醫學影像部 Case report

The 79 y/o male with unsteady gait and deviation to left side for a week

Clerk 5：101223 王琮崴

Related Clinical Data

Age 70-year-old

Sex Male

Social History

- Smoking: quitted now
- Alcohol: quitted now

Past History

- Hypertension(poored controlled)
- Hyperlipidemia

Before

ADL: The patient independent in all his activities before.

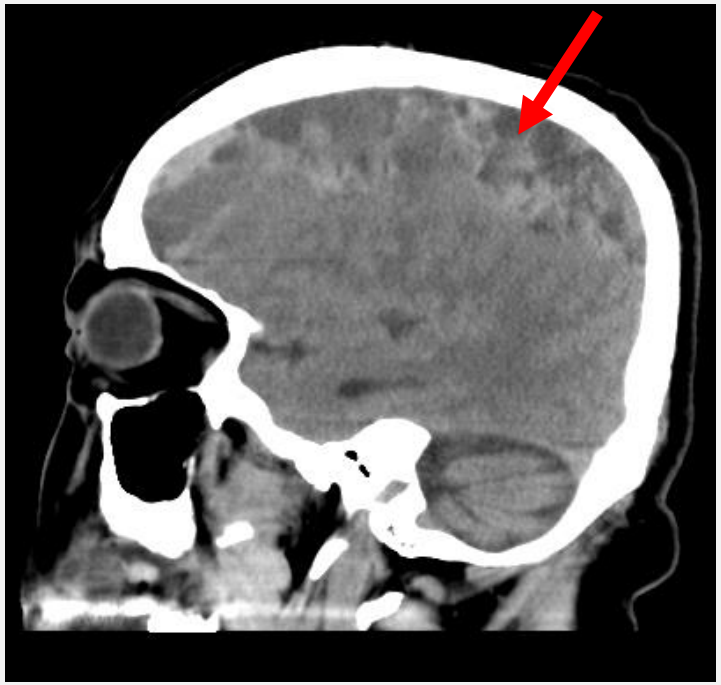
2022.12.21 ED

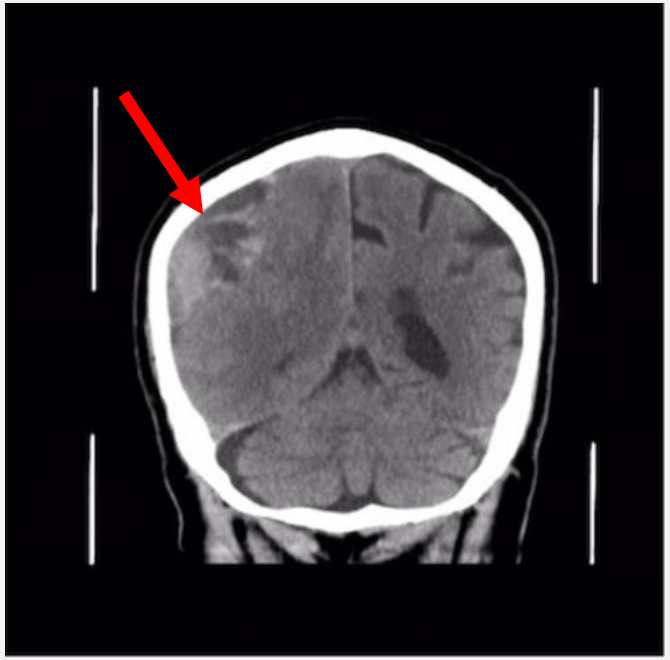
Chief Complamt: Unsteady gait, left side weakness one week ago and fell down several times

- headache, slurred speech, dysphagia
- Left upper/lower limbs muscle power: 4/4
- GCS: E4M6V5, pupil size: 3.0(+)/3.0(+)
- BP: 162 / 81 mmHg, HR: 76 /min

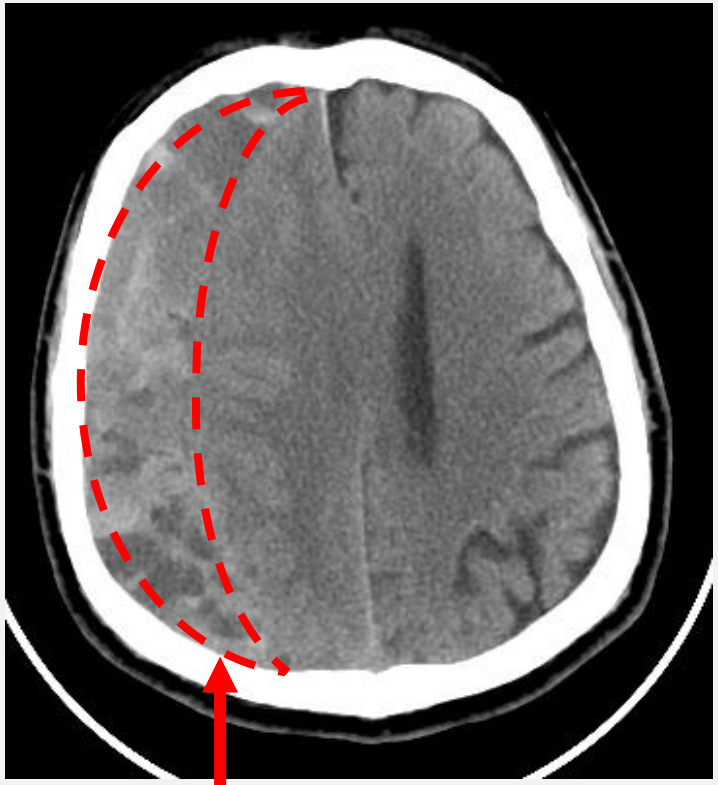
2022/12/21 Brain CT

Acute with chronic subdural hematoma (SDH) with thickness for about 3cm involving **right frontal-parietal region**.





