Mystery of Arachnoid Cysts

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Key points:

- Introduction
- Causes of Arachnoid Cyst
- Symptoms
- History
- Treatment Options
- Conclusion

Introduction

Arachnoid cysts are fluid-filled sacs of the arachnoid layer containing content that may be similar or not similar to cerebrospinal fluid. It is not an actual neurodegenerative disorder.[1]

Arachnoid cysts are non-cancerous. They are usually asymptomatic; however, large arachnoid cysts are symptomatic because they compress the surrounding structures. Therefore, they must be treated surgically. There are several surgical options available, and healthcare providers determine the best approach depending on the type of arachnoid cysts, including middle cranial fossa cysts, suprasellar cysts, intrahemispheric cysts, and quadrigeminal cysts.[1]

Causes of Arachnoid Cyst

Arachnoid cysts are often incidental findings on MRI or CT scans of the brain. Their causes are still not fully understood, but here are four major possible reasons:[2]

1. A ball-valve mechanism; this means fluid can enter the cyst but cannot leave, causing the cyst to enlarge.
2. An osmotic gradient between the intra- and extra-cystic medium; this means there is a difference in the concentration of fluid inside and outside the cyst.
3. Primary malformation; this means the cyst may be present from birth.
4. Fluid hypersecretion by the lining cells of the cyst wall; this means the cells of the cyst wall produce fluid.

There is stronger evidence supporting the last two theories than the first two.

Symptoms

Possible symptoms include:

- Back pain
- Dizziness
- Fatigue
- Headache
- Muscle spasms
- Nausea and vomiting
- Seizures

Common locations for the cyst include:

- In front of the ears (middle fossa region)
- Behind the eyes (suprasellar region)
- At the base of the skull (posterior fossa)

With a prevalence of approximately 1–2% and a male predominance, these cysts most commonly occur in the Sylvian fissure and posterior fossa of the brain. The cysts are found primarily in Asia, Europe, and North America.

Prevalence and Natural History of Arachnoid Cysts in Adults

Arachnoid cysts are mostly a random finding on intracranial imaging. The prevalence and natural history of these cysts are not well defined. In one study, 48,417 patients underwent brain MRI. Arachnoid cysts were identified in 661 patients, with a high male predominance. Multiple arachnoid cysts occurred in 30 patients. The most common locations were the middle fossa, especially on the left side (34%), retrocerebellar (33%), and convexity (14%). Only two patients developed new or worsening neurological symptoms during the follow-up period.[5]

Microstructure and Origin of Disease

The microstructure of arachnoid cysts was studied by comparing four cases with normal arachnoid tissue. The distinguishing features were:[3]

- Splitting of the arachnoid membrane at the edge of the cyst.
- A very thick layer of collagen in the cyst wall.
- Lack of traversing trabecular processes within the cyst.

Therapy and Healing Options for Arachnoid Cyst

A series of 209 cases with arachnoid cysts was reviewed. The cysts were treated with open surgery for fenestration, endoscopic fenestration, or cystoperitoneal shunting. Results showed that cystoperitoneal shunting was the best method for achieving early obliteration of the Sylvian cyst because 176 out of 209 arachnoid cysts reduced in size. However, it carries a risk of other complications. Therefore, healthcare providers generally prefer endoscopic or minimally invasive procedures to avoid complications associated with cystoperitoneal shunting. These approaches have shown nearly the same outcomes as shunting in reviewed case series.[4]

Conclusion

As the title suggests, the "Mystery of Arachnoid Cysts" remains unresolved. Based on the information above, the causes, symptoms, and effects of arachnoid cysts are still not fully understood. They are often incidental findings on MRI and CT scans. In many cases, they remain asymptomatic and do not pose a life-threatening condition in most cases.

References

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