Hemorrhagic stroke

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The lecture is enough for the exam!

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Objectives:

- **Not given yet**

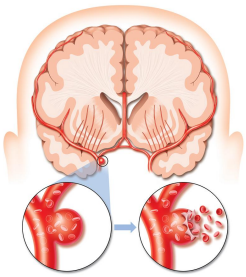
References:
Slides - Black
Doctor's notes - Red
Step up / davidson - Blue
Extra explanation - Grey

Optional:

p1237 to p1247

Editing file

Hemorrhagic Stroke



Two types:

1. **Ischemic**
2. **Hemorrhagic**

85% of strokes are ischemic and 15% or hemorrhagic. Hemorrhagic stroke has worse prognosis with high morbidity and mortality.

Two kinds of hemorrhages (ruptures) in the brain:

1. **Intraparenchymal/intra-axial**
   a. **Bleeding in the brain**
      i. **Shows white under CT scan (hyperdense)**
2. **Extraparenchymal/extra-axial**
   a. **Bleeding outside the brain (Meninges)**

A) Intraparenchymal/intra-axial

Clinically, you cannot certainly differentiate between hemorrhagic and ischemic stroke. However, severe/sharp headache is more symptomatic of hemorrhoid stroke. Also, in ischemic stroke, you will have the most severe symptoms upon onset. However, in hemorrhagic stroke, you will have progressive worsening symptoms. Therefor resolve by CT scan (simple, cheap, fast) to avoid mortality caused by treatment (medication) of the other type. For example, prescribing blood thinners to an hemorrhagic stroke patient.

Intracerebral hematoma

Normal Brain CT:

- **Gray matter** density is the highest in brain components
- **White matter** density is lesser
- **CSF** density is the least (Hypodense)

Now, In case of intracerebral hemorrhage.. the appearance of blood depends on its duration

Brain bleeding CT:

- **Acute** → High density (hyperdense).
- **Sub-acute** → Has a density similar to white matter density (isodense).
- **Chronic** → Decreased density (hypodense)

❖ Causes of bleeding:

1 Hypertension (most common cause of bleeding worldwide (50%-60%)/intracerebral hemorrhage/ischemic stroke)
- HTN causes rupture of small vessels deep within the brain parenchyma.
  - Chronic HTN causes degeneration of small arteries, leading to micro-aneurysms, which can rupture easily Found in older patients as risk increases with age

2 Ischemic stroke may convert to a hemorrhagic stroke.

3 Trauma
- Fracture in skull
- Edema in subcutaneous tissue

The Most common cause of brain bleeding in Riyadh is RTA's (Road traffic accidents)

4. Bleeding tendency: Hemophilia

5.Medication: Anticoagulants (Warfarin), more common than Aspirin

6. AVM (arteriovenous malformation)
- Under CT scan and MRI
  - Worm-like appearance with bleeding
- Treatment
  - Embolization and catheterization

7. Tumors
- Melanoma
- Renal carcinoma
- GI carcinoma that metastasized to the brain
- Primary tumors
- Glioblastoma

❖ Other Causes mentioned by doctor:

1. Ischemic stroke: 30%-40% of patients bleed

2. Dural venous sinus thrombosis

(usually a young Female Patient and present with headache)
- Causes: Hypercoagulable state, mostly patient's on OCP's (oral contraceptive pills)
- Risk factor
  - Intra and post-partum
    - Because they are physiologically in hypercoagulable state, especially post-partum
- Diagnosed by:
  - Magnetic resonance venogram
- Treatment
  - Stop OCP's PERMANENTLY
  - Anticoagulation ONLY

3. Drugs (ask for blood screen for young patient's)
   - Cocaine
   - Amphetamine
4. Amyloid angiopathy, especially if they have history of dementia and Alzheimer's
   - In elderly patients with brain bleeding, the first thing you think about
   - characterized high recurrence rate
   - Treatment: NOTHING!

❖ **Locations & Corresponding pupillary findings**

Deep structures

1. **Putamen: Dilated pupils**
2. **Thalamus: Poorly reactive pupils**
3. **Pons: Pinpoint pupils**
4. **Cerebellum**
5. **Other cortical area**

Complications of Intracerebral hemorrhage:

- **Increased ICP**
- **Seizures**
- **Rebleeding**
- **Vasospasm**
- **Hydrocephalus**
- **SIADH**

❖ **Clinical features:**

1. **Abrupt onset of a focal neurologic deficit that worsens steadily over 30 to 90 minutes**
2. **Altered level of consciousness, stupor (nearly unconscious), or coma**
3. **Headache, vomiting**
4. **Signs of increased ICP**

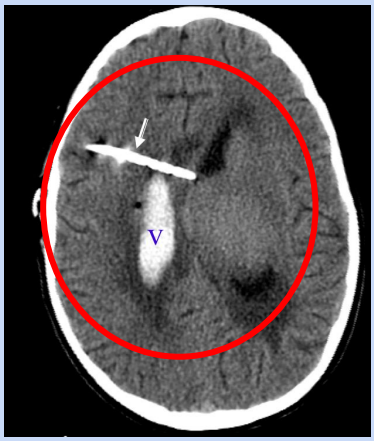
❖ **Management: (was not mentioned during the lecture):**

