

# Arachnoid pathology in neurological disorders: Insights and implications.

Bugdadi Parker\*

Department of Neurosurgery, Bicêtre University Hospital, Kremlin-Bicêtre, France

## Introduction

The arachnoid is one of the three layers that make up the meninges, a protective covering surrounding the brain and spinal cord. Positioned between the dura mater (outermost layer) and the pia mater (innermost layer), the arachnoid membrane is a thin and delicate structure that plays a crucial role in the protection and support of the central nervous system. The name "arachnoid" is derived from its web-like appearance, resembling a spider's web when viewed under a microscope. It consists of a thin, avascular layer composed of fibrous tissue and is responsible for several important functions within the central nervous system [1].

One of the primary functions of the arachnoid is to provide a barrier and support for the Cerebrospinal Fluid (CSF) that surrounds the brain and spinal cord. The arachnoid membrane forms a loose sac-like structure called the arachnoid mater, which encases the brain and spinal cord. It creates a space known as the subarachnoid space, where CSF circulates, providing protection, buoyancy, and a medium for the exchange of nutrients and waste products. The arachnoid membrane is also responsible for the production and absorption of CSF. It contains specialized structures called arachnoid granulations or arachnoid villi, which protrude into the dural venous sinuses. These granulations allow for the absorption of CSF back into the bloodstream, maintaining the balance of CSF volume and pressure [2].

While the arachnoid is generally smooth and avascular, it can develop certain pathological conditions. Arachnoid cysts, for example, are fluid-filled sacs that may form within the arachnoid membrane, potentially leading to neurological symptoms. Arachnoiditis, on the other hand, is a rare condition characterized by inflammation of the arachnoid, often causing chronic pain and neurological dysfunction. Understanding the structure and function of the arachnoid is crucial in diagnosing and treating various neurological conditions. Medical imaging techniques such as MRI and CT scans are employed to visualize the arachnoid and detect any abnormalities. In neurosurgical procedures, the arachnoid must be carefully handled to prevent damage to the delicate structures beneath [3].

The treatment of arachnoid-related conditions depends on the specific disorder or issue present. Here are some treatments commonly used for certain arachnoid-related conditions:

**Arachnoid cysts:** Treatment for arachnoid cysts may not be necessary if they are small, asymptomatic, and not causing any complications. However, if the cyst is causing symptoms or enlarging, treatment options may include surgical intervention. The goal of surgery is to drain or remove the cyst, relieving pressure on the surrounding structures.

**Arachnoiditis:** Arachnoiditis is a challenging condition to treat, and there is no cure. Management typically involves a multidisciplinary approach aimed at controlling symptoms and improving the patient's quality of life. Treatment options may include pain management techniques such as medications, physical therapy, nerve blocks, spinal cord stimulation, and psychological support [4].

**Arachnoid hemorrhage:** Treatment for arachnoid hemorrhage depends on the underlying cause and severity of the bleeding. If the hemorrhage is due to a ruptured aneurysm or Arterio Venous Malformation (AVM), emergency medical intervention may be necessary, such as surgical clipping or endovascular coiling to prevent further bleeding. Supportive care, including pain management and close monitoring, is also essential.

**Other arachnoid-related conditions:** Treatment for other arachnoid-related conditions, such as arachnoid cystic and fibrotic adhesions, will vary depending on the specific symptoms and complications involved. Conservative management options may include medication to alleviate symptoms, physical therapy, and lifestyle modifications. In some cases, surgical intervention may be required to address complications or remove fibrotic adhesions.

It's important to note that the treatment approach for arachnoid-related conditions should be determined by a healthcare professional with expertise in neurology or neurosurgery. They will evaluate the individual's specific condition, symptoms, and medical history to recommend the most appropriate treatment options [5].

## Conclusion

The arachnoid is a crucial component of the meninges, providing protection and support to the central nervous system. It plays a vital role in the circulation and absorption of Cerebrospinal Fluid (CSF) and serves as a barrier between the brain and spinal cord. Arachnoid-related conditions, such as arachnoid cysts, arachnoiditis, and arachnoid hemorrhage, require specific treatment approaches depending on the nature

---

\*Correspondence to: Bugdadi Parker, Department of Neurosurgery, Bicêtre University Hospital, Kremlin-Bicêtre, France. E-mail: bugdadiparker@hotmail.com

Received: 02-Apr-2023, Manuscript No. AAJNNR-23-104599; Editor assigned: 05-Apr-2023, Pre QC No. AAJNNR-23-104599(PQ); Reviewed: 19-Apr-2023, QC No. AAJNNR-23-104599; Revised: 22-Apr-2023, Manuscript No. AAJNNR-23-104599(R); Published: 27-Apr-2023, DOI: 10.35841/ajnmr-8.3.143

and severity of the condition. Treatment options range from conservative management techniques, such as medication and physical therapy, to more invasive interventions like surgical procedures. The goal of treatment is to alleviate symptoms, prevent complications, and improve the patient's overall well-being. Managing arachnoid-related disorders often requires a multidisciplinary approach involving healthcare professionals specializing in neurology, neurosurgery, pain management, and rehabilitation. These experts collaborate to develop personalized treatment plans tailored to the individual's needs, taking into account their symptoms, medical history, and overall health. Continued research and advancements in medical technology contribute to a better understanding of arachnoid-related conditions and the development of more effective treatment strategies. By focusing on early detection, appropriate intervention, and comprehensive care, healthcare providers strive to optimize outcomes and enhance the quality of life for individuals affected by arachnoid disorders.

## References

1. Frič R, Eide PK. Chiari type 1—a malformation or a syndrome? A critical review. *Acta Neurochir.* 2020;162:1513-25.
2. Holly LT, Batzdorf U. Chiari malformation and syringomyelia: JNSPG 75th anniversary invited review article. *J Neurosurg Spine.* 2019;31(5):619-28.
3. Kondety SK, Chatterjee S. Acquired Chiari malformation secondary to tuberculous arachnoiditis of the lumbar spine. *Neurol India.* 2016;64(5):1066.
4. Perrini P, Benedetto N, Tenenbaum R, et al. Extra-arachnoidal cranio-cervical decompression for syringomyelia associated with Chiari I malformation in adults: technique assessment. *Acta Neurochir Suppl.* 2007;149:1015-23.
5. McCullough GA. Arachnoid calcification producing spinal cord compression. *J Neurol Neurosurg Psychiatry.* 1975;38(11):1059-62.