Case Report

Ruptured Intra-axial Dermoid Cyst of Brain

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Abstract

Dermoid cysts are rare intracranial tumors commonly located in the subarachnoid spaces. Intra-axial dermoid cysts are even rarer. Intracranial dermoid cysts are generally slow-growing and benign; symptoms result from the mass effect of these cysts. Rupture of intracranial dermoid with spillage of its contents into subarachnoid space and/or ventricles can lead to chemical meningitis, hydrocephalus, seizures, cerebral ischemia and infarction. Very rarely rupture may not be associated with any symptoms. We here present a case of spontaneous rupture of an intra-axial dermoid cyst in an adult patient that presented with headache and was diagnosed on the basis of dramatic appearance of intraventricular and cisternal fat droplets along with parenchymal fat containing lesion on CT and MRI.

Keywords: Intra-axial mass, dermoid cyst, fat droplets, ruptured dermoid, MRI

INTRODUCTION

Intracranial dermoids are uncommon neoplasms that arise from inclusion of ectopic embryonic rests of the ectoderm due to defects in closure of neural tube at around three to five weeks of embryonic development\(^{(5)}\). They comprise 0.2 to 1.8% of intracranial tumors and are usually found in the midline in contrast to epidermoids. Dermoid tumours show a slight male predominance, and most dermoid tumours are revealed during the second and third decades\(^{(1)}\). Common locations of intracranial dermoid include the parasellar and cerebellopontine angle cisterns. Dermoid cysts are composed of a thick fibrous capsule with a lining, of stratified squamous epithelium that encloses a thick viscous greenish brown fluid comprising of lipid metabolites, liquid cholesterol and whorls of hair; sebaceous or sweat glands are sometimes seen\(^{(1,5)}\). Intracranial dermoid cysts are

Özet


Anahtar Kelimeler: İntraaksiyel kitle, dermoid kist, yağ damlacıkları, yürütülmişdermoid, MRG
slow growing and usually cause symptoms because of mass effect\textsuperscript{(2,3)}. We report a rare case of intra-axial dermoid cyst of brain that was recognized after rupture with imaging by CT and MRI.

CASE PRESENTATION

A 21-year-old woman presented with history of continuous dull headache for about 2 months, which got relieved with analgesics. CNS examination was within normal limits. No sensorimotor deficits, no signs of raised intracranial tension or meningeal irritation were found. Laboratory investigations were within normal limits. CT scan showed a large hypodense mass without any calcification in the right temporal lobe with attenuation of the mass -22 to -37 Hounsfield units (HU); similar low attenuation foci were seen in the frontal horns of lateral ventricles (Figure 1). MRI showed a hyperintense signal intensity lesion on T1 weighted images with some hypointense signal intensity areas in the right temporal lobe of brain (Figure 2). Right temporal lobe lesion showed suppression of the hyperintense signal intensity on fat saturation T1W images (Figure 3). Frontal horns of lateral ventricles revealed hyperintense signal intensity anteriorly on T1W images compatible with spilled fat droplets with fat-fluid level (Figure 4). T2W fluid attenuated inversion recovery (FLAIR) coronal MR images showed hyperintense signal intensity lesion in the right temporal lobe of brain with hyperintense signal intensity contents in the frontal horns of the lateral ventricles (Figure 5). Hyperintense signal intensity lesion appeared to involve the surface of the right medial temporal lobe, extending across white matter into the temporal horn of lateral ventricle (Figure 5). Gray matter was not visible anywhere along the medial aspect of the fat containing lesion in the medial temporal lobe of right cerebral hemisphere (Figure 3,5). Predominance of fat contents within the ventricular system as compared to subarachnoid spaces on imaging suggested rupture from the medial aspect into the temporal horn of lateral ventricle. On the basis of the clinical presentation and the radiological images, a diagnosis of ruptured intra-axial right temporal lobe dermoid was made. At surgery, an intra-axial dermoid cyst with contents was evacuated from the right temporal lobe of brain, confirming the imaging findings. Fat was found at various locations in the CSF cisterns. Postoperatively, the patient showed significant improvement in headache. Patient is doing well one year after surgery.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure1.png}
\caption{Axial CT image of brain showing a fat attenuation mass in the right temporal lobe of brain and fat droplets in the frontal horns of lateral ventricles with fat-fluid level.}
\end{figure}
Figure 2: T1 weighted axial MR image of brain shows a hyperintense signal intensity intra-axial mass in the right temporal lobe of brain.

