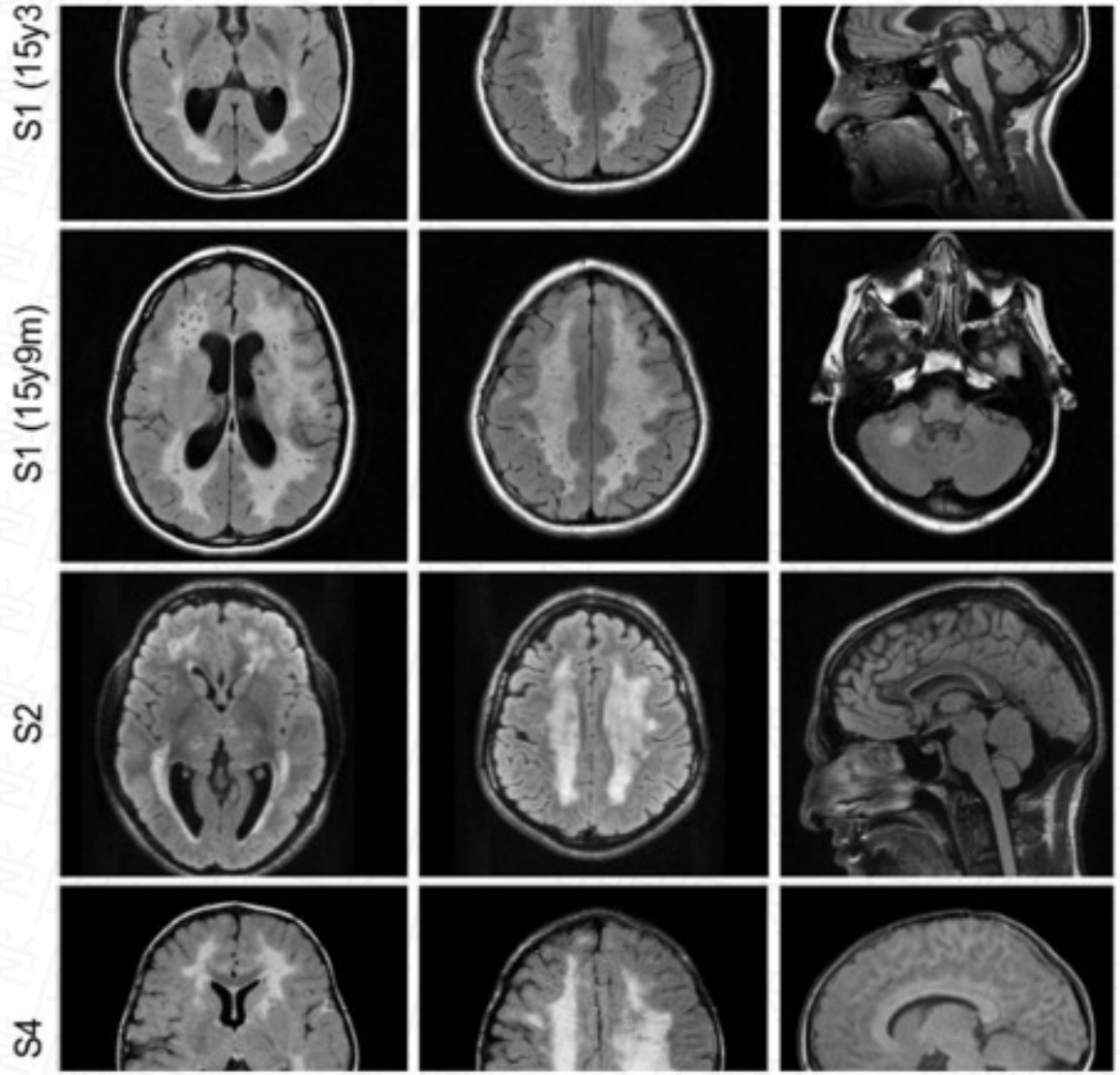
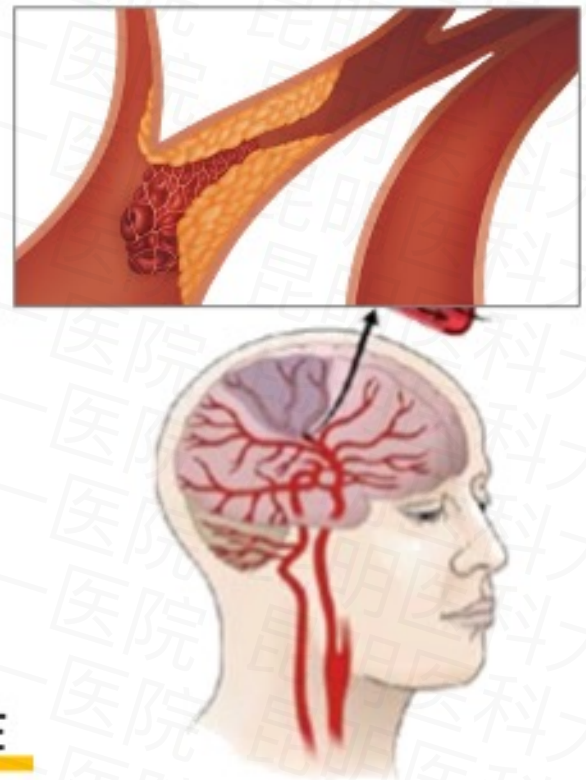
脑卒中
影像学诊断



