

## CLINICAL VIGNETTE

# Arachnoid Cyst: A Case Study

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### *Case Report*

A 57-year-old female with past medical history significant for a nonsecretory pituitary adenoma resected 7 years prior, presented with increasing confusion and mood disturbance. Upon a more detailed interview, her son had noticed increasing forgetfulness starting 2 years prior along with increasing impulsiveness and rudeness. Over the last several months however, these symptoms had become more acute. The patient became lost while driving and was stopped by policemen when she was found to be driving on the wrong side of the road.

She was eventually seen by a neurologist and diagnosed with early Alzheimer's disease. She was placed on memory enhancement medications, the names of which could not be recalled. Her symptoms continued to deteriorate prompting presentation to her primary care physician for full evaluation.

Past medical history was significant for a nonsecretory pituitary adenoma, which was successfully treated surgically. Her most recent MRI scan for surveillance of the pituitary tumor could not be located. Her other medical problems included non-insulin dependent diabetes, hypertension, and hypercholesterolemia. Outpatient medications included metformin, memantine, amlodipine and aspirin.

The patient is Korean and travels to Korea every 2-3 years, without other significant travel. She is a non-smoker and does not drink. Family history is negative for malignancies.

### *Physical Examination*

She was alert and fully oriented. Vital signs were within normal limits. Cranial nerves 2-12 were intact. Motor function was intact in upper

and lower extremities bilaterally. Mental status was abnormal as she was unable to concentrate. She was easily distracted and could not perform simple calculations, or spell "WORLD" forward or backward. She was not able to comply with visual field testing or cerebellar testing. Her speech was slow and often halting. The rest of her physical examination is within normal limits, including gait testing.

### *Initial Laboratory Values*

White Blood Cell Count  $6.91 \times 10^3/\mu\text{L}$ , Hemoglobin 14.2 g/dL, Hematocrit 41%, Platelet 255,000. Sodium 141, Potassium 3.1, Bicarbonate 102,  $\text{CO}_2$  28, BUN 13, Creatinine 0.5, Glucose 141.

MR imaging demonstrated a 7.5 x 6.3 cm cystic lesion without enhancement, as well as significant mass effect with compression of the lateral ventricles and midline shift of 16 mm. No significant edema is appreciated. The lesion does not reveal DWI restriction.

### *Treatment Course*

Patient was hospitalized with infectious disease and neurosurgery services consulted. There was concern for a possible parasitic infection including neurocysticercosis and therefore the patient received 4 days of therapy with albendazole (400 mg twice a day) with close neurologic monitoring. Meanwhile, laboratory checks for infectious sources including neurocysticercosis eventually returned negative. Subsequently the patient underwent neurosurgical resection of the mass. Pathology from the resection revealed an arachnoid cyst. Postoperative MRI imaging revealed a gross total resection of the arachnoid cyst and the patient was discharged home three days later.

The patient recovered back to her baseline status approximately one month after surgery. Her follow-up MRI scan 6 months later revealed no unusual findings other than postoperative changes.

### **Discussion**

Arachnoid cysts are benign cysts that occur on the arachnoid membrane which covers the spinal cord and brain. They do not communicate with the ventricular system. They usually contain clear fluid that resembles normal cerebrospinal fluid<sup>1</sup>. The severity of symptoms is determined by the size and location of the lesion.

Most arachnoid cysts are developmental anomalies although a small number of arachnoid cysts are acquired, such as those occurring in association with neoplasms, or potentially meningitis. They constitute approximately 1% of intracranial masses and 50-60% occur in the middle cranial fossa<sup>2</sup>. Arachnoid cysts also occur within the spinal canal; in such cases and they are commonly located dorsal to the cord in the thoracic region.

Arachnoid cysts are frequently misdiagnosed, because symptoms are nonspecific. Often, the cysts are an incidental finding on magnetic resonance imaging (MRI). Usually, arachnoid cysts are asymptomatic and can remain asymptomatic even if cysts grow quite large. The most commonly associated clinical features are headache, calvarial bulging, and seizures.

Some clinicians advocate treating only patients with symptomatic cysts, whereas others believe that even asymptomatic cysts should be decompressed to avoid future complications. Cysts that cause symptoms from cord compression are best evaluated with MRI. Surgical options include<sup>1</sup> craniotomy with resection of the cyst walls and marsupialization into the subarachnoid space, basal cisterns, or ventricles<sup>2</sup>; shunting procedures<sup>3</sup>; stereotactic aspiration or fenestration of the cyst cavity<sup>4</sup>; neuroendoscopic fenestration<sup>3-5</sup>. One study of 32 cases reported control in over 80% of cases with surgical excision and marsupialization of symptomatic cases<sup>6</sup>.

Because arachnoid cysts are rare, other conditions should be considered in the differential diagnosis when treating a patient

with a benign, cystic appearing brain mass. Neurocysticercosis is the most commonly seen infectious cause, and intracranial abscesses can also present with similar radiographic findings. Neurocysticercosis refers to CNS infection with *Taenia solium* and is probably the most common parasitic infestation of the CNS. It has gained

increased recognition in the last two decades because of the development of MRI and CT scanning in the United States and in countries where neurocysticercosis is endemic. Approximately 1,000 new cases of cysticercosis are reported annually in the United States. Most occur among Latin American immigrants in locations such as California, Phoenix, Albuquerque, and other areas of the southwest United States. Neurocysticercosis is one of the leading causes of adult-onset seizures and is estimated to cause as many as 50% of adult-onset seizure cases in developing countries where *Taenia solium* is endemic<sup>7</sup>.

Intracranial abscesses are uncommon, but potentially life-threatening infections. They include brain abscesses and subdural or extradural empyemas. Intracranial abscesses can originate from infection of contiguous structures (eg, otitis media, dental infection, mastoiditis, sinusitis) or secondary to hematogenous spread from a remote site. They can also occur after skull trauma or surgery, and, rarely, following meningitis. In at least 15% of cases, no source can be identified<sup>8</sup>.

### **Conclusions**

Arachnoid cysts, while rare in terms of space occupying lesions in the brain, can present with impressive radiographic findings and often with significant clinical findings as illustrated in this case. Infectious etiologies should also be considered in the differential diagnosis. Treatment for arachnoid cysts remains controversial but surgical excision and marsupialization can provide good results. Advances in instrumentation may allow for more endoscopic management in the future. The approach to therapy however is usually based on the cystic characteristics of the lesion and the surgeon's experience.

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Submitted on August 9, 2013