Dermoid Cyst Rupture Presenting as Subarachnoid Hemorrhage: Report of a Rare Case

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Abstract: Dermoid cysts are usually asymptomatic tumors and consist $<0.5\%$ of all primary intracranial tumors. Rupture of the cyst can occur spontaneously, due to head trauma or during the intraoperative or postoperative period. Although patients have been reported to be asymptomatic after cyst rupture, its etiology is not fully understood. Here, we present a 53-year-old male patient who was admitted to the emergency department with loss of consciousness following sudden onset of headache. He had a stiff neck on physical examination. Although complaints and findings suggested spontaneous subarachnoid hemorrhage, cranial computed tomography and magnetic resonance imaging demonstrated rupture of a dermoid cyst.

Key Words: inracranial dermoid cyst, rupture, sudden headache

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Intracranial dermoid cysts are quite rare inclusion cysts and are usually asymptomatic. They consist of $<0.5\%$ of all primary intracranial tumors. They are benign and slowly growing tumors that originate from the ectodermal cells within the intracranial region during closure of the neural tube between the third and the fifth week of embryonal life.[1] They can be symptomatic because of age-related hormonal changes, trauma, increased glandular secretions, infection, or rupture,[1] and only a few symptomatic patients with dermoid cyst rupture have been reported in the literature. Herein, we reported a 53-year-old male patient who was admitted to emergency department with loss of conscious following sudden onset of headache. Although we suspected for possibility of spontaneous subarachnoid hemorrhage, radiologic evaluations demonstrated the rupture of a dermoid cyst.

CASE REPORT

A 53-year-old male patient was admitted to the emergency department with complaint of loss of conscious following sudden onset of headache. He did not have any history of trauma or intracranial operation. He had a stiff neck and his neurological examination was normal. On cranial computed tomography (CT) scan, we detected a large heterogenous hypodense lesion, which extends from left of the sella turcica to the frontal region and multiple small hypodense lesions scattered to both the hemispheres. We hospitalized the patient with a diagnosis of dermoid cyst rupture (Figs. 1A, B). Cranial magnetic resonance imaging (MRI) demonstrated a heterogenous hyperintense lesion on both T_1-weighted and T_2-weighted images in the left sylvian fissure, which extended from the sella turcica to the frontal region. In addition, we detected hyperintense foci in the subarachnoid space on T_1-weighted images that was compatible with liquid cholesterol lesions (Figs. 2A, B). On diffusion MRI, prominent hypointense appearance was striking in the superior part of the lesion and hyperintense appearance was striking in the inferior part of the lesion (Fig. 3).

We decided to perform surgery and removed the tumor from the left sylvian fissure by pterional craniotomy. During surgery, we evacuated the lesion that was yellowish, nonbleeding, nonvascular, and moderately hard. Macroscopically, the lesion was pearly shiny and primarily consisted of the epidermoid cyst. We also detected hair that appeared consistent with the dermoid cyst in only one part of the tumor (Fig. 4). Postoperative period was uneventful. We observed total removal of the tumor on MRI on the first postoperative day (Fig. 5). On histopathologic examination, the cyst wall was made up of sebaceous glands and hair follicles beneath the squamous epithelium (left) and keratin lamella constituting cyst content (right). No neural tissue was observed owing to the removal of cyst with its capsule (Fig. 6).

On the first and third postoperative months, radiologic evaluations were normal and we did not determine additional neurological deficits.

DISCUSSION

Intracranial dermoid tumors are cystic benign tumors that are mostly encountered in the supra or parasellar cisterns and cerebellopontin angle cistern. They are rarely seen in the spinal canal and syrinx cavity and originate from the congenital epidermis and dermis remnants. They grow slowly. In addition, they are lined with the squamous epithelium and include skin tags such as hair follicles, sebaceous glands, nail, or teeth. They may lead to pressure on the neural structures as the result of increased glandular secretion and epithelial desquamation.[1] They may clinically be recognized with headache, seizures, and various neurological complaints depending on the location of the lesion. Aseptic meningitis,