刘晓蕾
副主任医师 · 硕士生导师
昆明医科大学第一附属医院神经内科

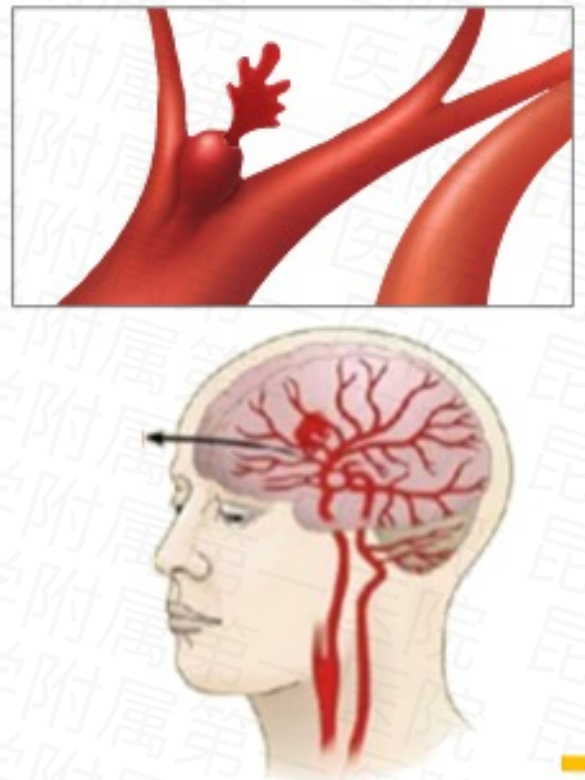
回顾脑卒中的分类

缺血性卒中
80%



脑梗死

短暂性脑缺血发作



出血性卒中
20%

脑出血

蛛网膜下腔出血

影像学在脑卒中诊断中的价值

卒中的诊断

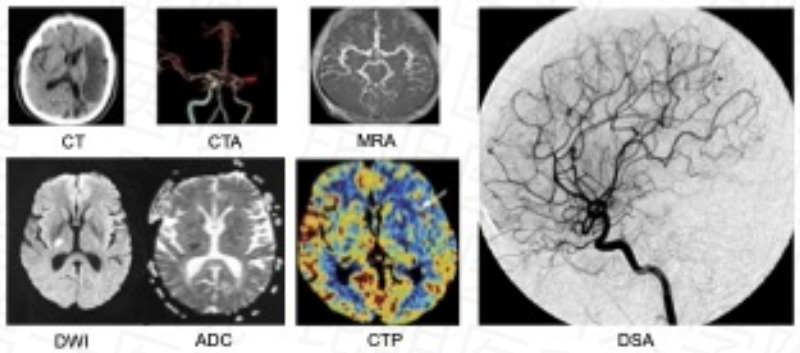
第一步　　临床表现 + 体格检查

第二步　　神经影像学检查：

i 确定卒中性质

ii 确定发病机制

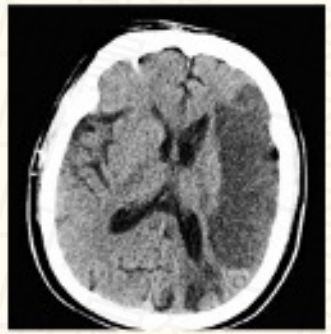
iii判断组织溶栓窗

