Skull Base Rhabdomyosarcoma Mimicking Osteomyelitis in a Pediatric Patient

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Background

- Rhabdomyosarcoma (RMS) is a rare malignant tumor affecting 4.58 per 1 million children[1]
- ~35% occur in head and neck and only 8-10% involve the temporal bone[2]
- Skull base RMS commonly presents at advanced stages due to overlapping features with other skull base pathology (e.g. osteomyelitis) and difficulty accessing for biopsy[3,4]
- Delays in diagnosis exacerbate the already poor prognosis of head and neck RMS
- The petrous apex, a common site for skull base osteomyelitis (SBO), is embedded in the skull base with close proximity to vital structures (e.g. internal carotid artery)[5]
- We present a very rare case of petrous apex RMS mimicking osteomyelitis — underscoring the challenges of diagnosis

Case Description

- 6-year-old immunocompetent female, with history of two acute otitis media episodes, presented with a 3-week history of sixth cranial nerve palsy and sudden-onset complete seventh cranial nerve palsy
- She did not have pain or otorrhea
- MRI and CT imaging revealed a 1.3 cm left petrous apex enhancing lesion with extension into the mastoid and clivus with surrounding bony and soft tissue destruction (**Figure 1A-1C, Figure 2A)**
- Nuclear medicine scan, with Technetium-99m followed by gallium, demonstrated avid uptake in the left petrous apex (**Figure 2B-2C)**
- The working diagnosis was SBO and patient received 2.5 weeks of antibiotics without clinical improvement
- Repeat imaging showed significant progression of the disease and extension into the nasopharynx and sphenoid sinus (**Figure 3A-3B**)
- Endoscopic trans-sphenoidal biopsy was performed with pathology consistent with rhabdomyosarcoma
- CT chest revealed lung metastases
- She partially responded to chemotherapy and received concomitant proton therapy during week 13 of treatment
- Five months after diagnosis, she developed leptomeningeal spread, which was further complicated by meningitis, and passed away

Imaging

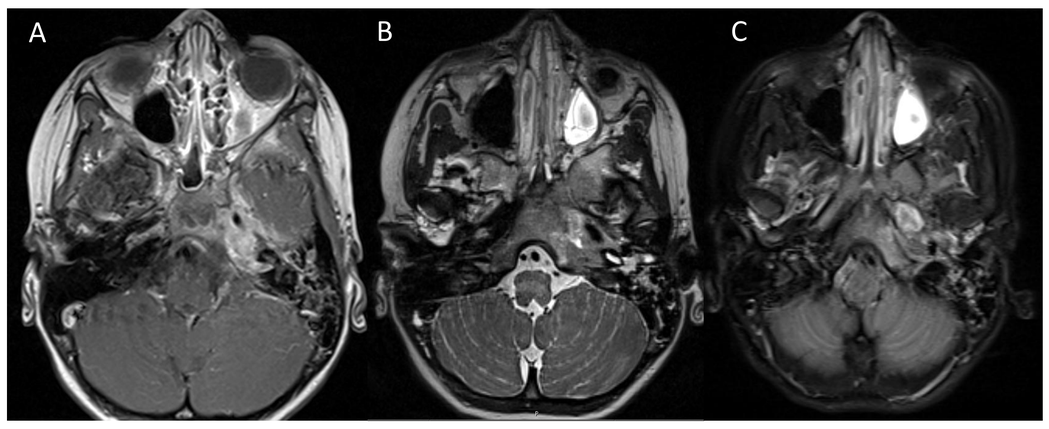

Figure 1: Left petrous apex on A) T1 with contrast showed enhancement and inflammatory changes extending into the Meckel cave with dural thickening; B) T2 with hyperintensity; C) T2 fat sat demonstrated hyperintensity.

