



**ĐẠI HỌC Y DƯỢC TP. HỒ CHÍ MINH**

# **Management of Spontaneous Intracerebral Hemorrhage**

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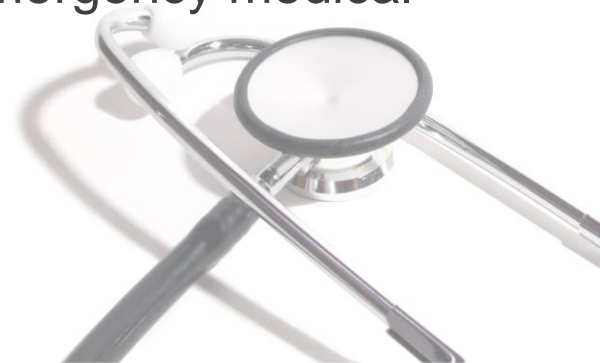
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# Background

- Intracerebral hemorrhage (ICH)
  - Rate 9% - 27% of all strokes
  - Early deterioration is common in the first few hours
  - > 20% of patients will decrease GCS of 2
    - Between the prehospital and emergency medical services assessment





# Background

- Intracerebral hemorrhage (ICH)
  - High early case fatality
  - 15% to 23% deterioration within the first hours after hospital arrival
  - Poor functional outcome





# ED Management

- History
  - Time of symptom onset
  - Initial symptoms and progression of symptoms
  - Vascular risk factors
    - History of stroke or ICH, hypertension
    - Diabetes mellitus and smoking





# ED Management

- History
  - Medications
    - Anticoagulant drugs, antiplatelet agents, antihypertensive medications, stimulants (including diet pills), sympathomimetic drugs
  - Recent trauma or surgery Carotid endarterectomy or carotid stenting
    - ICH may be related to hyperperfusion after such procedures





# ED Management

- History
  - Dementia
    - Associated with amyloid angiopathy
  - Alcohol or illicit drug use
    - Cocaine and other sympathomimetic drugs are associated with ICH, stimulants
  - Seizures





# ED Management

- History
  - Liver disease
    - May be associated with coagulopathy
  - Cancer and hematologic disorders
    - May be associated with coagulopathy





# ED Management

- Physical examination
  - Vital signs
  - A general physical examination focusing on the head, heart, lungs, abdomen, and extremities
  - A focused neurological examination







# ED Management

- Serum and urine tests
  - Complete blood count, electrolytes, blood urea nitrogen and creatinine, and glucose
  - Prothrombin time (with INR) and an activated partial thromboplastin time
  - Cardiac-specific troponin





# ED Management

- Serum and urine tests
  - Toxicology screen to detect cocaine and other sympathomimetic drugs of abuse
  - Urinalysis and urine culture, as well as a pregnancy test in a woman of childbearing age





# Neuroimaging

- CT or MRI
  - Consider contrast-enhanced or vascular imaging
  - 28% to 38% have hematoma expansion of greater than one third of the initial hematoma volume





# Neuroimaging

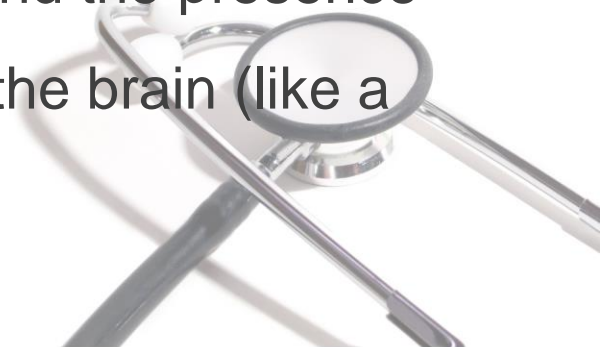
- CTA or MRA
  - Risk factors for underlying vascular abnormalities
    - Age <65 years, female sex, nonsmoker, lobar ICH, intraventricular extension, and absence of a history of hypertension or coagulopathy
- DSA
  - Clinical suspicion is high or noninvasive studies are suggestive of an underlying lesion





# Neuroimaging

- Subarachnoid hemorrhage, enlarged vessels or calcifications along the margins of the ICH
- Hyperattenuation within a dural venous sinus or cortical vein along the presumed venous drainage
- Unusual hematoma shape, presence of edema out of proportion to the time of presumed ICH, an unusual hemorrhage location, and the presence of other abnormal structures in the brain (like a mass)





# Medical Treatment for ICH

- Hemostasis and Coagulopathy, Antiplatelets, and Deep Vein Thrombosis Prophylaxis
  - Patients with a severe coagulation factor deficiency or severe thrombocytopenia should receive appropriate factor replacement therapy or platelets, respectively IC