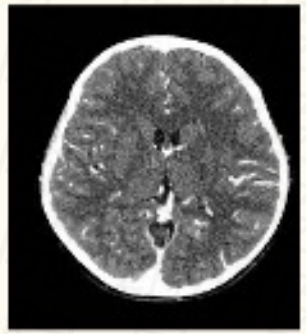


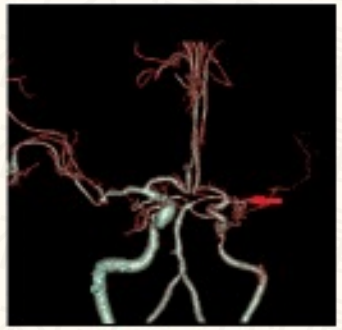
神经影像学分类

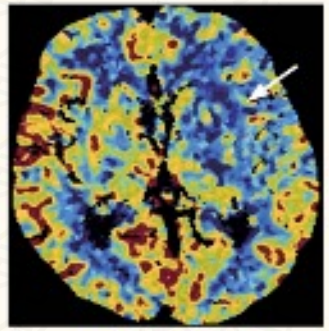
CT

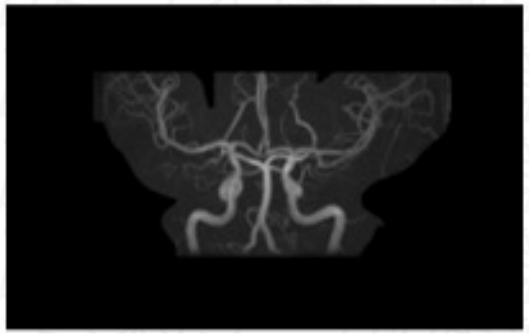
Computed Tomography


CT


CT with contrast

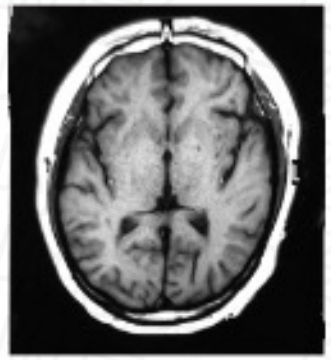

CTA

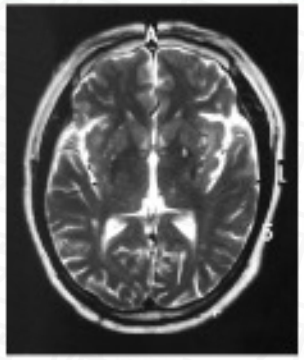

CTP