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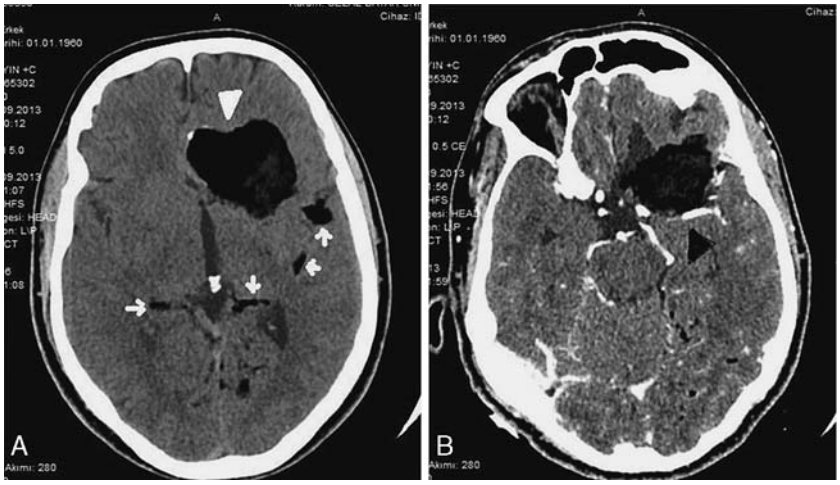

FIGURE 1. A, Cranial CT demonstrated homogenous hypodense mass lesion beginning from the sella turcica and extending to the frontal region (arrowhead) and multiple, hyperintense liquid cholesterol particles scattered in the subarachnoid space in both the cerebral hemispheres (small arrow). B, Lesions without contrast enhancement were seen on the contrasted cranial CT (arrowhead).

ventriculitis, cerebral vasospasm, and infarction due to the spread of the cysts content in subarachnoid space have been reported in the literature.[1,2] Stendel and colleagues reported that the cyst could enlarge and rupture owing to hormonal changes. Authors reported that, although rupture can occur iatrogenic during head trauma or surgery, spontaneous rupture is seen rarely.[3]

Liu et al[4] reported that headache (57%), seizures (42%), hydrocephaly (29%), vision disturbances (because of pressure on that optic chiasm 19%), and double vision (because of cavernous sinus compression 19%) are symptoms and indicated definitive diagnosis based on imaging methods. In the literature, many case reports were reported with different complaints and findings. Stendel et al[3] reported dermoid cyst cases with recurrent seizures. Wang et al,[5] Skovrlj et al,[6] and Asil et al[7] reported presenting symptoms such as chemical meningitis, vision disturbances, and vertigo, respectively. Park and Cho[8] reported a patient who had a rupture after trauma. Kim and Cho[9] reported a case who had subarachnoid hemorrhage as a result of aneurysmal rupture and dermoid cyst rupture. Togetherness of vasospasm in the cerebral vessels and dermoid cyst rupture were also reported. When the cyst is ruptured, contents spread into the subarachnoid space and irritate the

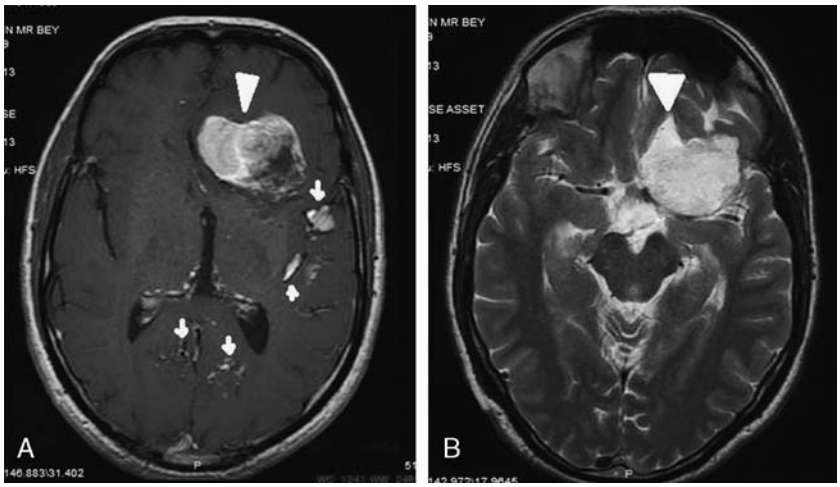

FIGURE 2. A, Axial T1-weighted image without gadolinium demonstrated the lesion from the sella turcica and extending to the frontal region with mixed signal intensity (arrowhead). Small arrows are showing hyperintense foci that indicate the presence of liquid cholesterol particles in the basal cisterns. B, Axial T2-weighted images demonstrated heterogenous hyperintense (because of fatty content and skin tags) lesion that begins from the sella turcica and extends to the frontal region (arrow).

