These findings are consistent with precursor B-ALL. Bone-marrow aspiration revealed concomitant leukemic bone-marrow relapse. On imaging, the tumor disappeared gradually with irradiation, and administration of systemic and intrathecal chemotherapy. Unfortunately, the patient died a few months later from gram-negative sepsis.

ALL is the most common type of cancer in childhood. Metastatic involvement of the meninges in children occurs primarily in ALL and in primary brain tumors. In patients with leukemia, it is often called 'leukemic meningitis' or 'meningeal leukemia'. In ALL, it is diagnosed either by detection of lymphoblasts in cerebrospinal fluid or by neuroimaging. Intracranial leukemic masses rarely occur in myeloid and lymphoid leukemias. However, in ALL, intracranial leukemic masses have been described in the literature using descriptive terms such as "tumor masses" [1] and "tumefactive presentations" [2], and also as "myeloid" (or "granulocytic") "sarcoma" or "chloromas" [3,4]. The latter terms are inaccurate and should be reserved only for leukemic masses consisting of myeloid cells expressing the enzyme myeloperoxidase.

So far, in the English literature, there have been four biopsy-proven cases of an intracranial leukemic mass either as the initial presentation [2] or as a relapse [1,3,4] of B-ALL. In the Japanese literature, however, a further four patients with ALL and an intracranial leukemic mass were reported in a retrospective study of 65 children with leukemia [5]. All tumors appeared to be homogeneously enhancing meningeal-based mass [1–5] that was either pachymeningeal (dural or falcal) or leptomeningeal. Peritumoral edema, presence of a dural tail and subperiosteal tumor extension were also seen in a patient with a dural-based mass [2]. Yet another patient presented with a leptomeningeal mass with peritumoral edema [1].

Our present patient presented with a leptomeningeal mass with a dural tail that was not caused by dural invasion, as the tumor was found underlying the dura. One neuro-oncological report [4] mentions an intra-axial (intracerebral) mass; however, MRI findings were consistent with an extra-axial mass bulging into the temporal lobe and causing peritumoral edema. Surgery and pathology demonstrated attachment to the dura with no invasion of the brain parenchyma, indicating that this was another case of a dural-based mass.

In addition to these proven cases, one other patient with ALL and multiple intracerebral (intra-axial) nodules has been described in the literature [6]. The nodules were not biopsied, but were assumed to be metastatic brain tumors of ALL. However, as the imaging features of these nodules are nonspecific, there is room for doubt over the leukemic origin of the nodules in this patient.

In conclusion, all of the reported and biopsy-proven intracranial leukemic masses in ALL were extra-axial tumors. They may be pachymeningeal or leptomeningeal, and they can all be designated as cases of meningeal leukemia.

Disclosure of interest

The authors have not supplied their declaration of conflict of interest.

References


doi:10.1016/j.neural.2011.02.009

Spontaneous Cervical Epidural Hematoma Mimicking Stroke

Hématoine épidural cervical spontané évoquant un accident vasculaire cérébral

A 62-year-old man presented to the emergency department after awakening with neck pain. En route to the hospital, he experienced progressive weakness and a sensation of heaviness in his right arm and leg. The patient reported a past medical history of hypertension and hyperlipidemia and a history of dancing at a party the previous night. The patient experienced "neck spasms" treated with aspirin the morning of presentation to the emergency department. Physical examination revealed 3/5 strength on
the right side and 5/5 on the left side with a blood pressure of 210/90 mmHg. The patient was awake, alert, and articulate. Cranial nerve examination was normal. Treating physicians appropriately considered the likely diagnosis of acute stroke, possibly with carotid artery dissection. A stroke alert process was initiated, neurological consultation promptly obtained, and a noncontrast head CT and CT Angiogram of the head and neck were performed. No significant intracranial or vascular abnormalities were identified, but an epidural lesion was noted in the upper cervical canal (Fig. 1a). Subsequent cervical spine Magnetic Resonance Imaging (MRI) demonstrated a 3.6 × 1.1 × 1.2 cm epidural lesion compatible with hematoma in the right posterolateral aspect of the canal extending from C2 to C4 with severe compression of the spinal cord (Fig. 1b). No cervical spine fracture was present and no vascular malformation was identified. Laboratory results including platelet count, INR, and PTT were normal. The patient was taken to the operating room for emergent decompression with epidural hematoma confirmed at surgery. Patient was later sent to rehabilitation for persistent right-sided weakness. Evaluation of the patient by hematology for evidence for bleeding diathesis proved negative.

Spontaneous epidural hematomas are rare, with a reported incidence in the literature of 0.1 per 100,000 individuals [1]. Most hemorrhages in adults occur in the lower cervical spine or at the thoracolumbar junction and present with acute onset of pain followed by myelopathy [2]. The pathophysiology is currently unknown, with proposed mechanisms including rupture of venous structures in the posterior epidural plexus due to fluctuations in intra-thoracic and intra-abdominal pressures as well as coagulopathies, vascular malformations, and hypertension [2]. Spontaneous cervical hematomas along with many conditions can present with a sudden onset of signs and symptoms mimicking stroke. A review by Huff in 2002 found rates of stroke mimics to be 1.2% to 19%, with the variation between studies largely reflecting the time in the diagnostic workup [3]. A 2006 study by Hand et al. reported that approximately 30% of the 350 consecutive presentations of brain attack were actually stroke mimics [2]. Of the stroke mimics, the most common diagnoses reported were seizure (38%), complicated migraine (37%), and conversion disorder (21%) [4]. Less than 3% were attributable to spinal cord lesions [5].