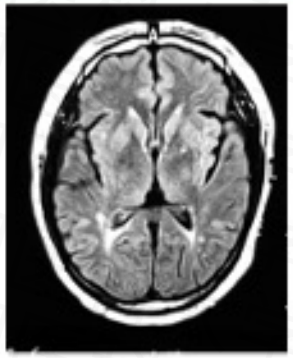

MRA、CE-MRA

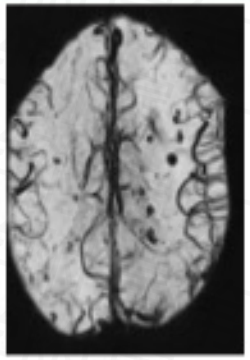
MRI

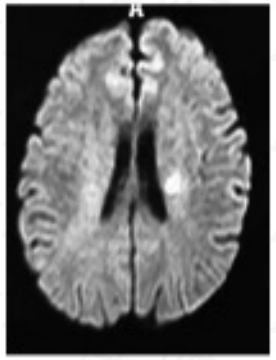
Magnetic Resonance Imaging

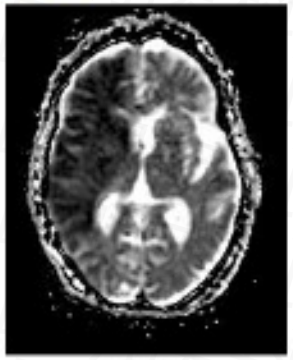

T1

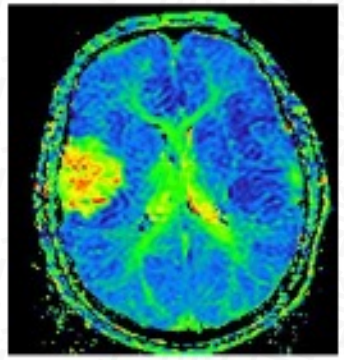

T2


Flair


SWI


DWI


ADC


PWI

