pericranii. Two months after the operation, control MRIs showed a total extirpation of anomalies and no signs for rest and/or recidive of the illness (Figure 8).
Fig. 4 – Magnetic resonance (MR) image showing the transosseus vessel (emissary or diploic vein) which connects intracranial venous system with extracranial lesion.

Fig. 5 – Magnetic resonance (MR) image showing sinus pericranii and the transosseus vessel in parietal region.

Fig. 6 – Intraoperative picture of large sinus pericranii.

Fig. 7 – Intraoperative picture after removal of sinus pericranii – the bone channel with the emissary vein closed with bone wax.

Fig. 8 – Postoperative magnetic resonance (MR) image – total removal of the lesion.

Discussion

Sinus pericranii was first described by Hecker in 1845 as "varix spurious circumscriptus venae diploicae frontalis". In 1850, Stromeyer referred this anomaly as a "subperiosteal blood-filled cyst of the skull communicating with an intracranial sinus" and proposed the term "sinus pericranii". Sinus pericranii is a vascular lesion, consistent with an abnormal transdiploic connection between intracranial and extracranial venous circulation. They usually increase in size on Valsalva manoeuvre and reduce on nondependent position; they disappear with compression. According to Ota et al., sinus pericranii is a collection of venous blood vessels without tunica muscularis or "venous hemangioma". Sinus pericranii can appear at any age, usually under 30 years, common in males and although usually asymptomatic, may present with nausea, vomiting and vertigo. It is most commonly located on the frontal region close to the midline connected to the superior sagittal sinus through a skull defect (Table 1). Off-midline and multiple lesions are extremely rare. Its multiplicity, association with flow void, and usually demonstrate the diploic vein which connects intracranial sinus with the abnormal extracranial vessels. Today, according to excellent opportunity of MR imaging and MR angiography, digital subtraction angiography is rarely necessary, except in cases when sinus pericranii is associated with brain vascular anomaly. The differential diagnosis include leptomeningeal cyst, meningocele, encephalocoele, epidermoid tumor, cavernous haemangioma, scalp arteriovenous malformation. The diagnosis of sinus pericranii and its differentiation from scalp arteriovenous malformation can be difficult. Strictly speaking, sinus pericranii is a collection of nonmuscular venous blood vessels tightly adhering to the outer surface of the cranium and communicating directly with an intracranial venous sinus. Treatment for sinus pericranii has mainly been recommended for cosmetic reasons, prompt treatment after diagnosis is required for prophylactic purposes to prevent complications such as thrombosis, traumatic air embolism or massive hemorrhage. Surgery is the usual method of treatment. In surgical treatment, the goal is to resect the extracranial venous package and ligate the emissary communicating vein. This can be done by craniectomy or by dissection of soft tissue and vein without craniectomy, like in our case. Endovascular treatment using transvenous route and percutaneous direct puncture has also been described. Although spontaneous regression of sinus pericranii has been reported, most patients require removal of the sinus and blocking the communivating veins.

Table 1

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontal</td>
<td>46</td>
<td>43</td>
</tr>
<tr>
<td>Parietal</td>
<td>39</td>
<td>36</td>
</tr>
<tr>
<td>Occipital</td>
<td>8</td>
<td>7.4</td>
</tr>
<tr>
<td>Frontoparietal</td>
<td>5</td>
<td>4.6</td>
</tr>
<tr>
<td>Parieto-occipital</td>
<td>4</td>
<td>3.7</td>
</tr>
<tr>
<td>Occipito-temporal</td>
<td>4</td>
<td>3.7</td>
</tr>
<tr>
<td>Temporal</td>
<td>2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Sinus pericranii is a rare vascular malformation with unique clinical features. Sinus pericranii may cause fatal complications, and it must be treated by surgical or endovascular procedures. Exceptionally, sinus pericranii may have a prominent role in the venous drainage of the intracranial compartment, and represents the main venous drainage of the underlying brain in case of bilateral occlusion of the jugular veins, and no surgical nor endovascular treatment are recommended.

Conclusion

Sinus pericranii is a rare vascular malformation with unique clinical and radiological features. Sinus pericranii may cause fatal complications, and it must be treated by surgical or endovascular procedures.
REFERENCES


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