Diffusion-Weighted MR Imaging Findings in an Isolated Abscess of the Clivus


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The clivus is an uncommon location for intracranial lesions. Chordoma, chondrosarcoma, plasmocytoma, giant cell tumors, lymphangioma, adenocystic and nasopharyngeal carcinomas, and metastases are lesions known to develop in the clivus. Secondary clival involvement from sphenoid sinus abscesses and mucopyoceles have been reported and documented by CT and conventional MR imaging. We describe the diffusion-weighted imaging (DWI) findings of a primarily clival abscess.

Case Report
A 44-year-old woman presented with a 1-month history of progressively worsening hemifacial and hemicranial headaches, nausea, and vomiting. There were no visual complaints or previous history of sinusitis. At examination, the patient was awake and alert, afebrile, with no signs of meningeal irritation. Sensation in the face was intact. Hess screen chart examination revealed incomplete left sixth nerve palsy. CT showed a midline mass lesion with bone erosion, involving the upper clivus and sellar floor (Fig 1A). MR imaging (1.5T scanners, Symphony and Avanto; Siemens, Erlangen, Germany) demonstrated a cystic-necrotic lesion, with a hypointense rim on T2-weighted turbo spin-echo images and thick peripheral enhancement (Fig 1B, -C). DWI and apparent diffusion coefficient (ADC) maps demonstrated central restricted diffusion (Fig 2). DWI parameters were as follows: coronal plane, TR = 170 ms, TE = 94 ms, b = 1000 s/mm², section thickness = 3 mm with a 0.5-mm gap, matrix = 218 × 256 ms, and FOV = 20.9 cm. Laboratory analysis failed to reveal leukocytosis or signs of infection. Sensation in the face was intact. After 3 weeks of treatment with high-dose clindamycin and gentamicin without clinical improvement or imaging findings, the patient underwent a pretemporal-transsphenoidal approach to the mass. A smoothened upper clivus due to an inflammatory process was noted, with no signs of meningeal irritation. The patient underwent a complete surgical resection of the clival lesion. The final pathology revealed a clival abscess.

Discussion
Infectious lesions of the clivus are rare, mainly arising from the sphenoid sinus. Sphenoid mucopyoceles can expand posteriorly, eroding the posterior wall of the sphenoid sinus, and present as a clival mass entrapped by sphenoidal mucosa. The clival infection was caused by the administration of antibiotics. After surgery, there was resolution of the patient’s complaints. Antibiotherapy was administered for another 4 weeks. Imaging follow-up at 3 months showed partial clival bone reconstitution.

SUMMARY: We report the finding of restricted diffusion in an isolated abscess of the clivus and discuss the imaging differential diagnosis, with an emphasis on the usefulness of diffusion-weighted imaging.
The use of DWI in skull base infection has not been reported previously, to our knowledge. As in brain abscesses, a possible explanation for restricted diffusion is that hypercellularity and the presence of macromolecules in pus reduce water diffusivity. Another similarity with brain parenchymal abscesses is the presence of a T2-hypointense rim due to paramagnetic free radicals.

Elsewhere, the usefulness of DWI in bone infection is controversial. Increased signal intensities on DWI have been reported, both in tuberculous and pyogenic spondylodiskitis. Increased tissue diffusivity in patients with aggressive osteomyelitis of the femur has been described. The origin of the osteomyelitic process is unclear: the patient’s recent history did not include any sinus infection that could have spread to the clivus. Nevertheless, the sphenoid sinus remains the most likely origin of the organisms, because there were no other clinical or laboratory signs of systemic infection. We cannot exclude a secondary infection in a previously existing lesion, such as an ecchordosis physaliphora, an intradural posterior clival notochordal remnant found in 2% of random autopsies. Intradural chordoma, epidermoid, and dermoid cysts are less likely primary lesions, all of which occur at the same location as ecchordosis.

Based on this case, the finding of a purely lytic, cystic-necrotic lesion of the clivus, with a T2-hypointense rim, peripheral enhancement, and central restricted diffusion is suggestive of an abscess, irrespective of the absence of clinical or laboratory signs of infection.

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References