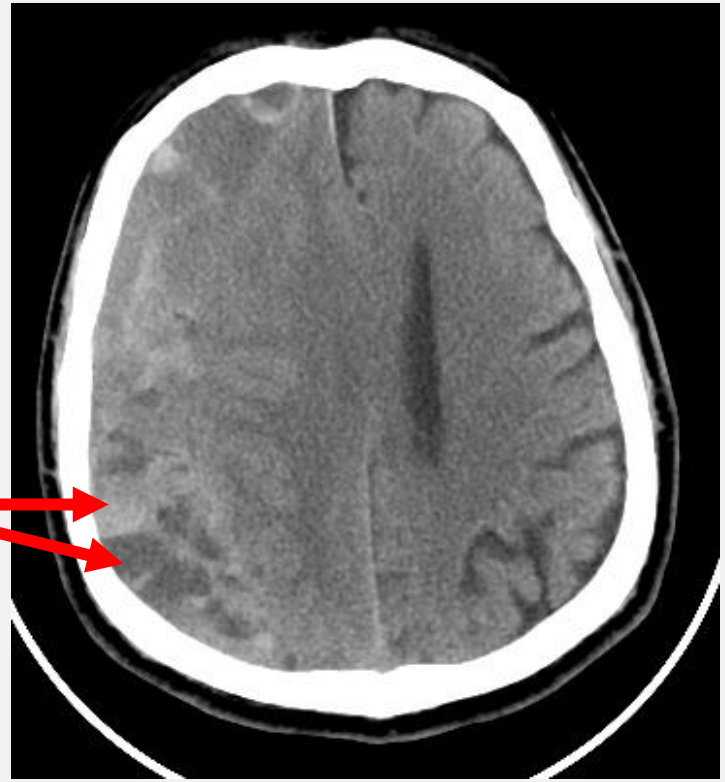
2022/12/21 Brain CT



Crescent-shaped

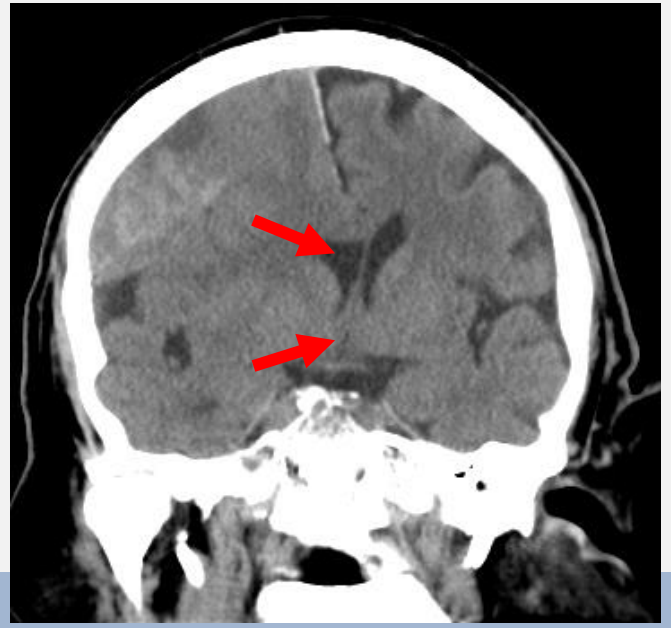
Mixed density leision

There is recurrent or recent bleeding(hyperdense) within an older hematoma(hypodense).



2022/12/21 Brain CT

Mass effect and
Midline shift
Compression of
right lateral ventricle

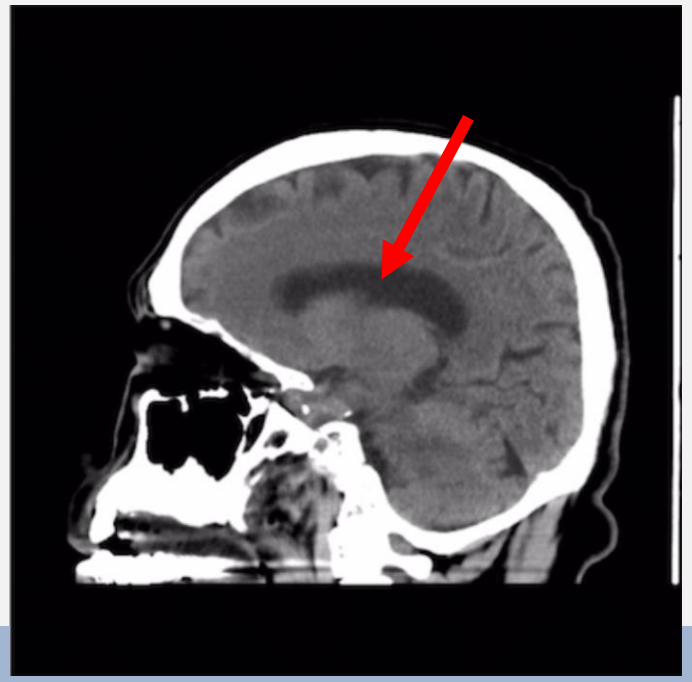


2022/12/21 Brain CT

- Age-related cortical atrophy, sulcal space widening, proportionate ventricular dilatation

