

# A Spontaneous Ruptured Intracranial Dermoid Cyst in an Older Patient

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**Abstract:** Dermoid cysts are rare cystic tumors originating from ectodermic cells within the intracranial region. These cysts emerge during closure of the neural tube during embryological development. The symptoms are generally incidental and non-specific. If rupture occurs, the cyst contents propagate through the subarachnoid space and the ventricular system. The dramatic appearance of subarachnoid and cisternal fat droplets facilitates the diagnosis of dermoid cyst rupture by computer tomography and magnetic resonance imaging. Herein, we present a case of ruptured dermoid cyst in an elderly patient. The patient presented with minor symptoms such as nonspecific headache and dizziness; dermoid cyst rupture was diagnosed by observing the fat droplets disseminate into the subarachnoid and cisternal spaces that extend from the left cerebellopontine angle, adjacent to the left carotid channel, to the cavernous sinus, using computer tomography and magnetic resonance imaging.

**Key Words:** dermoid cyst, rupture, CT, MRI

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Dermoid cysts are caused by epithelial elements inside the neural tube during the closure of the neural tube between the third and fifth weeks of embryonic life. Dermoid cysts constitute <1% of all intracranial tumors. In these cases, the clinical history is related to the localization of the lesion; because of their slow growth, they can attain very large sizes without the patient showing any symptoms or findings.<sup>1,2</sup> Despite their benign nature and slow growth, patients with dermoid tumors have a high morbidity and mortality rate, especially when rupture occurs.<sup>1,3</sup> Ruptured dermoid cyst may cause many clinical symptoms including headache, nausea, vomiting, visual disturbances, dizziness, epilepsy, aseptic chemical meningitis, hemiparesis, mental changes, ventriculitis, vasospasms, increased intracranial pressure, hydro-

cephalus, and granulomatous arachnoiditis.<sup>2</sup> The ruptured intracranial dermoid cysts have a typical appearance on computer tomography (CT) and magnetic resonance imaging (MRI). On CT, these cysts are observed as low-density masses that contain fat and do not indicate any contrast involvement. On MRI, however, dermoid cysts are observed as hyperintense signals based on the fat content in T1-weighted images and at variable signal intensities depending on different components in the cysts in T2-weighted images. When ruptured, it is diagnostic to observe hyperintense fat particles in the T1-weighted images at the subarachnoid range and ventricular system and fat-liquid levels in the ventricular system.<sup>4,5</sup>

Herein, we present a case of ruptured dermoid cyst in an elderly patient, who presented with minor symptoms such as nonspecific headache and dizziness; the patient was diagnosed by observing the fat droplets disseminate into the subarachnoid and cisternal spaces that extend from the left cerebellopontine angle, adjacent to the left carotid channel, to the cavernous sinus, using CT and MRI.