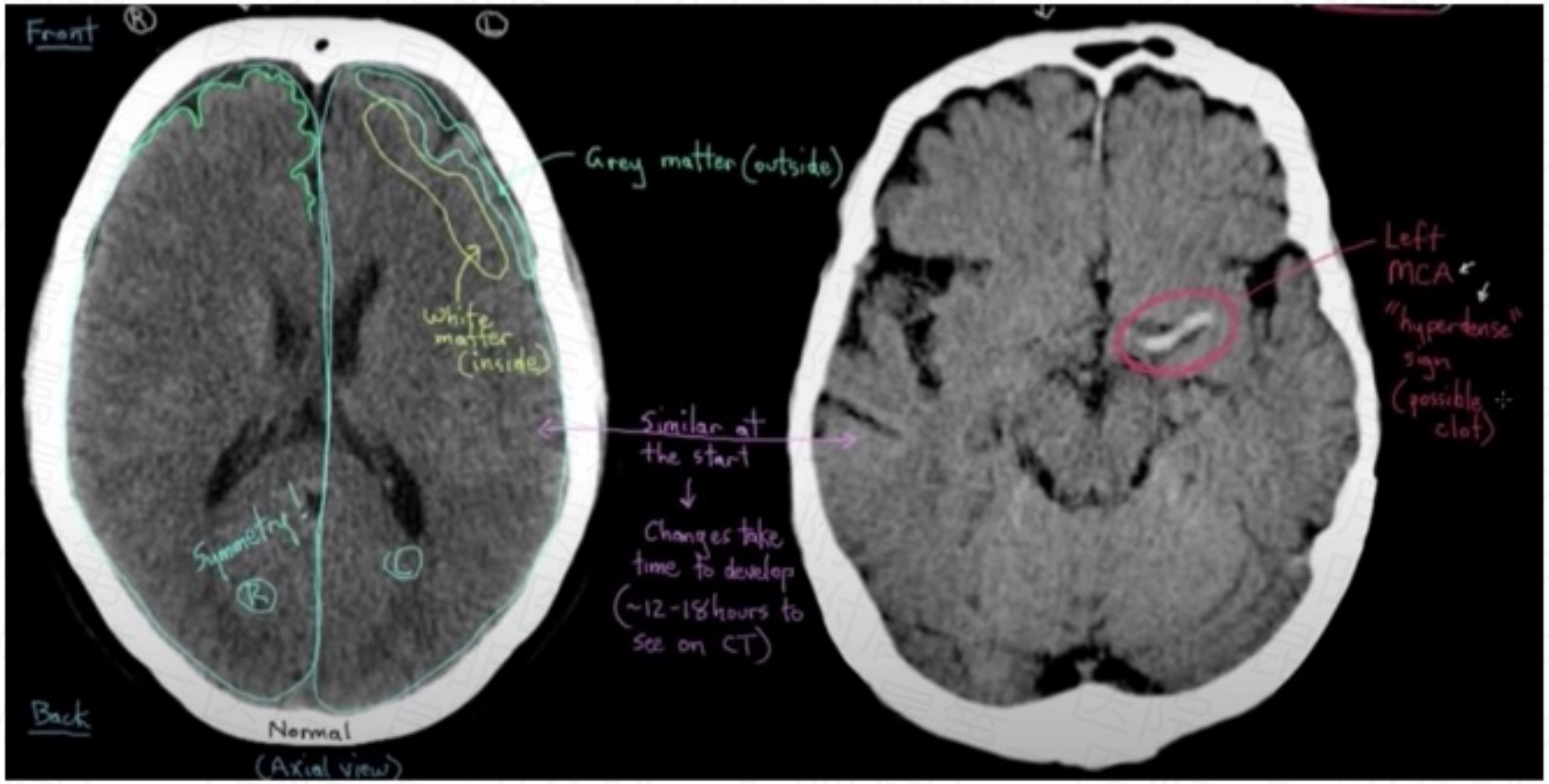
DSA

Digital Subtraction Angiography

急性脑梗死的影像表现

CT

Computed Tomography

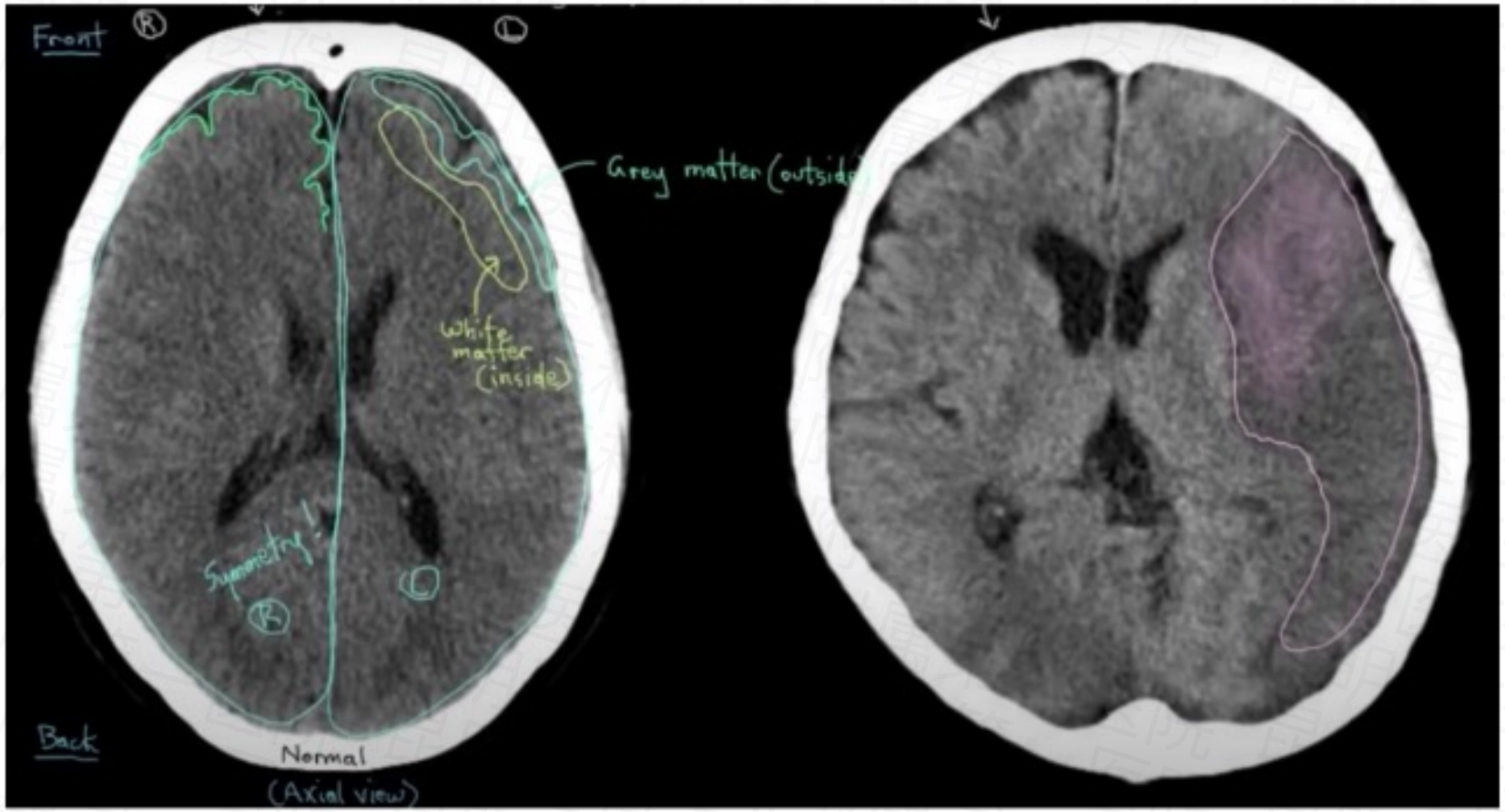


正常头颅CT平扫　　脑梗死数小时的头颅CT平扫

急性脑梗死的影像表现

CT

Computed Tomography



正常头颅CT平扫

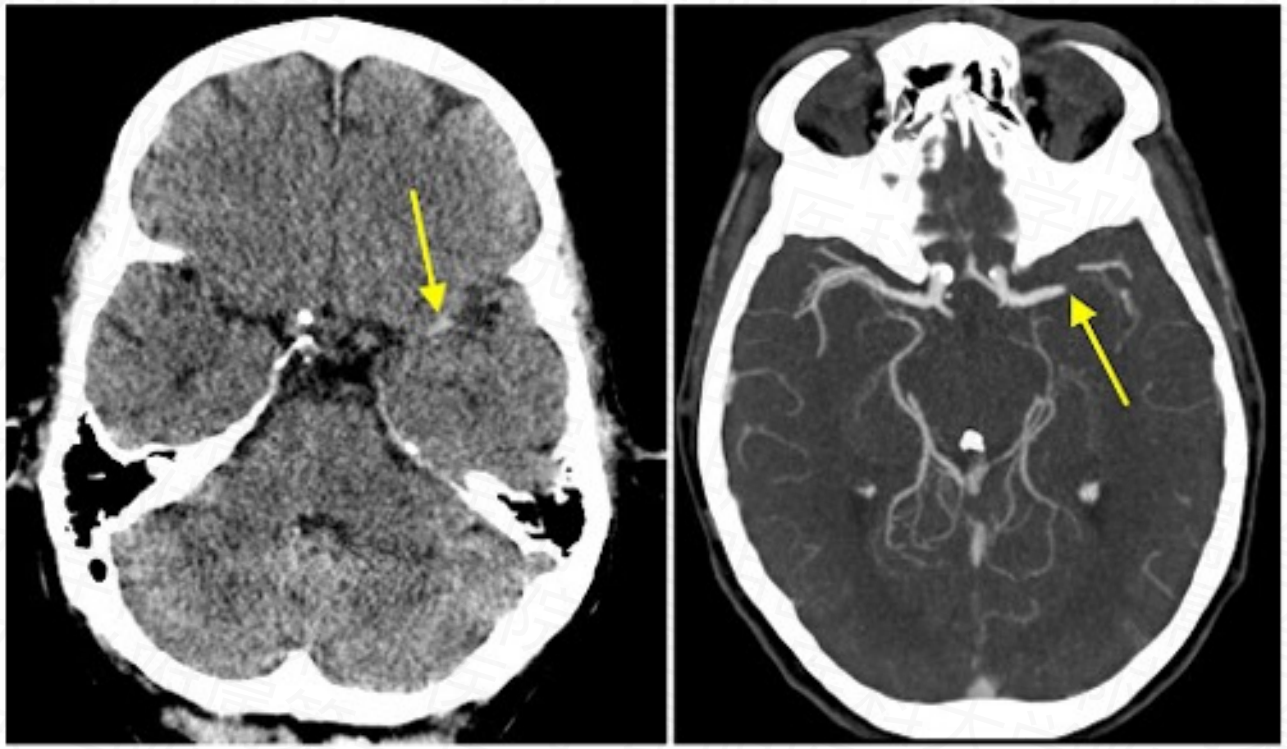
脑梗死48小时的头颅CT平扫

急性脑梗死的影像表现

CTA

CT
A angiography

正常头颅CTA

