

## Image Diagnosis: Arachnoid Cyst

Andrew C Karnazes; Jonathan Kei, MD, MPH; Minh V Le, MD

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## CASE STUDY

A 14-year-old boy with no significant medical history presented to the Emergency Department (ED) for evaluation with 3 months of generalized headache. He had seen his primary care physician for the same problem a few weeks earlier, and the ibuprofen he was told to take had not seemed to improve his symptoms. The patient reported his headaches had increased in intensity and frequency, with associated lightheadedness, in the 2 weeks before presentation to the ED. The patient denied drug or alcohol use and stated that he never got headaches. He also denied any fevers, neck stiffness, shortness of breath, abdominal pain, diarrhea, visual changes, focal weakness, or speech disturbances. However, nausea and vomiting started a day before presenting to the ED. The patient's mother witnessed the patient having a syncopal episode upon standing, which led her to bring him to the ED.

On arrival, the patient was afebrile and his blood pressure, pulse, respiratory rate, and oxygenation were all normal. Physical exam found the patient was in no acute distress, his neck was supple, and his cranial nerves were grossly intact, including normal pupils. In addition, he had 5/5 strength bilaterally in his upper and lower extremities, a normal gait, and normal cerebellar function. The rest of his physical examination was unremarkable, and there was no family history of central nervous system processes. Laboratory test results, including complete blood count and basic metabolic panel, were all normal.

Although the patient had a normal physical exam, the clinical features in his history of a chronic progressive headache pattern and associated vomiting in the context of never getting headaches, along with a lack of response to outpatient medical therapy, suggested the possibility of an intracranial mass or bleed. We obtained a computed tomography scan of his brain without intravenous contrast, which showed a large extra-axial cystic lesion causing mass effect with effacement of the right lateral ventricle and brain shift to the left (Figures 1 and 2). We diagnosed the lesion as an arachnoid cyst and admitted the patient to the hospital. Magnetic resonance imaging of the brain was performed during his hospitalization and confirmed the diagnosis of an arachnoid cyst.

Because of the associated symptoms, size of the cyst, and mass effect seen in this case, the patient underwent

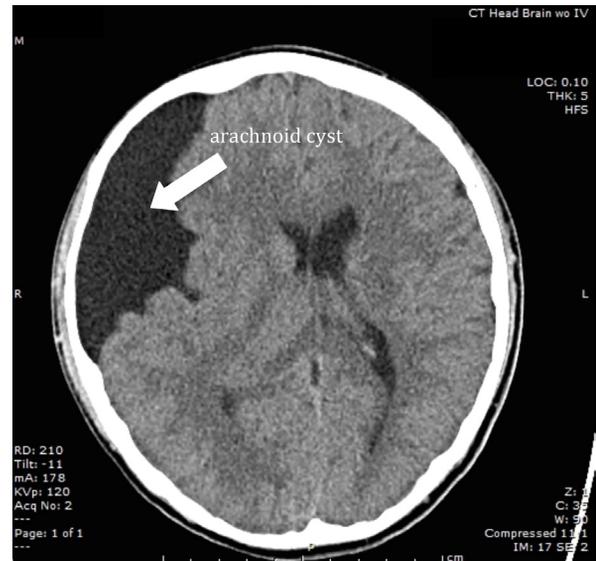


Figure 1. Axial view computed tomography scan of the head and brain without intravenous contrast, showing the arachnoid cyst with mass effect and brain shift to the left.

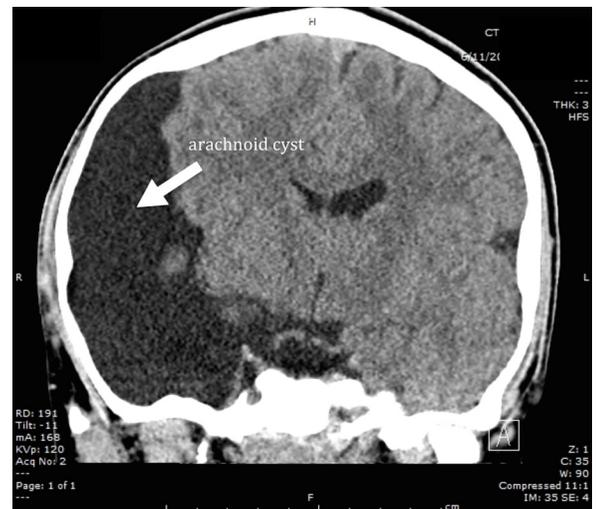


Figure 2. Sagittal view computed tomography scan of the head and brain without intravenous contrast, showing arachnoid cyst with mass effect and brain shift to the left.

Andrew C Karnazes, is a Premedical Student and a Scribe in the Emergency Department at Mission Hospital Regional Medical Center in Mission Viejo, CA. E-mail: akarnaze2123@gmail.com. Jonathan Kei, MD, MPH, is an Emergency Physician at the San Diego Medical Center in CA. E-mail: jonathankei@kaiser-ed.com. Minh V Le, MD, is an Emergency Physician at Mission Hospital Regional Medical Center in Mission Viejo, CA. E-mail: mvanle@gmail.com.

endoscopic fenestration of the arachnoid cyst during his hospital stay. The neurosurgery was uneventful and reconfirmed the diagnosis of a primary arachnoid cyst. The patient fully recovered with no further sequelae.

## DISCUSSION

Localized within the layers of the arachnoid membrane, arachnoid cysts are benign lesions that are prevalent in about 1% to 2% of both pediatric and adult populations.<sup>1-2</sup> Sixty percent to 80% of these malformations are diagnosed in patients under 16 years of age<sup>3</sup> with the largest proportion recognized in the first 2 years of life.<sup>4</sup> Primary arachnoid cysts result from developmental abnormalities arising in the brain and spinal cord during the early weeks of gestation.<sup>5</sup> Secondary arachnoid cysts, however, are more rare and develop as a result of head injury, meningitis, or tumors, or as a complication of brain surgery.<sup>5</sup>

The vast majority of individuals with arachnoid cysts remain asymptomatic throughout their lifetime, though expanding cysts that exert mass effect on the brain may produce clinical symptoms and ultimately require surgical intervention. Associated symptoms may include headache, nausea and vomiting, seizures, hearing and vision disturbances, vertigo, and difficulties with balance and walking. Computed tomography and magnetic resonance imaging are the preferred modalities for diagnosis. Surgical decompression and removal of these cysts can be done with a burr hole, craniotomy, shunt placement, or endoscopic fenestration depending on the size and location of the cyst.<sup>6</sup>

Headaches in the pediatric population tend to be self-limited and of benign origin.<sup>7</sup> However, physicians should always be aware of concerning clinical features such as a sudden severe headache, persistent nausea or vomiting, a

worsening progressive pattern of symptoms, altered mental status, ataxia, and papilledema, which may indicate severe intracranial pathology requiring more emergent neuroimaging and intervention.<sup>8,9</sup> ❖

## Disclosure Statement

*The author(s) have no conflicts of interest to disclose.*

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