## CASE REPORT

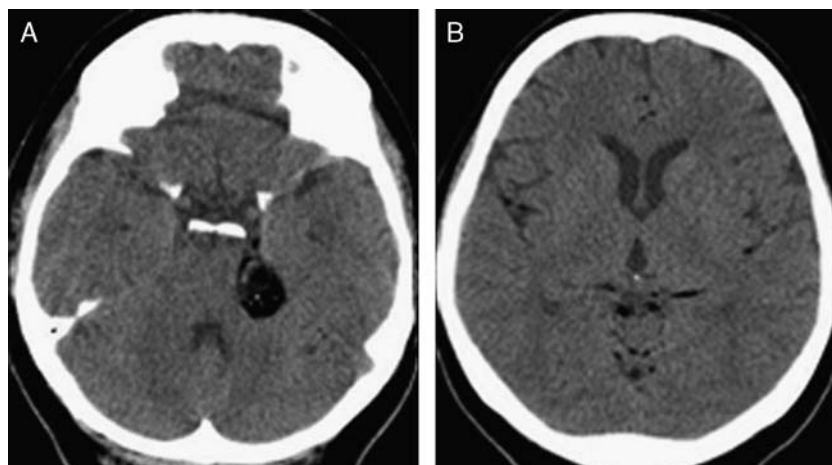
A 57-year-old, right-hand-dominant female patient presented to the emergency room with mild to moderate headache complaints at a vertex level after suffering from dizziness for approximately 3 hours; head movements increased this dizziness. After examining the patient's medical history, it was learned that the patient previously had similar short-term, mild dizziness. With no specificity on her medical background, the patient had a normal neurological examination. We found a dermoid cyst with a hypodense appearance and high fat density; a mild hyperdense calcification was observed anterior to the cyst. The CT showed that calcification began from the cerebellopontine cistern level and extended to the left cavernous sinus, adjacent to the carotid channel and cerebral sulcus and hypodense fat particles that disseminate into the quadrigeminal cistern were also observed to the left sylvian fissure secondary to the dermoid cyst rupture (Figs. 1A, B). Multiple hyperintense foci were observed as scattered droplets based on the heterogenic, hyperintense dermoid cyst in the left cerebellopontine cistern, and the cyst rupture in the left sylvian fissure, subarachnoid range, and the cisternal spaces on cranial MRI T1-weighted and T2-weighted images (Figs. 2A–D). Our patient, who had decreasing complaints after symptomatic treatment, was informed about the ruptured cyst complications, and surgical treatment began at regular intervals.

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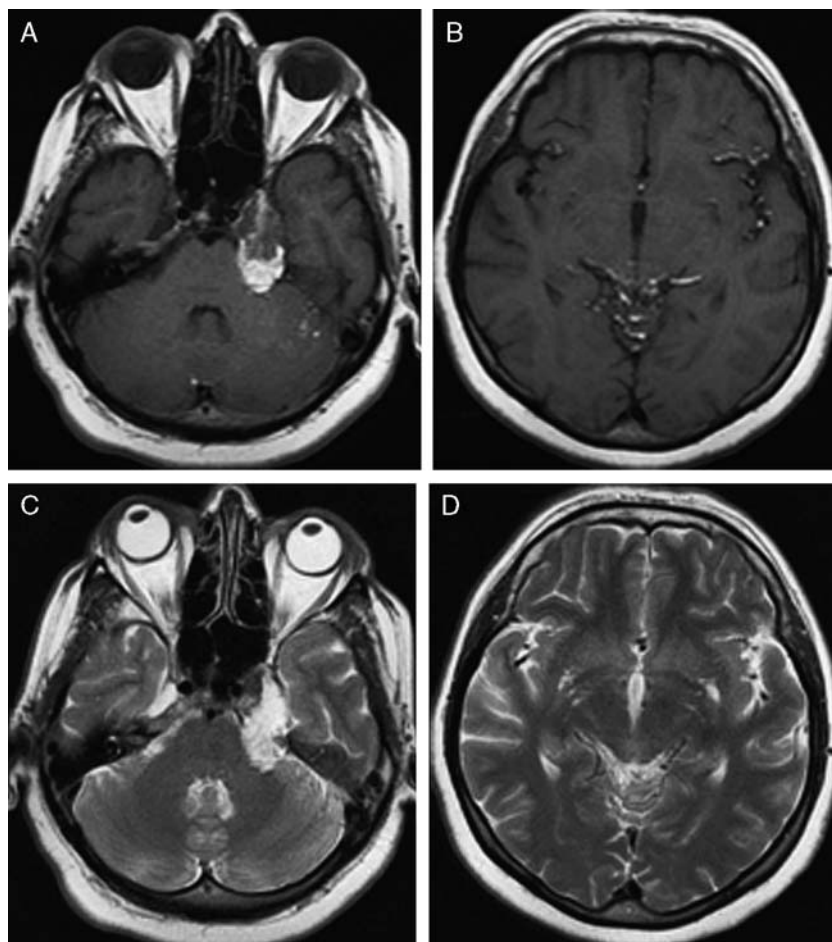
The authors declare no conflict of interest.

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**FIGURE 1.** A and B, A dermoid cyst in the left cerebellopontine cistern, and the hypodense areas of its rupture in the subarachnoid and cisternal spaces on CT. Because of its fat content, the hypodensity is more intense than the cerebrospinal fluid density. CT indicates computed tomography.



