

# Subdural Hematoma

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# Two Types of Subdural Hematoma (SDH)

- Acute SDH
- Chronic SDH

# Acute SDH

- Usually secondary to trauma
- Brain tissue injured with torn tissue or blood vessel
- Dural venous sinus torn secondary to traumatic injury
- Torn veins that connect the brain surface to the overlying dura and venous sinuses
- Blood leaks into subdural space (space between dura and brain surface)
- Symptoms develop as blood accumulates and the blood clot pushes on the brain displacing it
- Symptoms also develop due to the direct brain injury itself from the trauma or from an acceleration-deceleration injury to the brain

# Signs and Symptoms

- Abnormal neurological examination
- Headache

# Treatment

- Craniotomy is needed because the blood clot is thick and cannot be removed through a smaller opening
- Surgical evacuation of SDH via a craniotomy if
  - Symptomatic with brain shift (1 cm or greater is usually significant)
  - If SDH is smaller but there is significant brain herniation/shift this may be a sign of significant underlying brain injury and swelling. Large craniotomy may be needed to allow brain to herniate towards the bony defect to reduce the shift and control intracranial pressure (Decompressive craniotomy)

# Treatment

- It is generally believed that a symptomatic acute SDH should be removed within 4 hours of the onset of symptoms to reduce mortality and improve neurologic outcomes
- It is suggested that an intracranial pressure monitor be placed in all patients with a  $GCS \leq 8$

# Outcomes as Related to Glasgow Coma Score on Presentation

| GCS   | Mortality | Functional Survival |
|-------|-----------|---------------------|
| • 3   | 90%       | 5%                  |
| • 4   | 76%       | 10%                 |
| • 5   | 62%       | 18%                 |
| • 6,7 | 51%       | 44%                 |

# Outcomes

- Outcomes related to
- Time to surgery (< 4 hours in some publications)
- Neurologic condition upon presentation
- Mechanism of injury
- Age (worse over age 40)
- Postoperative intracranial pressure (when <20 mm Hg outcomes are better)



# Chronic SDH

- Collection of blood in the subdural space that is usually greater than 3-4 weeks in age
- Acute blood clot breaks down and becomes liquid in consistency
- Blood products often induce more bleeding from membranes that form around the clot secondary to inflammation
- More commonly found in the elderly (>65 yrs)

# Etiology

- May develop secondary to
  - Lysis of acute subdural hematoma after trauma
  - Tearing of small bridging blood vessels that connect the surface of the brain to the dura. May occur in elderly when these veins are stretched due to brain atrophy and the resultant greater distance these veins need to travel from the brain surface to the dura.

# Symptoms

- Headache
- Abnormal neurologic examination

# Etiology of Symptoms

- Mass effect on the underlying brain
- Seizures secondary to blood products irritating the underlying brain cortex

# Treatment

- Small subdural hematomas with minimal symptoms can be observed with frequent follow-up CT imaging. Many of these hematomas will be reabsorbed and mass effect will resolve
- Larger hematomas with focal symptoms should be evacuated via craniotomy or small burr hole made in skull.
  - Decision regarding craniotomy vs, burr hole evacuation is based on surgeon preference, presence of membranes, presence of less chronic components mixed into the hematoma, hematoma recurrence

# Outcomes

- Morbidity and mortality following treatment of a chronic SDH is usually less than 10%