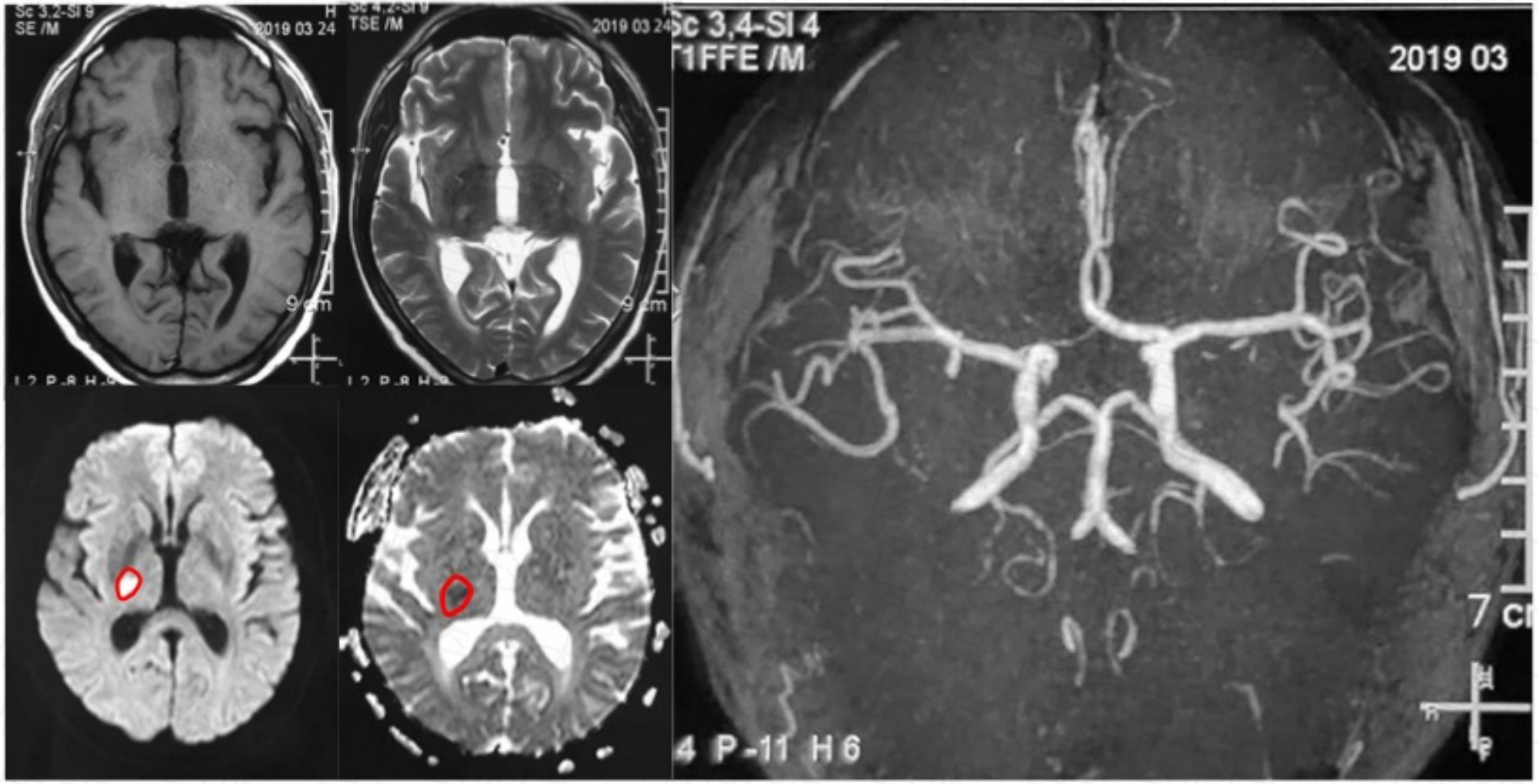


左侧大脑中动脉闭塞患者CT及CTA

急性脑梗死的影像表现

MRI

Magnetic
Resonance
Imaging



急性脑梗死诊治流程

JAMA | Review

Diagnosis and Management of Transient Ischemic Attack and Acute Ischemic Stroke

A Review

Scott J. Mandelkern, PhD, MD; Shyam Prabhakaran, MD, MS

JAMA. 2021;325(11):1088-1098.