The importance of stroke mimic recognition is mostly in terms of treatment. Of the 21% of patients without infarct on follow-up imaging in the Chernyshev study, a total of 14% were found to be stroke mimics and 7% were found to be neuro-imaging-negative cerebral ischemia, with no bad outcomes in these patients after the administration of tPA [4]. However, no cervical epidural hematomas were identified and the one reported cervical epidural mass demonstrated evidence of hemorrhage at surgery [4]. One may speculate that thrombolysis could have led to increased hematoma size, increased neurological deficit, and delayed the appropriate surgical therapy.

In conclusion, in patients presenting to the emergency department, the initial evaluation for acute stroke should include consideration of stroke mimics. Stroke mimics run the gamut from primary CNS processes to metabolic disturbances to spinal lesions. Imaging is invaluable in the evaluation of stroke and potentially in the detection of stroke mimics.

References

K.C. Bailey a
M.R. Sochor b
M. Wintermark a, c
J.S. Huff c

a University of Virginia, Department of Radiology, Neuroradiology Division, Charlottesville VA, United States
b University of Virginia, Department of Emergency Medicine, Charlottesville VA, United States
c University of Virginia, Department of Emergency Medicine and Neurology, Charlottesville VA, United States

Corresponding author. Division Head Department of Neuroradiology University of Virginia PO Box 800170 Charlottesville, VA 22908, United States.
E-mail address: Max.Wintermark@virginia.edu
(M. Wintermark)

doi:10.1016/j.neurad.2011.03.001

Posterior fossa dermoid cyst with a sinus tract and restricted diffusion on MR imaging: Value of structural imaging findings and signal characteristics

Kyste dermoïde de la fosse postérieure avec sinus dermique et diffusion restreinte en IRM: apport de l’imagerie morphologique et caractéristiques du signal

We present the case of a six-year-old boy with a subcutaneous palpable mass in the midline occipital region persisting since birth. The patient was referred for pediatric brain MR with contrast for further evaluation. Sagittal T1-weighted images showed a moderate sized midline intracranial posterior fossa cyst. Apparent communication with a small subcutaneous cyst was noted via a sinus tract coursing through an occipital bone defect in the midline (Fig. 1A). The cysts followed CSF signal in all pulse sequences without increased T1 or T2 signal within the cyst to suggest the presence of either fat or calcification. The cysts displayed restricted diffusion both in the intracranial and extracranial components (Fig. 1B,C). The posterior fossa was normal in size and the cerebellum, vermis and pons displayed normal shape and signal. Supratentorial brain was normal. There was no abnormal contrast enhancement of the cysts nor the brain parenchyma or meninges. The patient had surgery on the day following MR imaging.

Intracranial dermoid and epidermoid cysts are congenital ectodermal inclusion cysts. Dermoid and epidermoid cysts are very rare, accounting for 0.1%–0.7% and 0.2%–1.8% of all intracranial tumors, respectively [1–4]. Though both rare, epidermoid cysts are reported to be four to nine times more common than dermoids in adults [2–4]; however, dermoids are reported to be more common in the pediatric population [4]. Posterior fossa dermoids are frequently associated with congenital dermal sinus tracts, which can predispose to recurrent meningitis and other infections, possibly explaining why they are detected earlier during childhood [1,5]. Dermoids most commonly occur in the midline of the anterior fontanelle or occipital region of children. The midline location is likely due to formation of the falx and tentorium by invaginating folds of dura, which can inadvertently draw in ectoderm [1–3,5]. Contrarily, epidermoid cysts are most often found in lateral locations, such as the cerebellopontine angle or parasellar cisterns, due to lateral displacement by developing optic and otic vesicles [3–5]. Dermoids and epidermoids are frequently differentiated on the basis of MR findings; however, as in our case, overlapping features can be observed. Typically, epidermoids are hyperintense to CSF on T1 and T2 weighted images; they do not display contrast enhancement [3,4]. Epidermoids can often be differentiated from other cystic lesions by restricted diffusion on MR imaging. Dermoids tend to show more variability in signal intensity due to variable cholesterol and fatty content, which often results in hyperintensity on T1-weighted images [3,4]. In fact, nearly all reported dermoid cysts show high T1 signal intensity [2,3]. In our case, upon surgical resection, the cyst was found to have the “nastiness” of dermoid cysts, containing hair and sebaceous glands, and the pres-

Figure 1  Sagittal T1-weighted image demonstrates a midline extra-axial cyst in the posterior fossa communicating with a small occipital subcutaneous cyst via a bone defect and sinus tract (A). Diffusion weighted image reveals increased signal (B) that is confirmed to be restricted diffusion on the ADC map (C).