1. **ICU admission**
2. **ABC's**
3. **BP reduction**
   - **Elevated BP increases ICP and can cause further bleeding. However, hypotension can lower cerebral blood flow, worsening the neurological blood deficits. Therefore, BP reduction must be gradual so as to not induce hypotension.**
4. **Surgical evacuation**
   - **ONLY works in two scenarios:**
     - **Bleeding is large and superficial**
     - **Cerebellar hemorrhage**

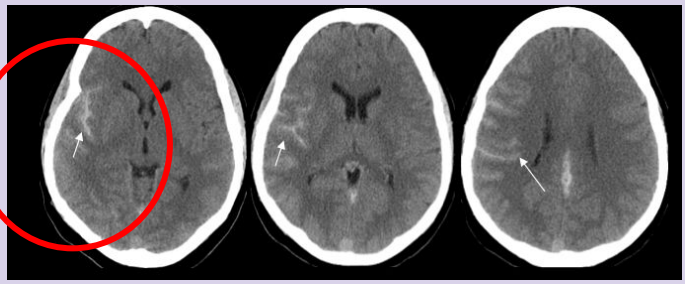
Extraparenchymal/extra-axial

Subdural (crescent like under imaging)	**A. Causes:** **i.Trauma (specially in elderly, because brain atrophies and dura narrows in causing bridges to become under tension)** **1.Venous: bridging veins (compare to epidural)** **B. Treatment:Burr hole**
Epidural (lens/biconvex like under imaging)	**1. Causes** **a. Trauma (must have skull fracture)** **i. Arterial: more dangerous than subdural and must act quickly (compare to subdural)**
Subarachnoid (very serious, 20-30% are dead upon admission)	**1. Clinical features:** **a. Sudden severe (excruciating) headache. Classical presentation is "the worst headache of my life."** **b. Vomiting** **2. Causes:** **a. Brain aneurysm (very clear under imaging). Ruptured saccular (berry) aneurysms are the most common cause.** **b. Trauma** **3. Diagnosis:** **a. Non-contrast CT scan – identifies the majority of subarachnoid hemorrhages (SAHs). However, CT scan maybe negative in up to 10% of cases (sensitivity 90%)** **b. Perform Spinal Tap or Lumbar Puncture if CT scan is negative, to look for blood (Xanthochromia) in the CSF.** **c. Once SAH is diagnosed, order a cerebral angiogram (most common finding is left MCA (middle cerebral artery) aneurysm).**

Subdural hematoma



Shunt (arrow) intraventricular hemorrhage (v)



Subarachnoid hemorrhage

subdural chronic hematoma - collection of old blood, mostly or totally liquefied (Not white in CT-scan (hypodense)

Chronic subdural hematoma

a. **Treatment:**
   i. Doctor said catheter NOT surgical because it has high mortality. However, Step Up argues that berry aneurysms are usually treated surgically.
   ii. Femoral artery → aortic arch → ICA → MCA → inject coil (inside balloon)
   iii. Bed rest in quiet, dark room
   iv. Stool softeners to avoid straining (increases ICP (intracranial pressure and risk of re-rupture)
   v. Analgesics for headache
   vi. IV fluids and hydration
   vii. Control of HTN
   viii. Calcium channel blocker for vasospasm

b. **Complication:**
   i. Vasospasm
   ii. Hydrocephalus
   iii. Hyponatremia
   iv. Rupture

1. Ask about drug history of antiplatelets or anticoagulation
2. look for the MRI or CT (venous thrombosis, AVM, tumor or ischemic to hemorrhagic transformation)
3. if you suspicious: Do drug screening to look for cocaine or amphetamine
4. Treat with Evacuation (aggressive and low chance to survive)
5. Control of the HTN (prevent but to treat)

MCQ's

Q1: Which one of the following is a common cause of intracranial hemorrhage in a county hospital emergency room?
A. Rupture of arterio-venous malformation
B. Rupture of cerebral aneurysm
C. Trauma
D. Hypertension
E. Stroke

Q2: Which one of the following is a likely cause of nontraumatic intracranial hemorrhage in an 8 year-old girl?
A. Rupture of arterio-venous malformation
B. Rupture of cerebral aneurysm
C. Hypertension
D. Stroke

Q3: A 35 year-old man developed severe headache and drowsiness while having sex. The patient was taken to the emergency room and a CT scan showed subarachnoid hemorrhage. Most likely cause for subarachnoid hemorrhage to be considered is:
A. Rupture of arterio-venous malformation
B. Rupture of small vessel within the brain from excitement, nothing to worry about.
C. Rupture of cerebral aneurysm
D. Acute migraine
E. Stroke

Answers: 1.C, 2.A, 3.C

Thank you

If you have any question please contact with us at:
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