- 高齡Brain Atrophy後更容易發生CSDH，且症狀容易較晚才發現

Ventricular dilatation



Sulcul space widening

Sulcul space widening

Present Illness

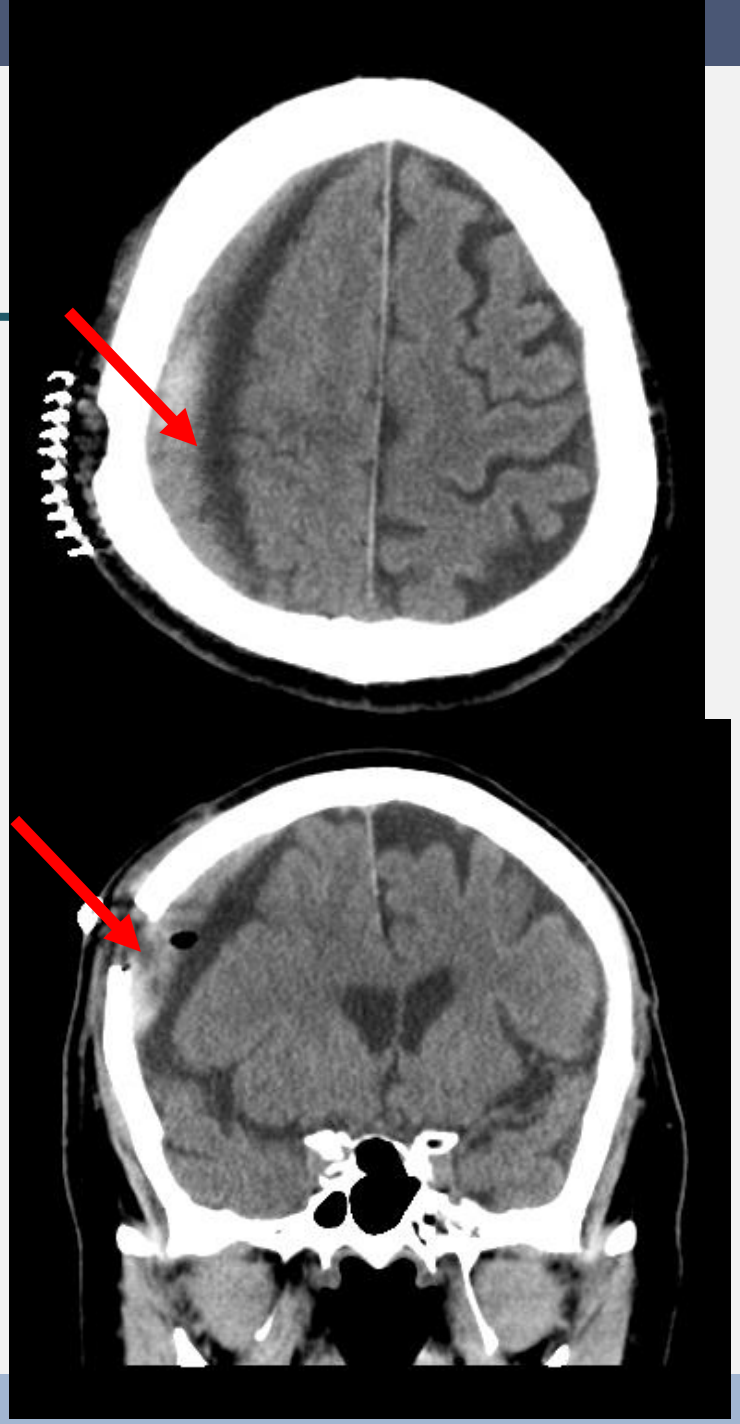
2022.12.22 — Craniotomy (burr hole)

2022.12.26 — **Nonenhanced CT**

- s/p right craniotomy.
- Acute with chronic subdural hematoma (SDH) for about 2 cm involving right frontal-parietal region.

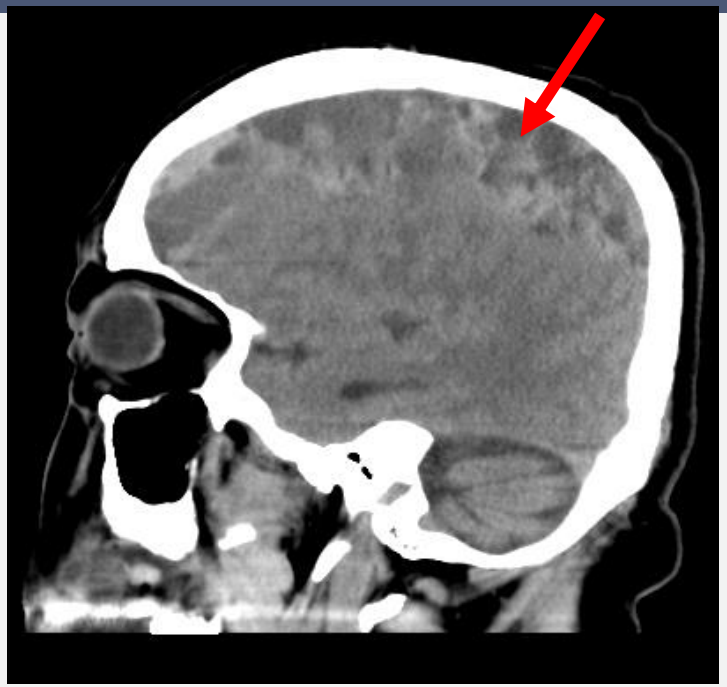
2022/12/26 Brain CT

- s/p right craniotomy
- Acute with chronic subdural hematoma (SDH) with thickness for about 2cm involving **right frontal-parietal region.**
- Mass effect with compression of right lateral ventricle and minimal left midline shift.
- Age-related cortical atrophy, sulcal space widening, proportionate ventricular dilatation

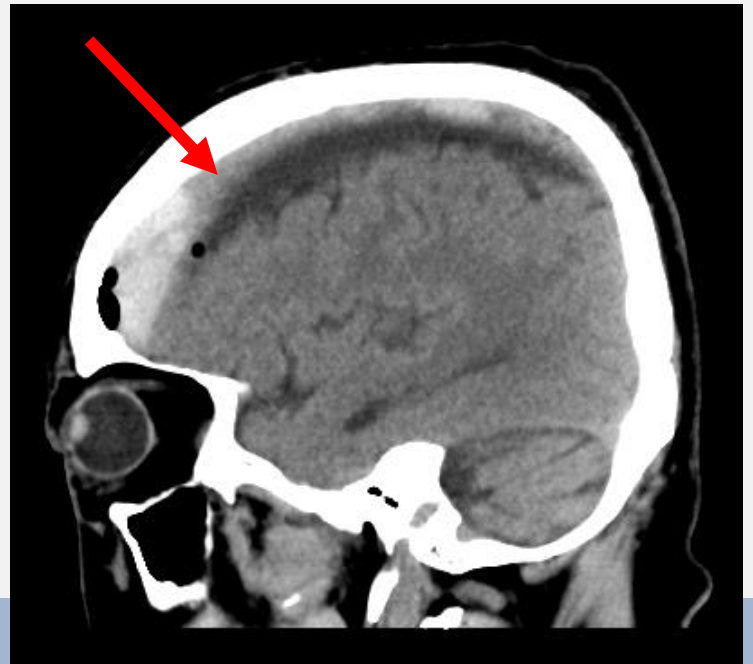


Comparison

12/21 Acute with chronic subdural hematoma (SDH) with thickness for about 3cm involving **right frontal-parietal region.**



12/26 Acute with chronic subdural hematoma (SDH) with thickness for about 2cm involving **right frontal-parietal region**.