# Medical Treatment for ICH

- Patients with ICH whose INR is elevated because of VKA should have their VKA withheld, receive therapy to replace vitamin K–dependent factors and correct the INR, and receive intravenous vitamin K IC





# Medical Treatment for ICH

- Protamine sulfate may be considered to reverse heparin in patients with acute ICH
- IIbC
- Patients with ICH should have intermittent pneumatic compression for prevention of venous thromboembolism beginning the day of hospital admission IA







# Medical Treatment for ICH

- After documentation of cessation of bleeding, lowdose subcutaneous low-molecular-weight heparin or unfractionated heparin may be considered for prevention of venous thromboembolism in patients with lack of mobility after 1 to 4 days from onset





# Medical Treatment for ICH

- Blood pressure
  - For ICH patients presenting with SBP between 150 and 220 mmHg and without contraindication to acute BP treatment
    - Acute lowering of SBP to 140 mmHg is safe IA
    - And can be effective for improving functional outcome IIaB





# Medical Treatment for ICH

- Blood pressure
  - ICH patients presenting with SBP >220 mmHg, it may be reasonable to consider aggressive reduction of BP
    - Continuous intravenous infusion and frequent BP monitoring IIbC





# Medical Treatment for ICH

- Management and prevention of secondary brain injury
  - Initial monitoring and management of ICH patients should take place in an intensive care unit or dedicated stroke unit with physician and nursing neuroscience acute care expertise IB





# Medical Treatment for ICH

- Glucose Management
- Temperature Management
- Seizures and Antiseizure Drugs
  - Clinical seizures should be treated with antiseizure drugs IA
  - Patients with a change in mental status who are found to have electrographic seizures on EEG should be treated with antiseizure drugs
  - Prophylactic antiseizure medication is not recommended





# Surgery

## – ICP Monitoring and Treatment

- Ventricular drainage as treatment for hydrocephalus is reasonable, especially in patients with decreased IlaB
- Patients with a GCS score of  $\leq 8$ , those with clinical evidence of transtentorial herniation, or those with significant IVH or hydrocephalus might be considered for ICP monitoring and treatment. A CPP of 50 to 70 mmHg may be reasonable to maintain depending on the status of cerebral autoregulation IbcC





# Surgery

- Intraventricular Hemorrhage
  - Although intraventricular administration of rtPA in IVH appears to have a fairly low complication rate, the efficacy and safety of this treatment are uncertain IIbC
  - The efficacy of endoscopic treatment of IVH is uncertain IIbC





# Surgery

- Craniotomy for posterior fossa
  - Patients with cerebellar hemorrhage who are deteriorating neurologically or who have brainstem compression and/or hydrocephalus from ventricular obstruction should undergo surgical removal of the hemorrhage as soon as possible IB. Initial treatment of these patients with ventricular drainage rather than surgical evacuation is not recommended IIB







# Surgery

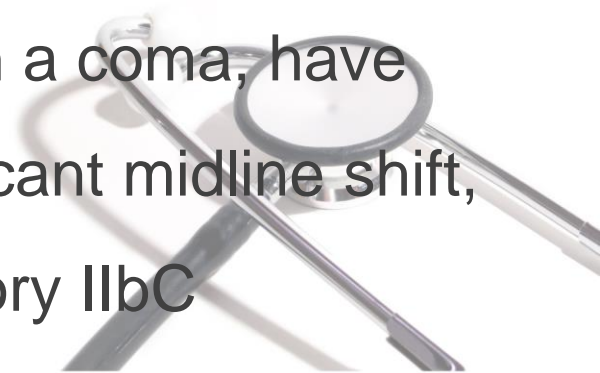
- Craniotomy for supratentorial
  - For most patients with supratentorial ICH, the usefulness of surgery is not well established
  - IIbA
  - A policy of early hematoma evacuation is not clearly beneficial compared with hematoma evacuation when patients deteriorate IIbA





# Surgery

- Craniotomy for supratentorial
  - Supratentorial hematoma evacuation in deteriorating patients might be considered as a life-saving measure IIbC
  - DC with or without hematoma evacuation might reduce mortality for patients with supratentorial ICH who are in a coma, have large hematomas with significant midline shift, or have elevated ICP refractory IIbC





# Surgery

- Craniotomy for supratentorial
  - The effectiveness of minimally invasive clot evacuation with stereotactic or endoscopic aspiration with or without thrombolytic usage is uncertain IIbC





**Thank you**

