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A case of hemorrhagic pineal cyst: MR/CT correlation*

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Summary. A 30-year-old male had a headache for one month and was evaluated with both computed tomography (CT) and magnetic resonance (MR). These scans demonstrated an obstructing pineal cyst containing layered acute and subacute blood products by MR criteria. The concurrent scans allowed correlation between CT and MR findings in this rare complication of an unusual entity, explained his headache (and the development of later upward gaze paresis), provided a precise surgical/anatomic approach, and gave a good final clinical result. The report illustrates appropriate CT and MR images and pathological specimen.

Key words: Pineal body, cyst – Pineal body, hemorrhage – Hemorrhage, intracranial – Pineal tumor – Pineal apoplexy

Pineal cysts are identified in as many as 40% of autopsy specimens but detected with magnetic resonance (MR) in only 1.4 to 4.3% of patients [1–4]. These cysts are nearly always asymptomatic and represent incidental findings. Hemorrhage within such a cyst is extremely rare [5–8]. Acute hemorrhage within a pineal cyst with rapid expansion and mass effect has been termed pineal apoplexy. We present the MR appearance of such a case along with computed tomography (CT) and pathological correlations.

Case report

A 30-year-old black male complained of headache for the previous month. During the last week the pain worsened significantly. At the time of admission he was experiencing difficulty with near vision, especially reading. He denied hypertension, morning nausea, drug usage, or other significant history. Initial CT evaluation demonstrated a 2 cm nonenhancing, round, smoothly marginated pineal region mass that contained a fluid/blood level (Fig. 1). MR performed the day of admission showed fluid/fluid levels representing acute and subacute hemorrhage within the sharply defined pineal region mass (Fig. 2). The mass effaced the tectum and occluded the cerebral aqueduct and thus caused moderate hydrocephalus. A normal pineal gland was not identified.

On the second hospital day a ventricular shunt was placed and the cerebral spinal fluid (CSF) was sampled. The CSF contained 141 red blood cells per high powered field. Tumor cells were not identified. Immediately following the shunt placement the pa-

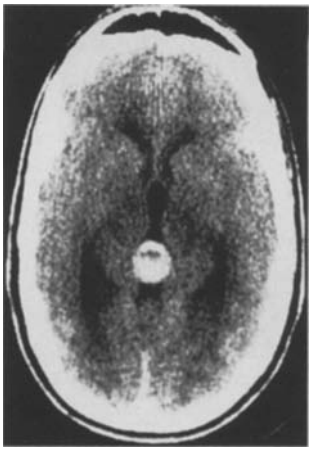

Fig. 1. Pre- and post-contrast enhanced CT demonstrates a 2 cm, non-enhancing pineal region mass which contained a fluid/blood level. Calcification and/or thrombus is adherent to the anterior wall of the cyst

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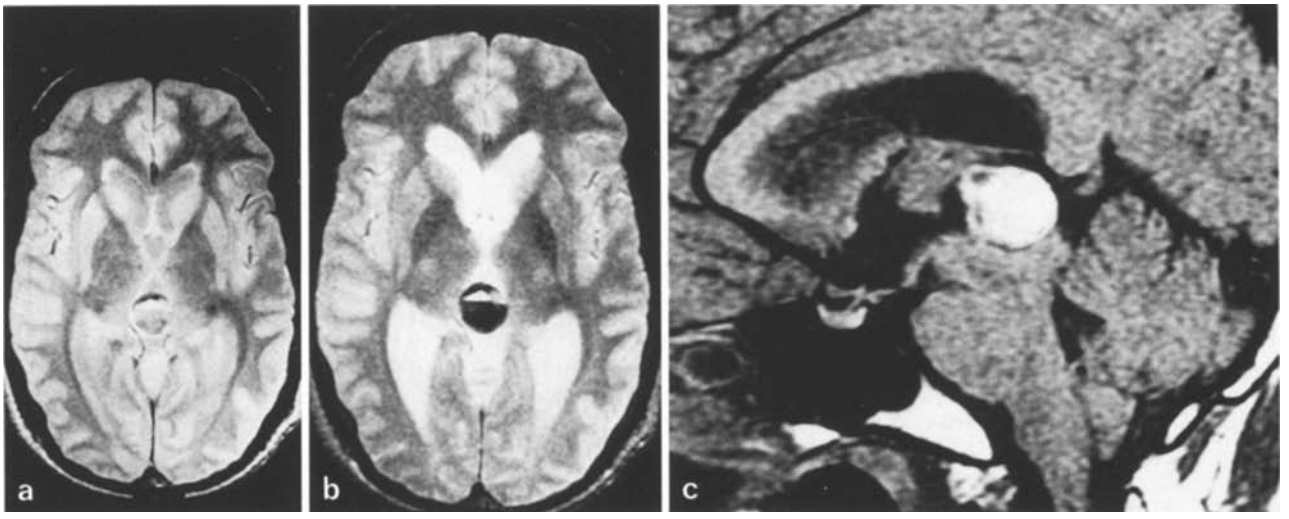