Diagnosis

1. R't chronic SDH s/p burr hole on 111/12/22
2. Focal (partial) idiopathic epilepsy

Learning objectives

1. Introduction of Chronic SDH
2. Why Elderly Individuals Are Prone to Chronic SDH

Pathophysiology of chronic SDH

- Chronic subdural hematoma (CSDH) is characterized by the gradual accumulation of blood, fluid and blood degradation products in the subdural space, often seen in elderly individuals.
- CSDH typically results from ruptured bridging veins, with blood breakdown and chronic inflammation promoting hematoma expansion over time.

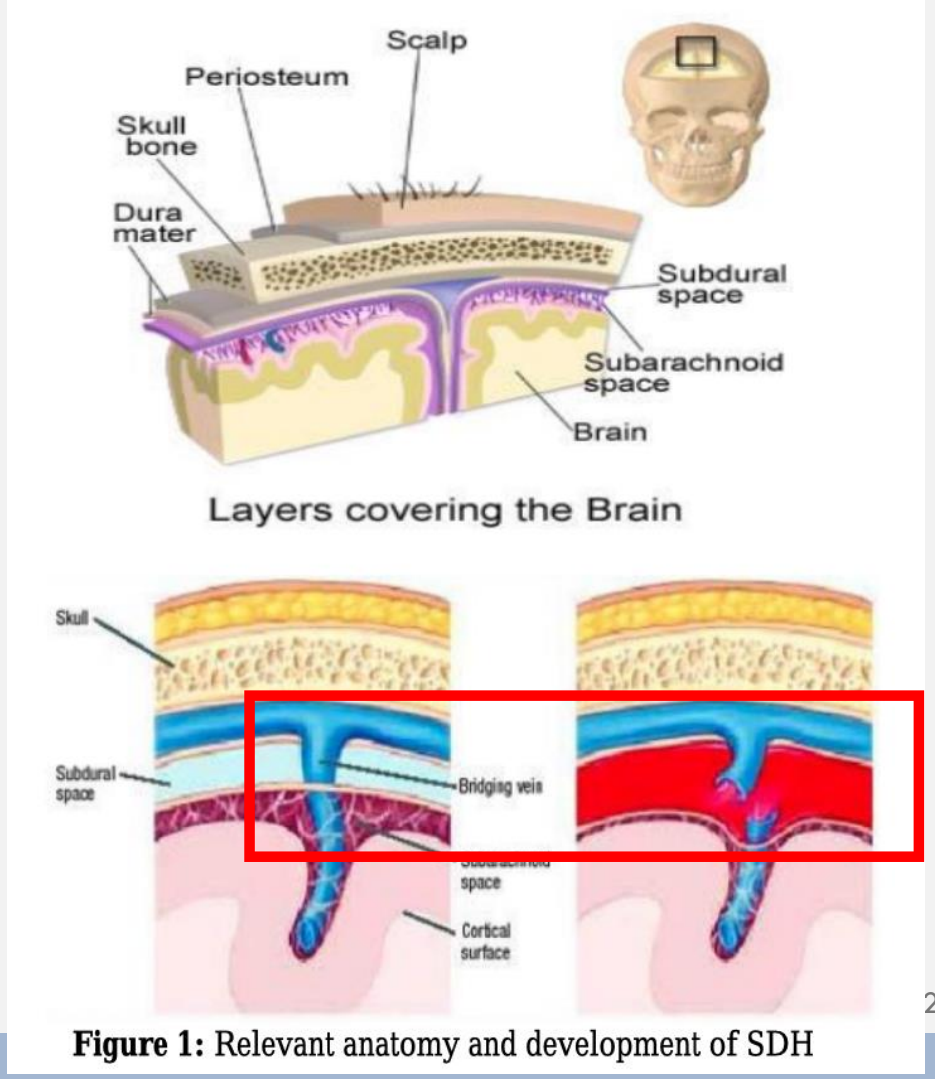


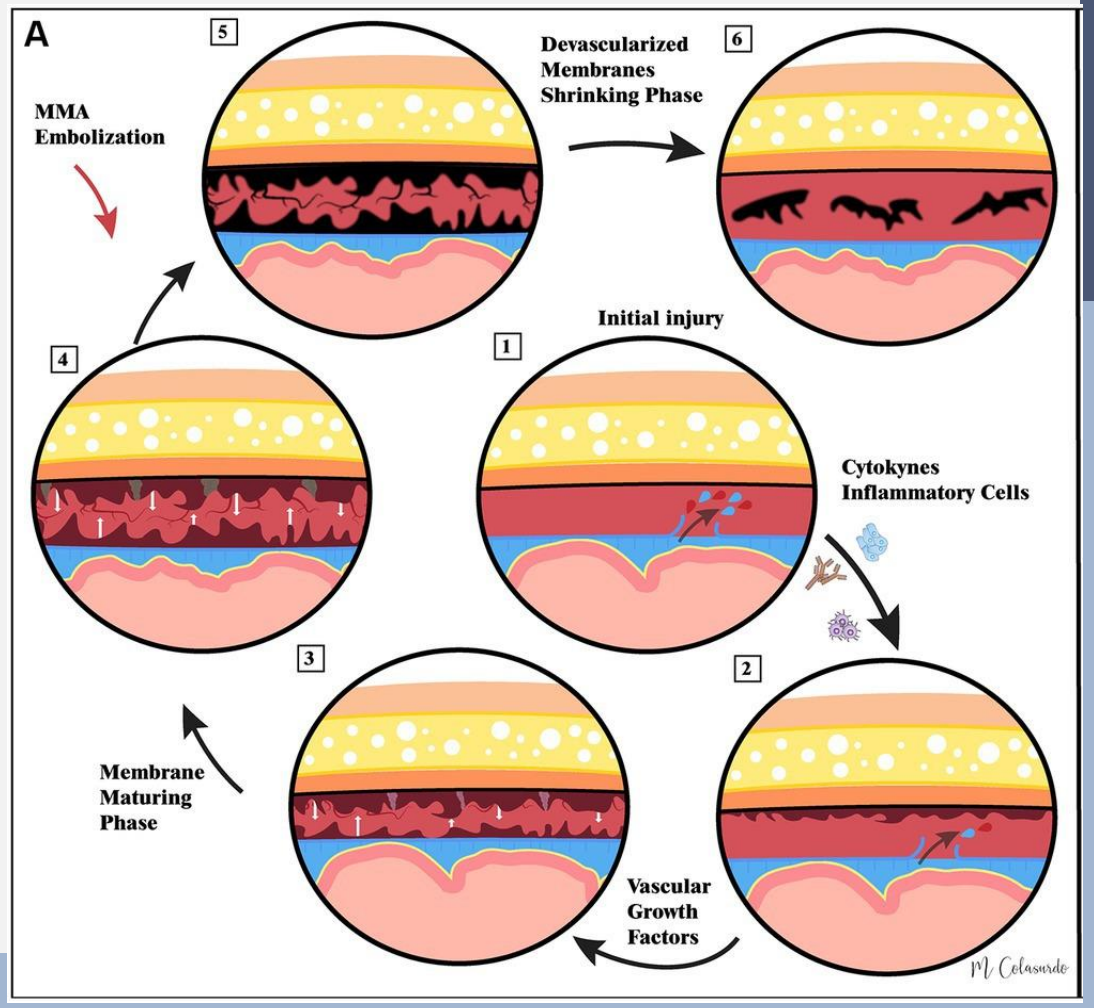
Figure 1: Relevant anatomy and development of SDH