Figure 3: Fat suppressed T1W image shows loss of hyperintense signal intensity of the right temporal lobe mass compatible with a fat containing lesion. Lesion is extending from surface towards the temporal horn across white matter; no gray matter is seen medial to lesion.
Figure 4: Axial T1W image at the level of ventricles shows hyperintense signal intensity fat droplets in the frontal horns of lateral ventricles with fat-fluid level.

Figure 5: Coronal FLAIR image shows heterogenous hyperintense signal intensity mass in the right medial temporal lobe of brain with hyperintense signal focus in the frontal horn of right lateral ventricle. Hyperintense lesion is extending from surface of the medial temporal lobe into the temporal horn of lateral ventricle.
DISCUSSION

Although intracranial dermoid tumours develop from the embryonic period, symptoms may not occur until adulthood due to their slow growth. Patients with dermoid cysts may either be asymptomatic or present with seizures and other symptoms and signs due to compression of or irritative effect on the adjacent structures of brain\(^4\). Though located in the CSF cisterns, there is no communication between the cyst and the subarachnoid space. However, spontaneous, iatrogenic or traumatic rupture results in dissemination of lipid material from the dermoid tumours into the CSF\(^2,3\). After rupture of these cysts, the fatty content can disperse into the subarachnoid space cisterns and ventricles. Clinical manifestations in ruptured dermoid are very diverse and include aseptic meningitis, transient cerebral ischemia as a result of vasospasm, seizures, olfactory delusion and rarely rapidly developing hydrocephalus\(^3,5,6,7\). The relatively bright signal from fat on T1W MR images makes identification of lipid droplets easy within the cerebral sulci, CSF cisterns and ventricles resulting in consequent more frequent detection of asymptomatic spillage on MRI\(^8\).

CT scan typically shows an intracranial dermoid as a well-defined round hypodense mass lesion with fat attenuation and peripheral calcification. Dermoid tumours may sometimes show two distinct portions, a lipid one and a more solid or more fluid one\(^9\). In case of ruptured dermoid cyst fatty droplets are seen throughout the ventricles and subarachnoid space. A fat-cerebrospinal fluid (CSF) level may be seen in the frontal horns of lateral ventricles. The presence of disseminated fat droplets in the subarachnoid space or ventricles on imaging is diagnostic for a ruptured dermoid cyst\(^1,6,8,9\). A definitive diagnosis can be made by the characteristic features on CT scan. On MRI the fat can be seen as strongly hyper-intense signal on T-1 weighted imaging while the other tumor contents appear hypo-intense. Characteristically the tumor is often non-homogeneous due to its mixed composition. On T2 weighted imaging, the fat component turns slightly, hypo-intense similar to subcutaneous fat\(^1,5,6,8,9\). Typically intracranial dermoid is seen as a fat containing extra-axial or combined extra and intra-axial soft tissue mass on MRI. With rupture of the cyst high-signal droplets on T1 images may be seen throughout the CSF and fat-CSF fluid levels may also be seen. The fat/liquid levels correlate with the extent of spread of the lipid contents of the cyst. Although dermoid cysts do not enhance on contrast administration, the use of intravenous contrast medium makes diagnosis of a meningeal inflammation easier\(^1,5,8\). MRI is investigation of choice for preoperative diagnosis of intracranial dermoid and to assess the extent of subarachnoid spread. MRI allows multiplanar imaging, determines the exact extent of the mass and its relation to the skull base and depicts the associated vessel displacement and mass effect on adjacent structures\(^5,8\).

Symptoms due to rupture of intracranial dermoid are a response to the cholesterol rather than lipid content, and do not correlate with the time of rupture. Prognosis of patients depends on the spread of the contents and the time period after rupture. Mortality and morbidity from complications of intracranial dermoid rupture can be significantly reduced if diagnosed early on the basis of characteristic imaging appearance\(^2,5,8\). Thus, the dramatic appearance of intraventricular and cisternal fat droplets on CT and MRI of brain facilitates early diagnosis of dermoid rupture and avoids fatalities.
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