Fig. 2. **a** Axial SE 3000/30 and **b** axial SE 3000/80 images delineate the pineal cyst and acute-subacute blood level. Note the T2 shortening of the dependent acute blood contrasted with the high signal intense extracellular methemoglobin. **c** The sagittal SE 600/20 images best delineate the mass effect on the midbrain

tient's headaches resolved; however, on the third postoperative day a complete Parinaud syndrome developed.

Two weeks after the shunting procedure the mass was subtotally evacuated via suboccipital craniectomy with a supracerebellar, infratentorial approach. The mass grossly appeared thin walled and cystic and contained obvious blood. The pathologist described thrombus surrounded by a fibrous capsular wall consistent with a pineal cyst. Postoperatively the Parinaud syndrome and headache resolved.

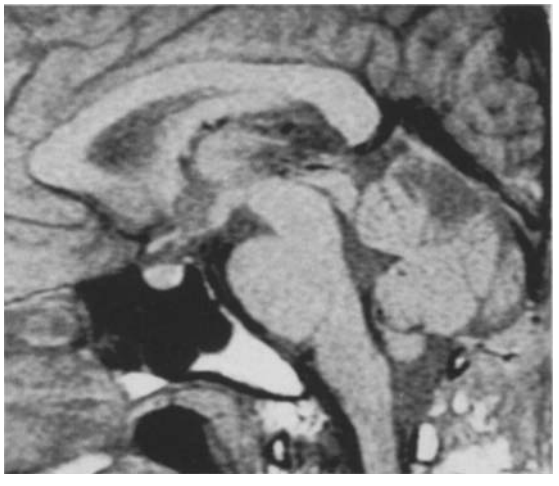

Fig. 3. Three-month postoperative T1 weighted sagittal image demonstrates no evidence of recurrent or residual mass. Note the encephalomalacic changes involving the superior vermis

A three-month postoperative MR scan demonstrated no evidence of recurrent or residual mass (Fig. 3).

Discussion

MR appears to be a more sensitive indicator of pineal cyst than CT [2]. An autopsy series described pineal cysts in up to 40% of specimens, but this included both microscopic and macroscopic cysts [1]. In a recent series of reports, it was found that the detection rate of pineal cysts with MR was only 1.4% to 4.3% [2-4]. The etiology of pineal cysts is not certain; they probably result from involutional changes within the pineal gland and appear to arise adjacent to glial plaques [1].

Hemorrhage in the pineal region may be secondary to tumors, cysts, or vascular anomalies [5-10]. In our review of the literature, only five pathologically proven cases of hemorrhagic pineal cysts were found [2, 5-8]. In one case, the intracystic hemorrhage was chronic. Hemosiderin laden macrophages lay within proteinaceous cyst fluid [2]. The remaining four hemorrhagic cysts were acute. Of the acute hemorrhages only two were evaluated with CT and none with MR [5, 8]. The last two patients had only pathological evaluation. In four patients, an anatomic cause of the intracystic hemorrhage was not identified, but in one patient, a small cyst wall vascular malformation was delineated pathologically [7]. One patient had been on anticoagulant therapy [6] and one patient had associated subarachnoid hemorrhage [5]. In the current patient, intraventricular hemorrhage was demonstrated microscopically; he had no coagulopathy.

Our patient had acute hemorrhage within the described pineal mass both on CT and MR. Preoperatively, differentiation between cyst and tumor was not made with certainty; however, the smooth, well-

defined, round appearance of the mass and the associated fluid/fluid levels were most suggestive of a cyst. MR best demonstrated the relationship of the cyst to adjacent structures, showed the marked effacement of the mesencephalic tectum especially well, and explained the Parinaud syndrome and obstruction of CSF outflow through the aqueduct of Sylvius.

In four of six reported cases, the etiology of the intracystic pineal hemorrhage remains unknown. A vascular malformation was proven pathologically in one patient and in another patient anticoagulation therapy may have complicated a simple pineal cyst. Our report illustrates a contemporary comparison of CT and MR in a patient who presented with a rare complication of pineal cyst. The scans allowed an accurate evaluation of the pathology, delineated the altered surgical anatomy, and eventually resulted in a good clinical result. MR evaluation three months after surgical removal of the cyst demonstrated no persistent or recurrent cyst or tumor.

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