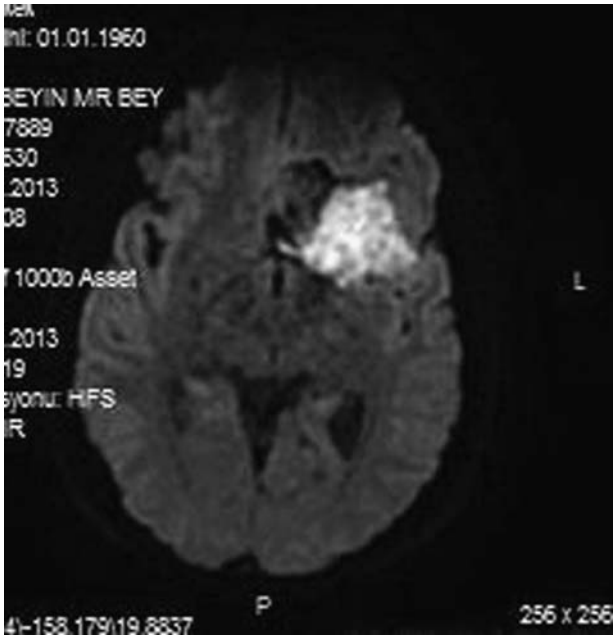

FIGURE 3. On diffusion magnetic resonance imaging, hypointense and hyperintense appearances are seen in the superior and inferior part of the lesion, respectively.

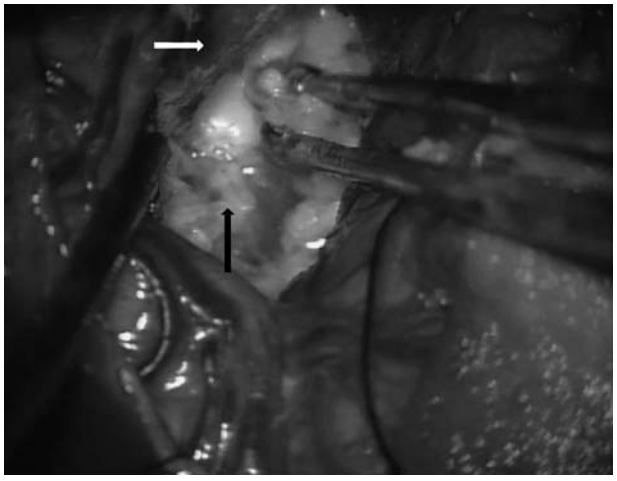

FIGURE 4. Intraoperative digital photograph demonstrated cyst capsule (white arrow) and yellow, nonbleeding, nonvascular, and moderately hard dermoid tumor (black arrow).

vessels by direct contact.[9] Our patient had headache, loss of consciousness, and stiff neck. Although we clinically suspected a subarachnoid hemorrhage, cranial CT and MRI did not determine the same and he had no sign of vasospasm. We thought these symptoms occurred because of chemical meningitis.

On cranial CT, dermoid cysts typically appear as little contrasting or noncontrasting hypodense lesions with sharp borders. They are usually homogenous lesions in the same density with cerebrospinal fluid. Calcification might be seen in the periphery of the lesion and this tomographic feature is seen 10-fold more than the epidermoid cysts.[3] In our case, there were noncontrasting lesions with sharp borders. On MRI, T1-weighted and T2-weighted images, dermoid cysts are seen as heterogeneous hyperintense lesions.[1] If the dermoid cyst ruptured, fat particles in the subarachnoid space and ventricular system are caused to best diagnose hyperintense appearances on T1-weighted images (Fig. 1). Although dermoid cyst ruptures were considered to be fatal in the past, widespread use of MRI showed that asymptomatic patients are more commonly contrary to the belief.[1,7] In a study on 7 patients, Smith et al[10] reported that MRI is not superior to CT in the diagnosis of ruptured dermoid cyst. However, preoperative MRI is superior for determination of the relationship of the tumor with adjacent tissues and its spreading.[11] Dermoid tumors are macroscopically hard, encapsulated, bright yellow lesions. Microscopically or macroscopically, they can contain glandular fat cells, hair follicles, and, rarely, tooth. They may lead to

