Epidermoid cysts are slow-growing benign tumors that represent less than 1–2% of all intracranial tumors. They are even rarer in supratentorial intraparenchymal location accounting for 2% of all intracranial epidermoid cysts. We present a rare case of pediatric supratentorial intraparenchymal epidermoid cyst with its variable radiographic features, surgical management, histopathology, and a review of the literature.

**Keywords:** Epidermoid cysts, intraparenchymal, pediatric

**INTRODUCTION**

Epidermoid cysts are slow-growing benign tumors that represent 1–2% of all intracranial tumors. The most common locations are the cerebellopontine angle (CPA), parasellar regions, or along the subarachnoid spaces of the basal cisterns. Less common locations are the middle cranial fossa, cranial diploe, spinal canal, brain stem, and

**CASE REPORT**

A 12-year-old boy presented to our outpatient clinic with sudden onset of one episode of generalized tonic–clonic seizures, followed by another episode 2 days later. No history of similar episodes, headache, vomiting, visual disturbances, cranial nerve involvement, motor weakness, or sensory disturbances was reported. Clinical examination was normal. EEG was suggestive of generalized epileptiform activity. Plain computerized tomography (CT) of the brain revealed well-defined irregular lobulated hyperdense (calcified) lesion in the right frontal lobe with areas of variable density indicative of necrosis and hemorrhage, with surrounding perilesional edema. On magnetic resonance imaging (MRI), lesion was found to be hypo- to isointense on T1, hyperintense on T2, peripheral contrast enhanced with non-enhancing center, and partially diffusion restricted [Figure 1]. With a provisional diagnosis of oligodendroglioma, the patient was taken up for surgery. Using a bicornoral flap, a right frontal craniotomy was performed, and then c-shaped durotomy was performed that was reflected medially. The lesion was visible superficially and was encountered at a depth of 1 cm. It was bony hard in consistency with well-defined margins. Gross total resection was performed. Gross specimen was globular bony hard, reddish white lesion [Figure 2]; cut section showed cystic areas filled with whitish material. Histopathological examination (HPE) showed cystic lesion with numerous cholesterol clefts with extensive areas of calcification and flakes of keratin along with fragments of sclerotic bony tissue, suggestive of calcified, ossified lesion probably an epidermoid cyst. Postoperative non-contrast CT showed no residual tumor [Figure 3]. Postoperative period was uneventful, with patient discharged on tenth post-operative day.

**DISCUSSION**

Epidermoid cysts are slow-growing benign tumors that represent 1–2% of all intracranial tumors. The most common locations are the CPA, parasellar regions, or along the subarachnoid spaces of the basal cisterns. Less common locations are the middle cranial fossa, cranial diploe, spinal canal, brain stem, and
Figure 1: (A) Plan CT of the brain showing hyperdense lesion in the right frontal lobe area of the hypodensity. (B) T1W image: hypointense. (C) T2W image: hyperintense. (D) Flair image. (E) Contrast; peripheral irregular contrast enhancement.

Figure 2: (A) Gross specimen. HPE image showing (B) keratin, (C) calcification, and (D) cholesterol clefts.
supratentorial intraparenchymal location. They grow slowly by desquamation of keratin, cholesterol, and accumulation of cellular debris producing symptoms due to compression of surrounding neurovascular structures. Intraparenchymal epidermoid cysts typically present with seizures and weakness and are much rarer, accounting for <2% of all intracranial epidermoid cysts. They are derived from the inward displacement of ectodermal tissue between fusing ectodermal surfaces during weeks 3–5 of embryologic development. Chandler et al. proposed that rest of ectodermal tissues may remain on either the inner or the outer surface of the neural tube, which would correlate with the occurrence of epidermoid tumors within the ventricles, the brain parenchyma, or on the surface of the brain.

Kaido et al. proposed that the timing of the sequestration determines the epidermoid cyst location. They hypothesized that sequestration of ectodermal elements during the third week of embryogenesis (development of the primary central vesicle) within the neural tube results in intraventricular or intraparenchymal epidermoid cysts. However, if sequestration occurs later (during the development of the secondary cerebral vesicles, otic or optic) the epidermoid would develop in the CPA, middle ear, or orbital regions. On CT and MRI, epidermoids are typical of cerebrospinal fluid density and nonenhancing. Typically, intraparenchymal epidermoid cysts on CT scan are found to be homogeneously hypodense because of their cholesterol and lipid content. Increased CT scan densities can occur due to excess nonlipids such as keratin and calcifications, as seen in our case. Common MRI findings in epidermoids are hypointense to isointense signal on T1-weighted images and hyperintense signal on T2-weighted images, as seen in our case. Diffusion-weighted imaging aids in the diagnosis of epidermoid cysts because it demonstrates a specific homogenous bright signal and diffusion restriction. Despite the characteristic imaging findings in epidermoid cysts, they are not always consistent or entirely specific. Intraparenchymal epidermoid cysts will not always demonstrate classic restricted diffusion, typically seen in extra-axial lesions. Complete surgical excision is the treatment of choice. The ideal goal of surgery when operating on epidermoid cysts would entail complete resection of the tumor capsule to prevent recurrences, but this is often not safe or feasible. In intraparenchymal epidermoid tumors, the cyst capsules can be thick and adherent to surrounding parenchyma. This can make dissection and complete resection particularly problematic in eloquent areas. Therefore, the goal becomes safe decompression while minimizing the amount of neurologic morbidity.

Although epidermoid cysts are benign, there have been rare reports of malignant transformations, particularly into squamous cell carcinoma.

**CONCLUSION**

The intraparenchymal epidermoid cysts are rare lesions, even more rare in pediatric age group. To the best of our knowledge, ours is probably the first reported case of supratentorial intraparenchymal epidermoid cyst in pediatric population. The radiologist and the neurosurgeon should be aware that they can present with atypical imaging features, which may mimic a more aggressive lesion. Intraparenchymal epidermoid cysts can be difficult to accurately diagnose preoperatively. Optimal surgical therapy, whenever possible, involves complete resection of the tumor capsule.

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**Conflict of interest**

There are no conflicts of interest.

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