1. Initial Trauma or Vessel Injury

- **Tearing of bridging veins:**
  - Stretched due to brain atrophy or minor trauma.
  - Leads to low-pressure venous bleeding.
- **Initial hematoma formation:**
  - Acute blood collection in the subdural space.

2. Liquefaction of the Hematoma

- Hematoma undergoes fibrinolysis.
- Forms serosanguinous fluid.
- Encapsulation by a **neomembrane**.



3. Formation of Neomembrane

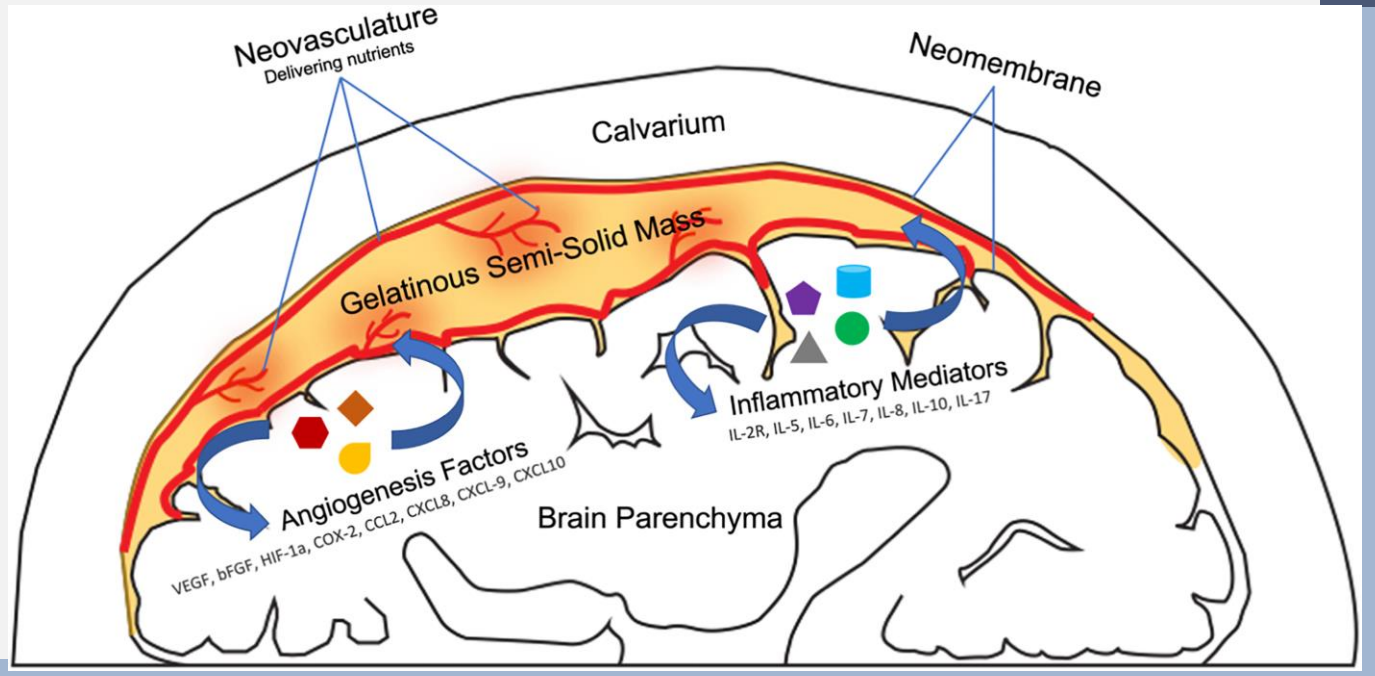
- **Inflammatory response:**
  - Recruited inflammatory mediators.
- **Neovascularization:**
  - Fragile capillaries prone to microbleeding.

4.Chronic Inflammation and Expansion

- **Osmotic forces:**
  - Breakdown products attract water into the hematoma.
- **Rebleeding:**
  - Fragile neomembrane vessels rupture.
- **Coagulopathy:**
  - Anticoagulants exacerbate bleeding.

5.Mass Effect and Symptoms

- **Compression of brain tissue:**
  - Causes headache, confusion, and drowsiness.
- **Neurological deficits:**
  - Hemiparesis, seizures, or focal symptoms.