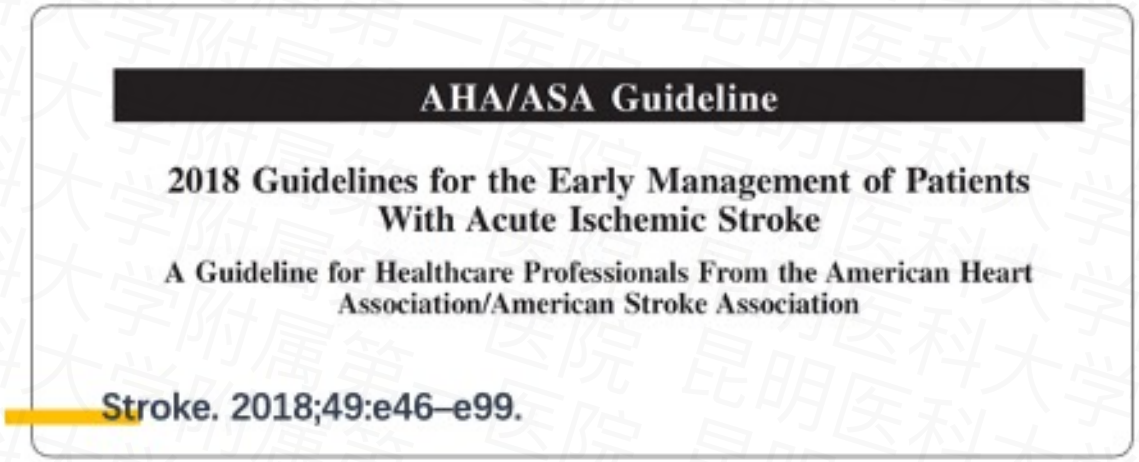
Guideline

EUROPEAN STROKE JOURNAL

European Stroke Organisation (ESO) guidelines on intravenous thrombolysis for acute ischaemic stroke

Eivind Berge[1,*], William Whiteley[2,*], Heinrich Audebert[3], Gian Marco De Marchis[4], Ana Catarina Fonseca[5], Chiara Padiglioni[6], Natalia Pérez de la Ossa[7], Daniel Strbian[8], Georgios Tsivgoulis[9,10] and Guillaume Turc[11,12,13]