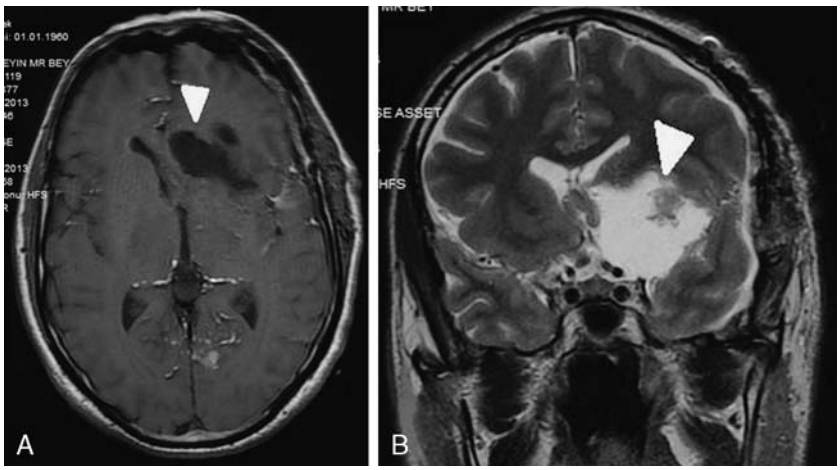

FIGURE 5. Postoperative axial (A) T1-weighted and (B) T2-weighted images without gadolinium demonstrated tumor lodge (arrowhead).

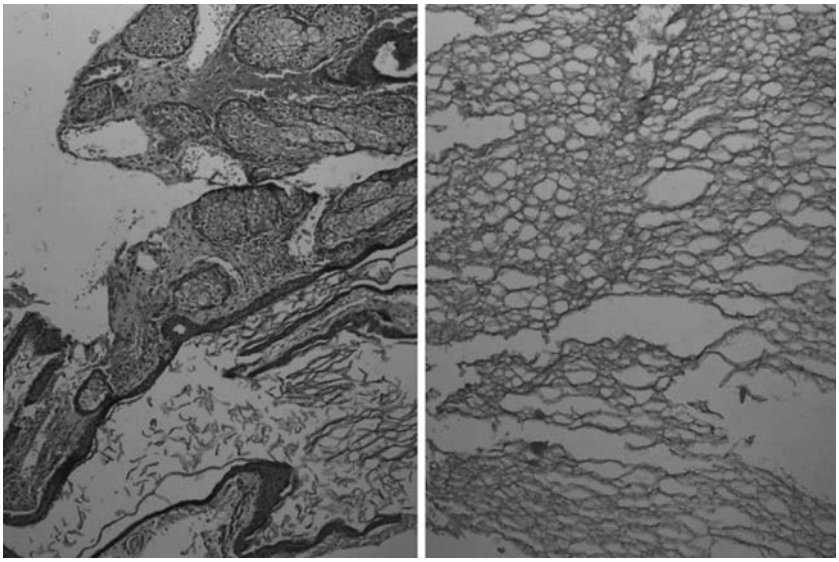

FIGURE 6. On histopathologic examination, the cyst wall was made up of sebaceous glands and hair follicles beneath the squamous epithelium (left) and keratin lamella constituting cyst content (right). No neural tissue is shown because of the removal of cyst with its capsule.

chemical meningitis when they are ruptured or spread into the cerebrospinal fluid after surgery. They are histopathologically benign tumors. However, malignant transformation was reported in 3 cases in the literature.[8] We observed a bright yellow, pearly, moderately hard, capsulated, and benign lesion after surgery (Fig. 4).

There are symptomatic cases with a ruptured single lesion in the literature. Yaldız et al[1] first reported a case of dermoid cyst rupture, which is nontraumatic and located multicentric foci. Epidermoid cyst, craniopharyngioma, lipoma, and teratoma should be considered in differential diagnosis. However, diffusion restriction of the epidermoid tumors, contrast enhancement of solid components of teratoma and craniopharyngioma, and suppression of lipomas in fat-suppressed sequences are the main characteristic features that distinguish them from dermoid cysts.[12]

CONCLUSIONS

(1) Dermoid cysts and their rupture have become more common with increasing use of MRI. Rupture can occur spontaneously or because of head trauma or during the intraoperative or postoperative period.
(2) In the presence of a rupture, sudden onset of headache and other symptoms can mimic complications of a subarachnoid hemorrhage, thus radiologic evaluations are required for definitive diagnosis.
(3) In differential diagnosis, epidermoid tumor, craniopharyngioma, lipoma, and teratoma should be kept in mind.

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