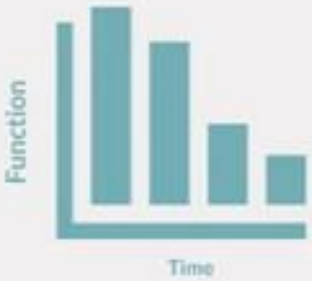
Signs and symptoms of chronic SDH

Neurological Symptoms

- Headache
- Altered Mental Status
- Cognitive Impairment

Other Signs

- Seizures
- Nausea and Vomiting
- Drowsiness or Lethargy



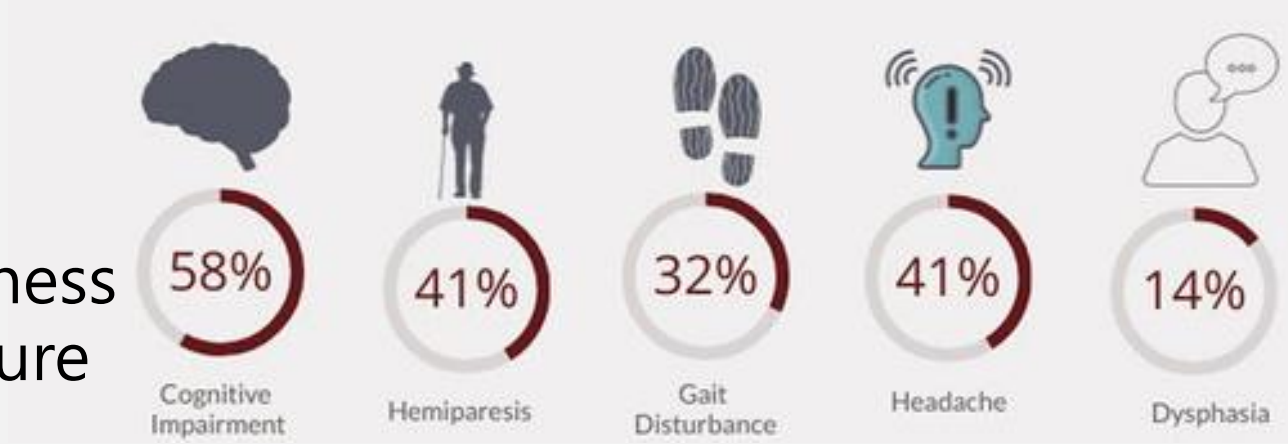
Motor Symptoms

- Weakness
- Gait Disturbances
- Aphasia

Symptom onset is subacute but may mimic stroke

Severe or Late Symptoms

- Coma or Loss of Consciousness
- Increased Intracranial Pressure



High risk groups

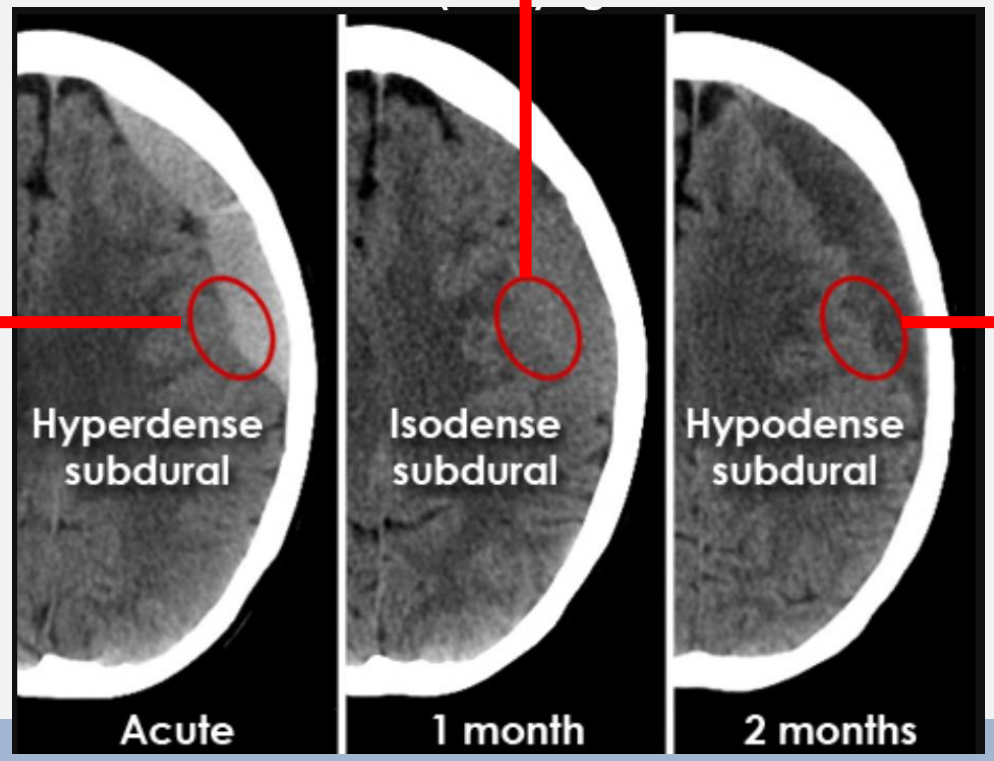
- Advanced age
- Anticoagulant or antiplatelet therapy
- Alcohol use disorder
- History of head trauma
- Coagulopathy
- Cerebral atrophy
- Chronic hypertension
- Diabetes mellitus
- Low intracranial pressure (e.g., after lumbar puncture or CSF shunting)
- Use of corticosteroids
- Male gender
- Hemodialysis
- History of prior CSDH

Images of chronic SDH

- Chronic SDH CT images presented at different times.

Sub-acute SDH is isodense (grey)

Acute SDH is hyperdense (white)



Chronic SDH is hypodense (black)

Treatment and Prognosis

Correction of coagulopathy

- Adjust or discontinue anticoagulant/antiplatelet therapy if possible.

