19 mo female presenting with worsening neurological deficits and milestone regression

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Patient Presentation

- HPI: 19 month old previously healthy female presenting to the ED with regression of walking and talking for three months. Refusing to bear weight and no longer saying words. Increased irritability and sleeping. Decreased appetite. Appears pale to mother.

- PMHx: born via term spontaneous vaginal delivery

- PSHx: None

- Family Hx: 3 healthy siblings; mother with anemia requiring blood transfusions during pregnancy
Physical Exam & Pertinent Labs

- Physical Exam
  - General: mild distress
  - HEENT: pale conjunctiva and lips
  - Lungs: CTA
  - CV: regular rate and rhythm
    - GI: soft, NT, liver palpable 4 cm below costal margin, palpable spleen
    - Neuro: Alert, patellar clonus 4-5 beats, not cooperative with standing or sitting, normal muscle tone and bulk

- Labs: Hgb 1.3, Hct 5.0, WBC 9.8, MCV 111.1, Plt 7

- Interval history: status epilepticus (secondary generalized seizure)
What Imaging Should We Order?
A child with a generalized seizure (neurologically abnormal). Initial imaging.

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STAT head CT ordered by the PICU team due to status epilepticus lasting >40 mins, prompting concern for mass, bleed, or other intracranial abnormality.
Non-Contrast Head CT

- a. Demineralization and permeative-type pattern of bone loss involving multiple areas throughout the skull, but most extensively involving the central skull base and greater wings of the sphenoid bone

- b. Abnormal soft tissue structure/mass centered within both greater wings of the sphenoid extending into the orbits, and both temporal and infratemporal fossas
### Further Imaging

**Variant 7:** Children 1 month to 18 years of age. Generalized seizure (neurologically abnormal). Initial imaging.

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Recommended by Neurology
Brain MRI with/without Contrast
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- a. Generalized abnormal signal throughout the marrow space of the skull, particularly within the region of the greater wings of the sphenoid bone

- b. Abnormal enhancing soft tissue extending into the lateral aspects of the orbits, the middle cranial fossa, and the infratemporal fossa (not shown)

Soft tissue mass apparent on coronal T2 and axial T1 post views
Brain MRI with/without Contrast
Multiple areas of abnormal diffusion signal on DWI (a), and ADC (b, different area), that are primarily centered within the deep white matter.
Final Dx

Acute Megakaryoblastic Leukemia
complicated by watershed ischemia due to profound anemia
Acute Megakaryoblastic Leukemia (AMKL)

- Rare subset of acute myeloid leukemia that predominantly occurs in childhood; accounts for <10% of pediatric cases of AML
- May be associated with Down syndrome and t(1;22)
- Imaging may reveal evidence of diffuse marrow-replacing process with possible extension into adjacent soft tissues, as well as pachymeningeal enhancement and generalized cerebral volume loss
- Bone marrow biopsy reveals ≥20% blasts of which at least half are of megakaryocyte lineage
- Immunohistochemistry and flow cytometry aid in diagnosis
Treatment and Prognosis

- **Treatment**
  - Traditional chemotherapies used for other AML subtypes
  - Role of hematopoietic stem cell transplant is under investigation

- In general, AMKL is a poor individual prognostic factor for overall survival in AML
  - Exception: patients with Down syndrome have excellent prognosis (long-term survival rates >80%; complete remission rates >90%)
  - Without Down syndrome, estimated 5-year overall survival of 10%
  - t(1;22) may confer favorable prognosis
References


Orphanet: an online database of rare diseases and orphan drugs. Copyright, INSERM