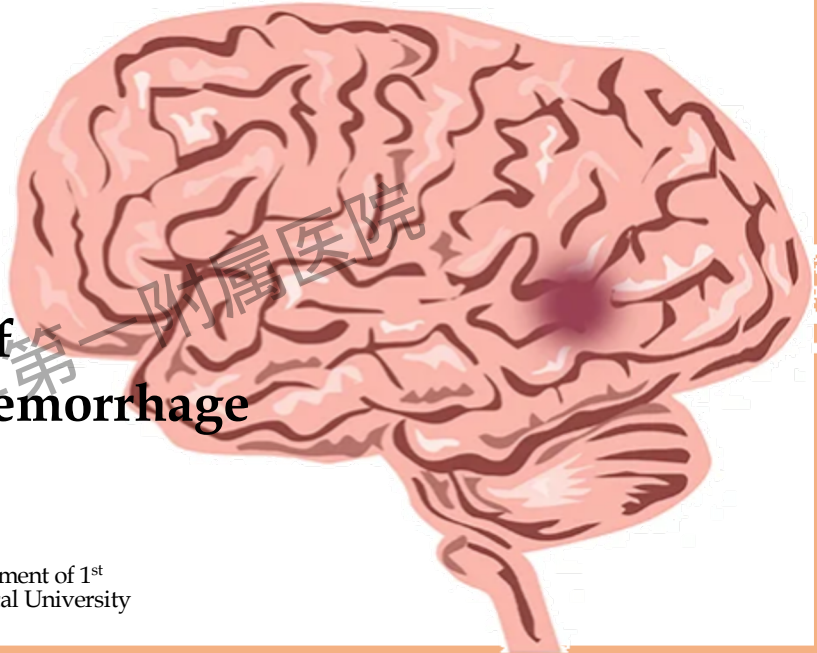


Diagnosis and Management of Intracerebral Hemorrhage

Liu Xiaolei

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ONE CASE

- A 75-year-old man presented with new-onset headache and right hemiparesis with onset 45 minutes prior to presentation to the emergency department.
- His history was significant for hypertension and atrial fibrillation, for which he took warfarin.
- Blood pressure: 185/95 mmHg. Temperature was 37.2°C.
- Physical examination confirmed the right hemiparesis with moderate sensory loss; he followed commands, uttered inappropriate words, and required stimulation to open his eyes (GCS score of 11).

What characteristics of this patient?

What investigations should he take?

What was the diagnosis?

What degree of the severity?

What was the proper management?

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What characteristics of this patient?

Acute onset

Deficits of central nervous system + headache + altered consciousness

Risk factors of cerebral vascular disease (especially, hypertension)

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Clinical Manifestation

- The clinical presentation is often similar to ischemic stroke
- **Sudden onset of a focal neurologic deficit**
- But are more likely to have
 - very elevated blood pressure
 - altered consciousness
 - headache, nausea, or vomiting

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What investigations should he take?

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What investigations should he take?

CT, CTA, MRI, or/and MRA

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BACK TO THE CASE



- Noncontrast CT is the first choice
 - This case:
 - hyperdensity in the left basal ganglia region as well as bilateral Ventricles
- Indication: hemorrhage in the left basal ganglia region with intraventricular extension

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Diagnosis

- Intracerebral hemorrhage (ICH) is the most deadly form of stroke and leaves many of its survivors with a persistent neurologic deficit
- Consequently, misdiagnosis is potentially catastrophic

Typical clinical presentation

Diagnostic CT scan

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Etiology

- ICH in younger populations is more likely due to chronic hypertension, and the hematoma is more likely to be in the basal ganglia or brainstem
- ICH in older populations is more likely to be lobar, which meet criteria for probable cerebral amyloid angiopathy (age at least 55 years, appropriate clinical history, evidence of multiple cerebral hemorrhages on MRI)

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What
was the
diagnosis?

ICH due to chronic hypertension and warfarin

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Severity of illness

Intracerebral Hemorrhage Score

Variable	ICH Score Points
Hematoma volume > 30 mL	1
Age ≥80 years	1
GCS 3 or 4	2
GCS 5~12	1
Infratentorial hematoma location	1
Intraventricular hemorrhage	1

Scores range from 0 (least severe with low expected mortality) to 6 (the worse possible score with death likely).

