

A **subpial hematoma** is a type of bleeding that occurs beneath the pia mater, which is one of the three layers of the meninges surrounding the brain and spinal cord. The meninges are composed of three layers:

1. **Dura mater**: The tough, outermost layer. 2. **Arachnoid mater**: The middle layer, which has a web-like structure. 3. **Pia mater**: The delicate, innermost layer that closely adheres to the surface of the brain and spinal cord.

A hematoma is a collection of blood outside of blood vessels, usually as a result of a traumatic injury or vascular rupture. In the case of a subpial hematoma, the blood accumulates beneath the pia mater, directly over the surface of the brain or spinal cord tissue.

Causes of Subpial Hematoma

Subpial hematomas are relatively rare and can result from various causes, including:

- **Traumatic brain injury**: Direct trauma to the head can cause blood vessels to rupture beneath the pia mater.
- **Vascular malformations**: Conditions such as arteriovenous malformations (AVMs) or aneurysms ¹⁾ can predispose individuals to spontaneous bleeding.
- **Neurosurgical procedures**: Hematomas can sometimes occur as a complication of brain surgery.
- **Coagulopathies**: Blood clotting disorders or the use of anticoagulant medications can increase the risk of spontaneous bleeding.
- **Tumors**: Certain types of brain tumors can invade or erode blood vessels, leading to bleeding.

Symptoms of Subpial Hematoma

The symptoms of a subpial hematoma depend on its size, location, and the extent of brain or spinal cord compression. Common symptoms may include:

- **Headache**: Often severe and sudden in onset.
- **Neurological deficits**: Such as weakness, numbness, or paralysis, depending on the affected area of the brain or spinal cord.
- **Seizures**: Blood irritation can trigger seizures.
- **Altered mental status**: Ranging from confusion to loss of consciousness.
- **Nausea and vomiting**: Often associated with increased intracranial pressure.

Diagnosis and Treatment

Diagnosis of a subpial hematoma typically involves imaging studies like a **CT scan** or **MRI**, which can visualize the location and size of the hematoma.

Treatment depends on the severity of the hematoma and the patient's symptoms:

- **Observation**: Small, asymptomatic hematomas may be monitored with serial imaging.
- **Medical management**: Controlling blood pressure, managing symptoms, and addressing underlying coagulopathies or discontinuing anticoagulant medications.
- **Surgical intervention**: Large or symptomatic hematomas may require surgical evacuation to relieve pressure on the brain or spinal cord.

Early diagnosis and appropriate management are crucial to prevent complications and improve outcomes in patients with subpial hematomas.

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Schroeder JA, Reith TP, Benson MD, Maley JE, Freitas LF. Sylvian fissure subpial hematoma: a rare imaging presentation of a ruptured middle cerebral artery aneurysm. *Arq Neuropsiquiatr*. 2024 Sep;82(9):1-2. English. doi: 10.1055/s-0044-1788268. Epub 2024 Aug 31. PMID: 39216491.

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