**FIGURE 2.** Disseminated hyperintense areas, suggesting a hyperintense dermoid cyst that extends from the left cerebellopontine cistern, adjacent to the left carotid channel, to the cavernous sinus (A and C), and rupture at the subarachnoid range including the quadrigeminal cistern, cerebellar sulci, and particularly in the sylvian fissures (A and B) seen on the T1-weighted and T2-weighted axial MRI images. Although the ruptured fat droplets are clearly seen on T1-weighted images because their hyperintense appearances, they cannot be clearly distinguished on FSE T2-weighted images (D). MRI indicates magnetic resonance imaging.

## DISCUSSION

Intracranial dermoid cysts usually grow slowly and are benign. Dermoid cysts are frequently asymptomatic; however, they may become symptomatic in an acute manner after rupture or infection.<sup>2</sup> Dermoid cysts are rarely ruptured. It may develop secondary to closed head traumas, and usually occurs spontaneously. The pathophysiology of the spontaneous rupture cannot be completely understood. However, it is hypothesized that these ruptures occur because of the impact of glandular secretions, head movements, and brain pulsation and because of the impact of age-dependent hormones.<sup>1,2,6</sup> In our case, there was no trauma history that could have affected the rupture, and the rupture occurred spontaneously. Intracranial dermoid cysts are frequently localized into the infratentorial area, near the midline and at the level of the fourth ventricle and the vermis.<sup>1</sup> In our case, the lesion extended to the left cavernous sinus, adjacent to the carotid channel, from the left cerebellopontine cistern. Dermoid cysts are typically found at an early age.<sup>7</sup> However, dermoid cyst rupture usually occurs in elderly individuals. In our case, diagnosis was made after spontaneous rupture in the fifth decade of life.

A ruptured intracranial dermoid cyst and its contents may disseminate to the ventricle and/or subarachnoid range and may lead to chemical meningitis, hydrocephalus, seizures, cerebral ischemia, and infarction.<sup>8</sup> The rupture rarely results in mild or no symptoms. Headache is often the presenting feature of a ruptured intracranial dermoid cyst. Our patient presented to the emergency room with headache and dizziness complaints. Although dermoid cyst rupture causes headache, this effect is rarely seen in advanced age groups. During follow-up, we did not find any neurological deficits or increase in the size of the cyst.

Although the fat amounts differ among the different cases of dermoid cyst, the fat observed inside the cyst has a diagnostic value.<sup>1</sup> On CT, fat has a hypodense appearance that is similar to cerebrospinal fluid. Calcification may also be found on the periphery of the lesion. In our case, the lesion was seen as hypodense on CT and contained calcification on the anterior section. On MRI examinations, it can be seen as hyperintense in T1-weighted images because of the fat content of the cyst and can likewise be seen as hyperintense in T2-weighted sequences because of the presence of cholesterol, which may

lead to a hypointense appearance.<sup>9</sup> In our case, it was seen as hyperintense on T1-weighted and T2-weighted images because of the excess potential fat content of the cyst.

During differential diagnosis, epidermoid tumor, craniopharyngioma, lipoma, and teratoma should also be considered. Specific features enable these diagnoses to be separated from those of dermoid cysts. Epidermoid cysts show diffusion restriction. There are solid components present in the teratoma. The craniopharyngioma shows contrast involvement, suppressed lipoma at fat-pulsurized sequences, and it has homogenous monitoring and produces chemical shift artifacts.<sup>10</sup>

Dermoid cysts are usually benign lesions with good prognosis. In cases of intact cysts, the primary tumor capsule and its contents need to be surgically removed and separated from the close neurovascular structures. In cases followed by Liu et al<sup>2</sup> by a series of MRI, no progression and movement of fat particles or new neurological deterioration were observed. Our case was given symptomatic medical treatment, and no progression was observed at her regular follow-ups. Herein, we presented a case of spontaneously ruptured intracranial dermoid cyst, which is rarely observed in elderly patients.

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