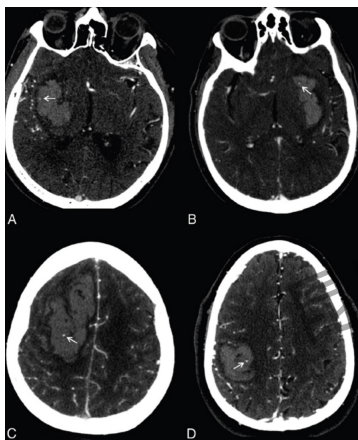
Stroke 2001.

11

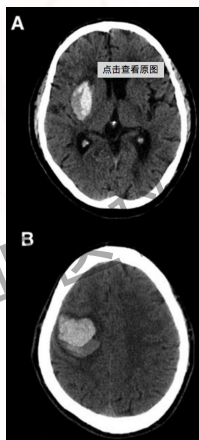
Severity of illness

CT imaging to predict Hematoma Growth in ICH

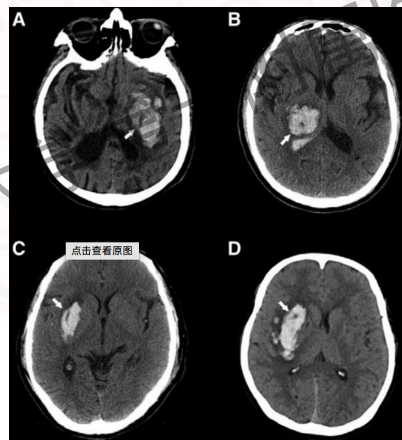
■ CTA: Spot Sign ¹



■ Blend Sign ²



■ Black Hole Sign ³



1. BioMedResearch International 2017. 2. Stroke 2015. 3. Stroke 2016.

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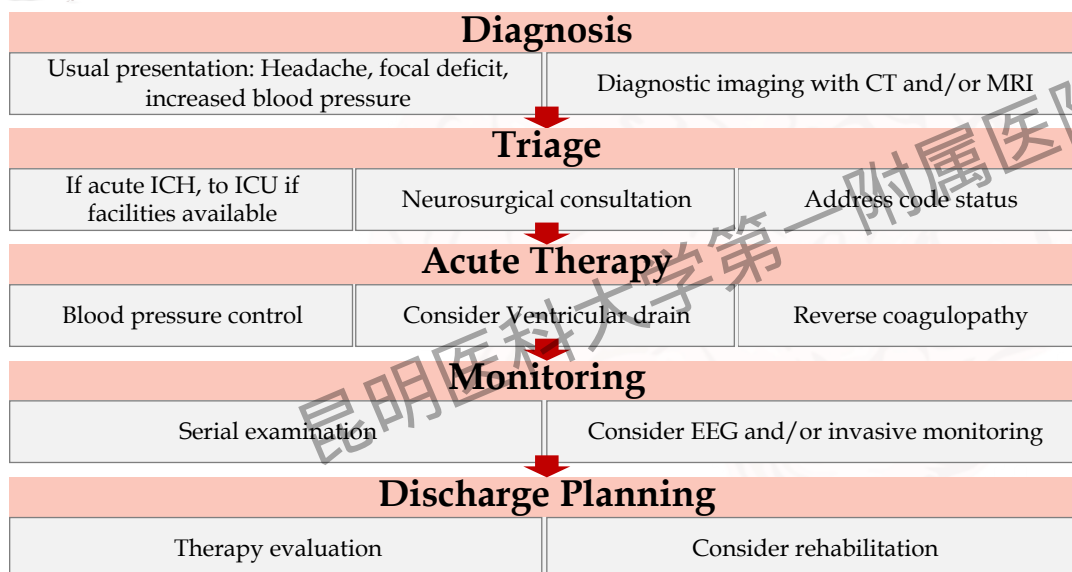
What
degree of
the severity?

ICH score of 3 with Black Hole Sign on CT scan

→ comparatively severe and the hematoma was more likely to be expanded

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TREATMENT



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General Management of ICH

Condition	Recommendation
Anticoagulant medication	Normalization of international normalized ratio (INR)
Blood pressure	<ul style="list-style-type: none"> For patients with systolic blood pressure >150 mmHg and ≤220 mmHg, consider lowering to 140 mmHg For patients presenting with systolic blood pressure >220mmHg, consider aggressive reduction of blood pressure with a continuous IV infusion of an antihypertensive and frequent blood pressure monitoring
Fever	Antipyretic medication; consider ice packs or devices for temperature control (preferably avoiding sedation, as appropriate)
Cerebral edema	Hypertonic saline and/or mannitol, usual goal 320 mOsm/L with weaning over several days
Antiplatelet medication	Consider desmopressin or platelet transfusion
Hyperglycemia	Routine protocol for glucose control
Deep venous thrombosis prevention	Consider mechanical prophylaxis; consider chemoprophylaxis after hematoma size stable for 2~3 days

