

**Case study****Tectal pineal cyst in a 1-year-old girl**☆

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**Summary** Glial cysts of the pineal gland can frequently be found in adults and children, but only rarely do they enlarge to become clinically relevant. We report a unique presentation of a pineal cyst in the midbrain tectum of a 16-month-old girl who initially presented with ptosis and strabismus. Preoperative imaging studies and intraoperative findings revealed no continuity between the tectal cyst and the pineal gland proper. We surmise that this tectal pineal cyst may have arisen from duplicated pineal gland tissue.

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**1. Introduction**

Here we report a unique presentation of a pineal cyst in the midbrain tectum of a 1-year-old girl. The pineal cyst showed no radiologic or intraoperative evidence of continuity with the pineal gland proper. The possibility that this pineal cyst arose in duplicated pineal gland tissue in the midbrain tectum is discussed.

**2. Materials and methods****2.1. Case report**

A 16-month-old girl was referred to our institution for evaluation of a tectal mass and obstructive hydrocephalus. The patient was previously healthy and developmentally

normal until 13 months of age when she developed ptosis and strabismus in her right eye followed by ptosis and strabismus in her left eye. A brain magnetic resonance imaging (MRI) performed at 13 months of age showed an ovoid, 17 × 13 × 12 mm, rim-enhancing, cystic lesion in the midbrain tectum with adjacent edema (Fig. 1A and B). The cyst content was bright on T2 and remained bright with cerebrospinal fluid (CSF) suppression (T2 Fluid attenuated inversion recovery [FLAIR], not shown). The lesion was focally exophytic, splitting the posterior right tectal plate (Fig. 1C). Her ventricles were mildly enlarged, but there was no transependymal flow of CSF. Serum β-human chorionic gonadotropin and α-fetoprotein were negative, but CSF levels were reportedly not measured. Her parents were initially told that this was a brainstem tumor and palliative treatment was recommended. Subsequent follow-up at age 14 months revealed resolution of her left-sided ocular signs, but her right-sided ptosis and strabismus persisted. A repeat MRI showed stable ventricular sizes, but the lesion had increased in size to 21 × 17 × 15 mm. MRI spectroscopy of this lesion was reportedly consistent with normal tissue in the tectum. We first evaluated the patient at 16 months of age, at

☆ Conflicts of interest: None.

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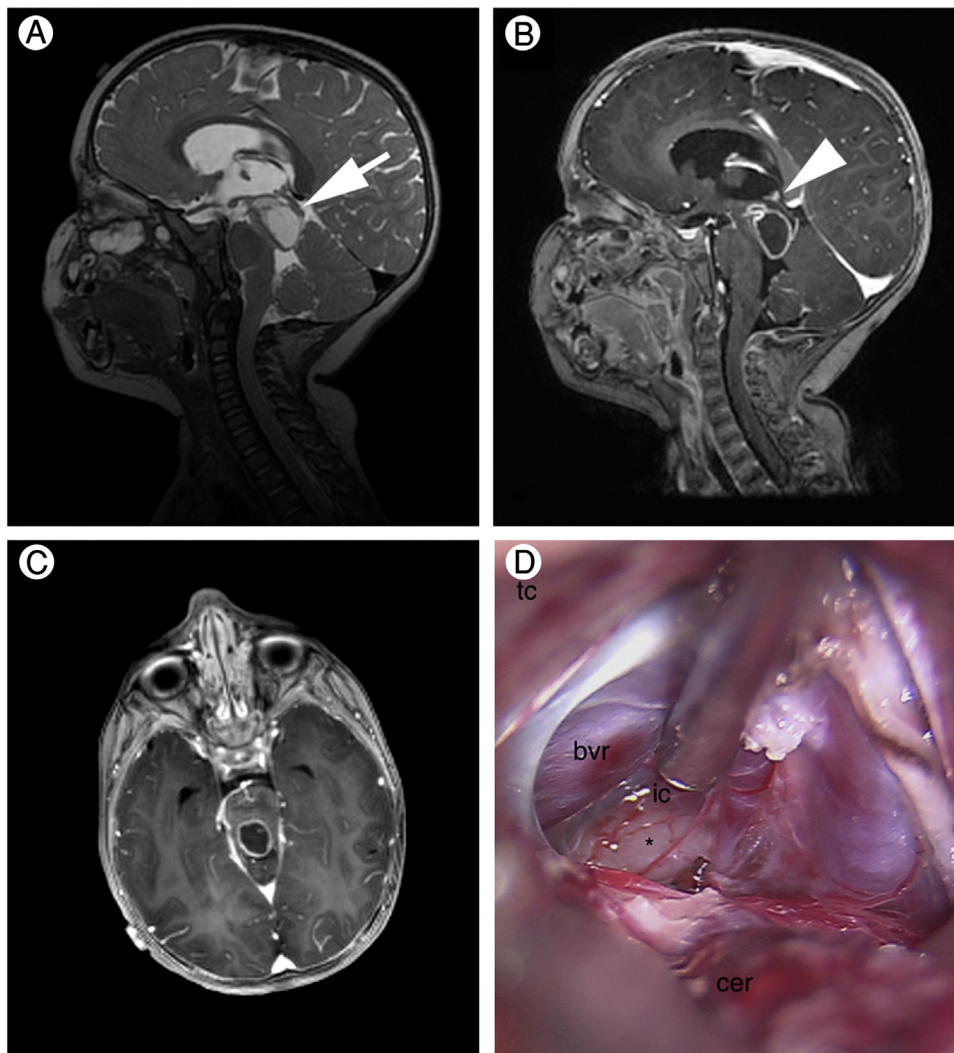
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which time her brain MRI showed that her tectal lesion had further enlarged to  $24 \times 21 \times 15$  mm and that her ventricles had noticeably increased in size. Operative intervention for diagnosis and relief of the hydrocephalus was planned.