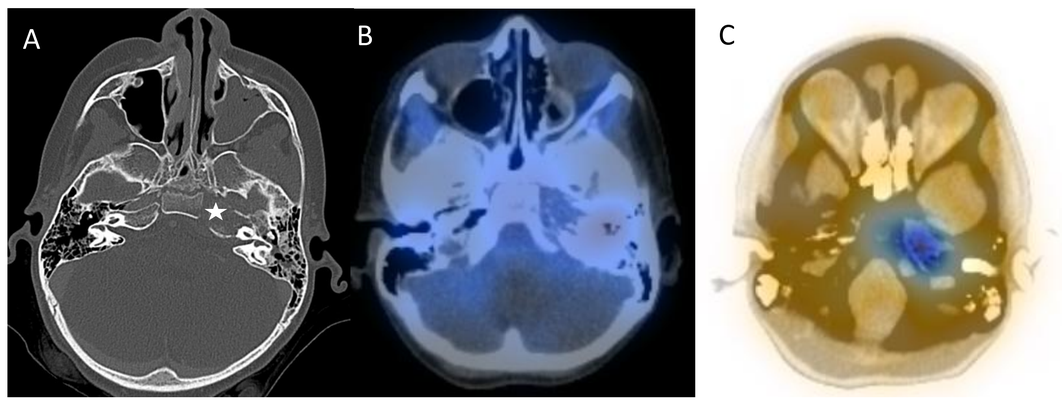

Figure 2: Non-contrast A) CT temporal bone demonstrating expansile lesion with bony destruction at left petrous apex (star); SPECT-CT B) with technetium showed trace uptake C) with gallium demonstrated extensive uptake in the left petrous bone, consistent with extremely active infection.

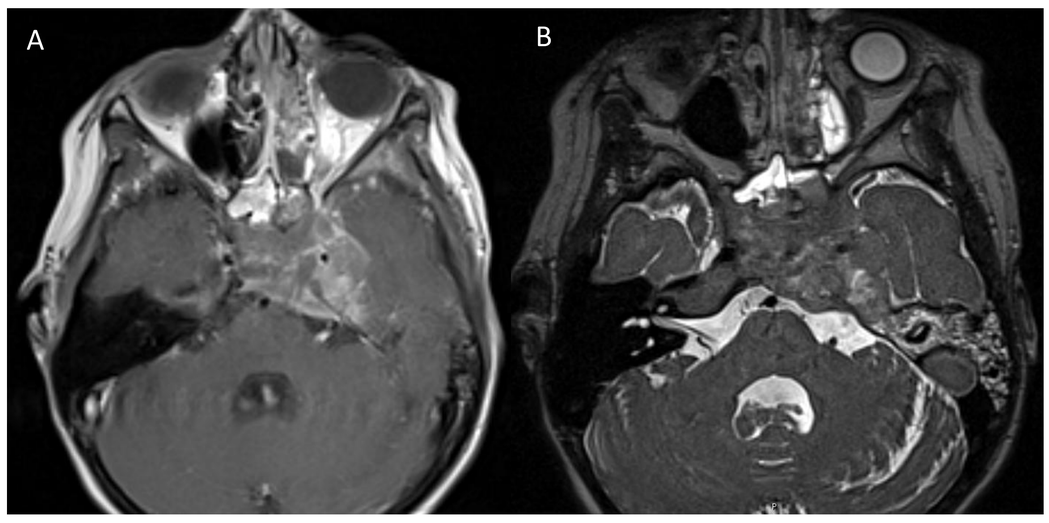

Figure 3: Repeat MRI at 2.5 weeks A) T1 with contrast and B) T2 demonstrated rapid growth of the petrous apex lesion now extending into nasopharynx and sphenoid sinus.

Discussion

- Skull base RMS commonly presents in advanced stages due to its overlap with other skull base pathology and difficulty to access for biopsy
- In particular, the petrous apex is a common site for SBO, and has overlapping features with RMS on imaging[6-8]
- This case represents the challenges in diagnosis and management, as the patient presented with findings indicative of SBO:
  - Elevated ESR and CRP
  - Bony destruction on CT/MRI and avid uptake on nuclear medicine bone scan
- We aim to caution clinicians to consider skull base RMS in their differential diagnosis of suspected SBO in children, prompting short-interval repeat imaging, especially when culture/biopsy cannot be obtained

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