Twist drill/ Burr hole

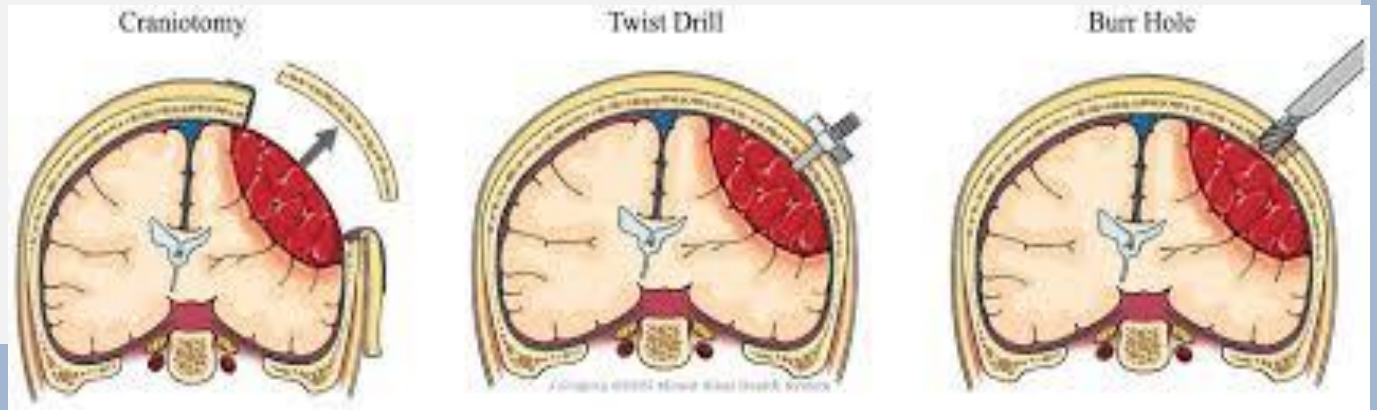
- Drilling a small hole to evacuate the hematoma
- Symptomatic hematomas causing neurological deficits or significant midline shift on imaging.

Craniotomy

- Large hematomas or solid blood clots may need to be removed through.

Recurrence Rates:

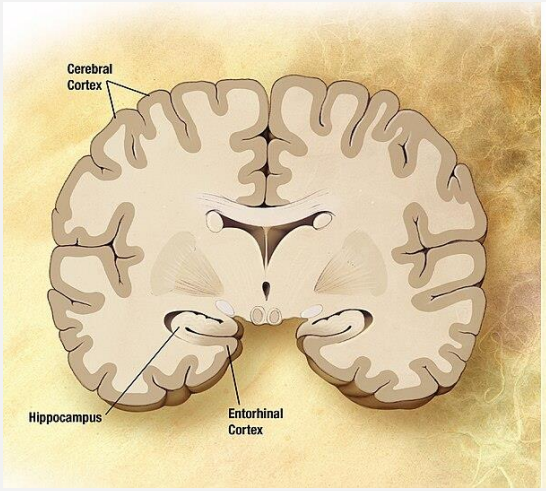
- Up to 10-20% of cases may recur.

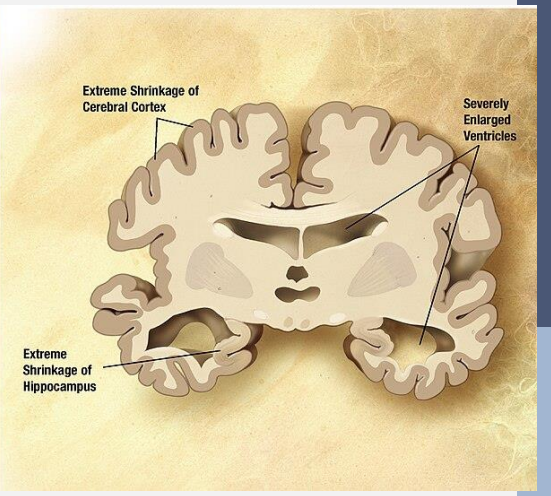


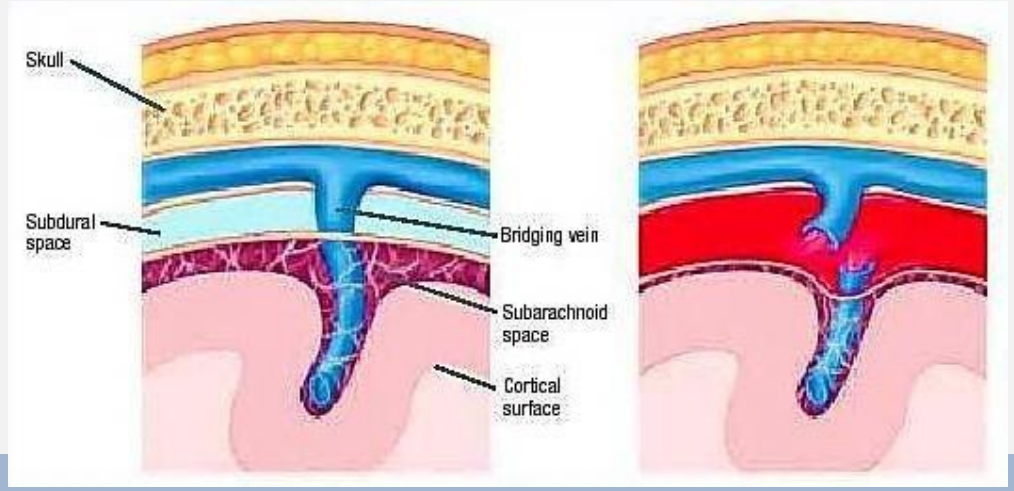
Why Elderly Individuals Are Prone to Chronic SDH

1. Physiological and Anatomical Factors

- **Brain Atrophy**
  - Age-related reduction in brain volume **increases the subdural space, stretching bridging veins** and making them more prone to rupture.
- **Increased Vascular Fragility**
  - **Aging reduces vascular elasticity**, making veins and capillaries more susceptible to damage.