The tectal mass was subtotally resected via a supracerebellar, infratentorial posterior fossa approach. Along the posterior aspect of the tectum, a tan-gray mass was noted. No direct relationship to the pineal gland was seen. As the mass was entered, clear fluid drained from the cyst. Biopsy samples from the cyst wall were obtained. To prevent future fluid accumulation, the posterior wall of the mass was resected to the border of normal brainstem. A postoperative MRI showed decreased ventriculomegaly and reduction in the size of the cyst.

## 2.2. Histologic processing

Intraoperative smear and frozen sections were stained with hematoxylin and eosin. The tissue biopsies were then routinely processed for paraffin embedding. Tissue sections ( $5\text{-}\mu\text{m}$  thickness) were stained with hematoxylin and eosin. After antigen retrieval with citrate buffer, additional sections were blocked with Power Block (Biogenex, Fremont, CA), stained via immunoperoxidase reactions (diaminobenzidine kit; Biogenex), and counterstained with hematoxylin. The following primary antibodies were used in the immunoperoxidase reactions: synaptophysin (Cell Marque, Rocklin, CA; CMC111, 1:80), glial fibrillary acidic protein (GFAP; Dako, Carpinteria, CA; Z0334, 1:2000), neurofilament (clone 2 F11;



**Fig. 1** Cystic tectal lesion in a 1-year-old girl. A, Sagittal T2 image demonstrating the cystic lesion in the midbrain tectum and the lack of quadrigeminal plate compression by a pineal recess lesion (arrow). The cyst content was subtly hypointense relative to CSF and was bright after CSF suppression on FLAIR (not shown). B, Sagittal T1 with contrast showing a regular thin rim of contrast-bright tissue around the midbrain cyst and no continuity with the pineal gland (arrowhead). The pineal gland measured  $4 \times 3$  mm in the sagittal plane. C, Axial T1 with contrast showing compression of the right midbrain tegmentum and focal dehiscence of the tectal plate by the cystic lesion. D, Intraoperative view of the abnormal tan-gray tissue (asterisk) emanating from the posterior tectal plate. There is no evidence of extension or contiguity of the lesional tissue toward the more dorsal pineal region. Abbreviations: bvr, basal vein of Rosenthal; cer, cerebellum; ic, internal cerebral vein; tc, tentorium cerebelli.

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