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What
was the proper
management?

lowering the blood pressure to 140 mmHg
ice packs or devices for temperature control
Hypertonic saline and/or mannitol

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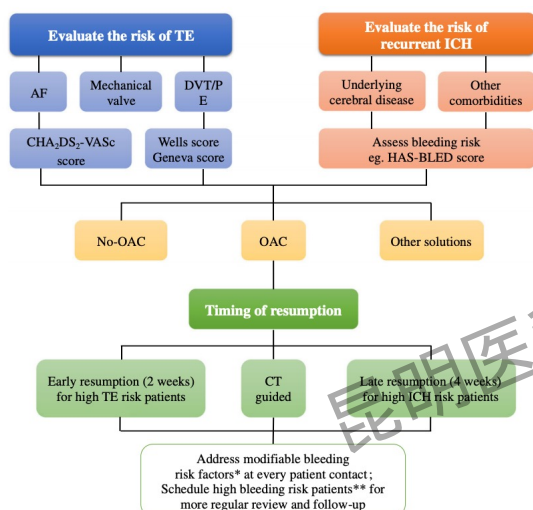
What was the proper management?

When to restart anticoagulation?

This is not well defined. One month is generally considered a reasonable time frame in patients considered to be a low risk for recurrent ICH.

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Anticoagulation Resumption After Intracerebral Hemorrhage



CHA2DS2-VASc = congestive heart failure, hypertension, age ≥ 75 years, type 2 diabetes, previous stroke/transient ischemic attack/ thromboembolism, vascular disease, age 65~74 years, and gender category;

HAS-BLED = hypertension, abnormal renal/liver function, stroke, bleeding history or predisposition, labile international normalized ratio (INR), elderly, drugs/alcohol concomitantly

Given the lack of high-quality evidence to guide clinical decision-making, clinicians must carefully balance the risks of thromboembolism and recurrent ICH in individual patients. We propose a management approach which would facilitate the decision-making process on whether anticoagulation is appropriate, as well as when and how to restart anticoagulation after ICH

Li Y, Lip G Y H. Current atherosclerosis reports, 2018, 20(7): 1-10.

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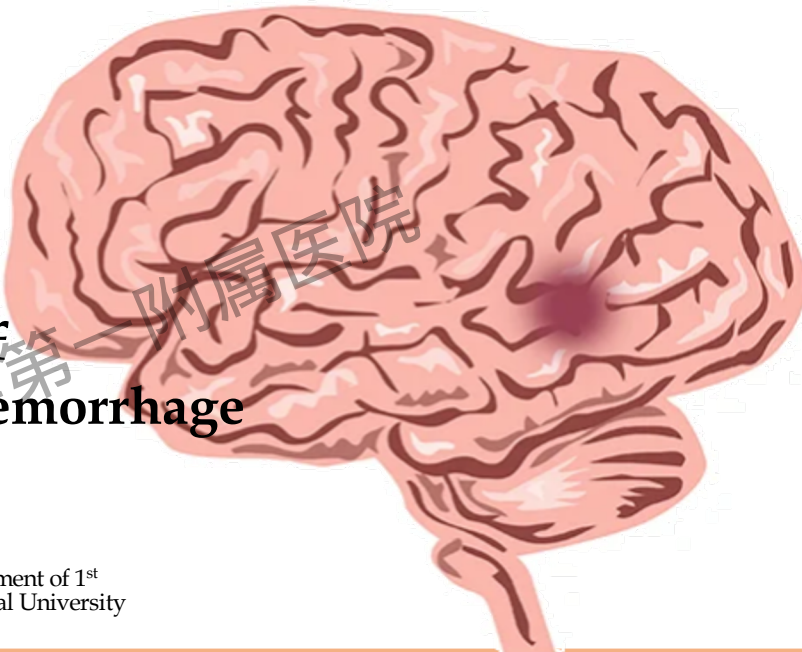
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1. ICH is less common than AIS but has a substantially higher acute mortality and a higher rate of early clinical decompensation¹ and is more likely to cause subsequent disability
2. Obtaining an MRI is desirable to help determine the etiology of intracerebral hemorrhage and is particularly helpful for cerebral amyloid angiopathy
3. The Intracerebral Hemorrhage Score and the signs on CT scan is useful to predict the prognosis
4. Blood pressure reduction and reversal of medications that exacerbate bleeding are likely to improve outcomes

TAKE HOME MESSAGES

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