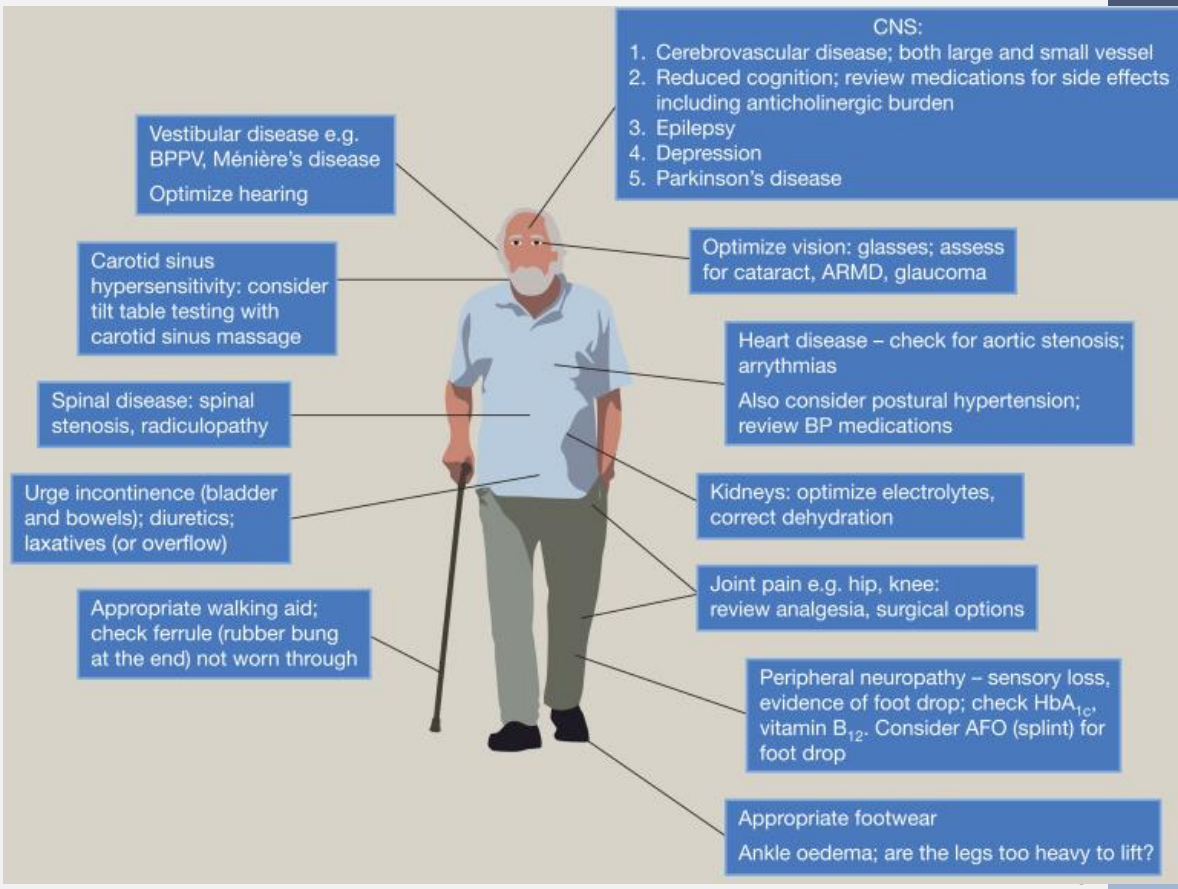




Why Elderly Individuals Are Prone to Chronic SDH

2. Trauma-Related Factors

- **Minor Head Trauma**
  - Even mild trauma can rupture stretched veins due to brain atrophy.
- **High Risk of Falls**
  - Impaired balance, reduced muscle strength, and poor vision increase fall frequency, leading to potential head injuries.
- **Difficulty in Obtaining Trauma History**
  - Elderly individuals **may not recall minor head trauma**, or they may downplay its significance.
  - Cognitive decline or lack of witnesses can further obscure the trauma history, delaying diagnosis.



Why Elderly Individuals Are Prone to Chronic SDH

3. Chronic Diseases and Medications

- Use of Anticoagulants or Antiplatelet Drugs
  - Medications like warfarin or aspirin elevate **bleeding risk.**
- Hypertension and Atherosclerosis
  - **Weaken blood vessels**, increasing susceptibility to chronic bleeding.
- Hemodialysis
  - Volume-overloaded long-term dialysis patients may have **venous hypertension**, and if the patient’ s **coagulation status is abnormal**, then small venous tears of the dural bridging veins may **easily expand and cause SDH**

Why Elderly Individuals Are Prone to Chronic SDH

4. Chronic Inflammation and Hematoma Expansion

- Persistent Inflammation
  - **Reduced immune efficiency** in the elderly promotes inflammation, worsening hematoma expansion through fibrinolysis and neoangiogenesis.

5. Cognitive Impairment Mimicking Dementia:

- Gradual onset of confusion, memory loss, or personality changes may **mistaken for Alzheimer’ s disease** or other dementias.

Why Elderly Individuals Are Prone to Chronic SDH

6. Delayed Symptom Onset Due to Brain Atrophy

- **Increased Subdural Space**
  - Brain atrophy **allows blood to accumulate** over weeks or months before symptoms manifest.
- **Chronic Progression of Hematoma**
  - Persistent minor bleeding and inflammation cause gradual symptom emergence.
- **Compensatory Mechanisms**
  - Early hematoma growth may not cause symptoms due to compensatory adjustments in the brain, delaying diagnosis until the hematoma becomes large enough to affect neurological function.

References

1. Kumar, Ajay & Pipraiya, Rahul. (2016). Chronic Subdural Haematoma: Aeromedical Disposition. 10.21275/ART20194569.
2. Edlmann, E., Giorgi-Coll, S., Whitfield, P. C., Carpenter, K. L. H., & Hutchinson, P. J. (2017). Pathophysiology of chronic subdural haematoma: inflammation, angiogenesis and implications for pharmacotherapy. Journal of neuroinflammation, 14(1), 108. https://doi.org/10.1186/s12974-017-0881-y
3. Yadav, Y. R., Parihar, V., Namdev, H., & Bajaj, J. (2016). Chronic subdural hematoma. Asian journal of neurosurgery, 11(4), 330–342. https://doi.org/10.4103/1793-5482.145102
4. Uno M, Toi H, Hirai S. Chronic Subdural Hematoma in Elderly Patients: Is This Disease Benign? Neurol Med Chir (Tokyo). 2017 Aug 15;57(8):402-409. doi: 10.2176/nmc.ra.2016-0337. Epub 2017 Jun 26. PMID: 28652561; PMCID: PMC5566699. https://pmc.ncbi.nlm.nih.gov/articles/PMC5566699/

Thank you!