European Stroke Journal. 2021, Vol. 6(1) I–LXII



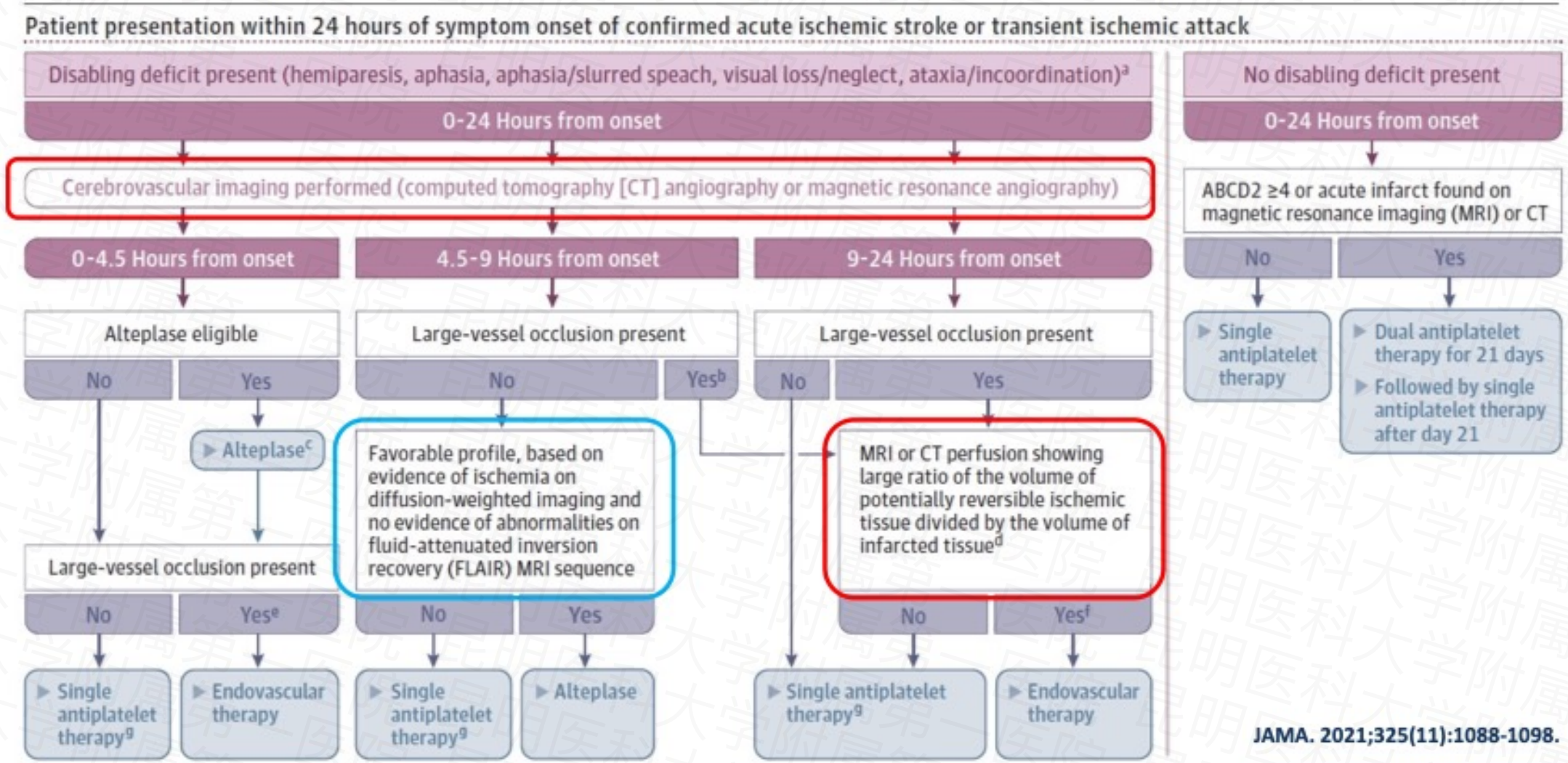
AHA/ASA Guideline

2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke

A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

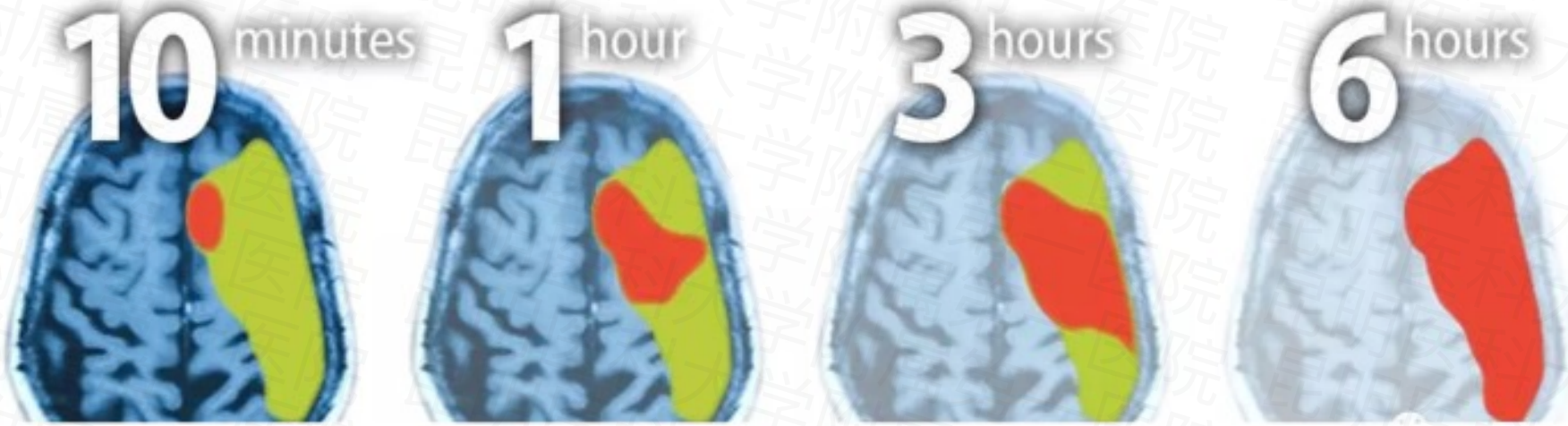
Stroke. 2018;49:e46–e99.

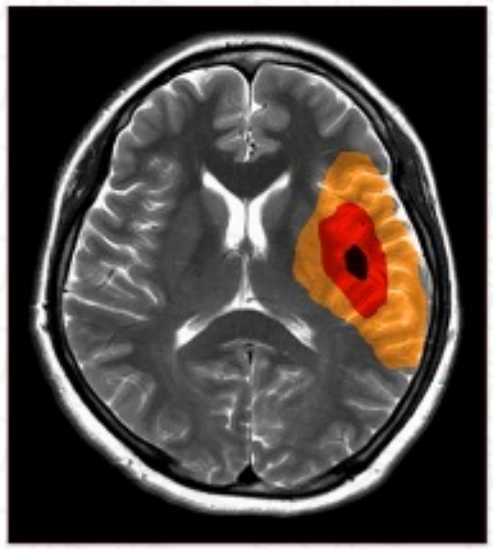
疑似急性脑梗死24小时内影像学检查流程



JAMA. 2021;325(11):1088-1098.

缺血半暗带的理论基础





正常脑组织：
50-60ml/100g/min

脑灌注不足：
20-50 ml/100 g/min

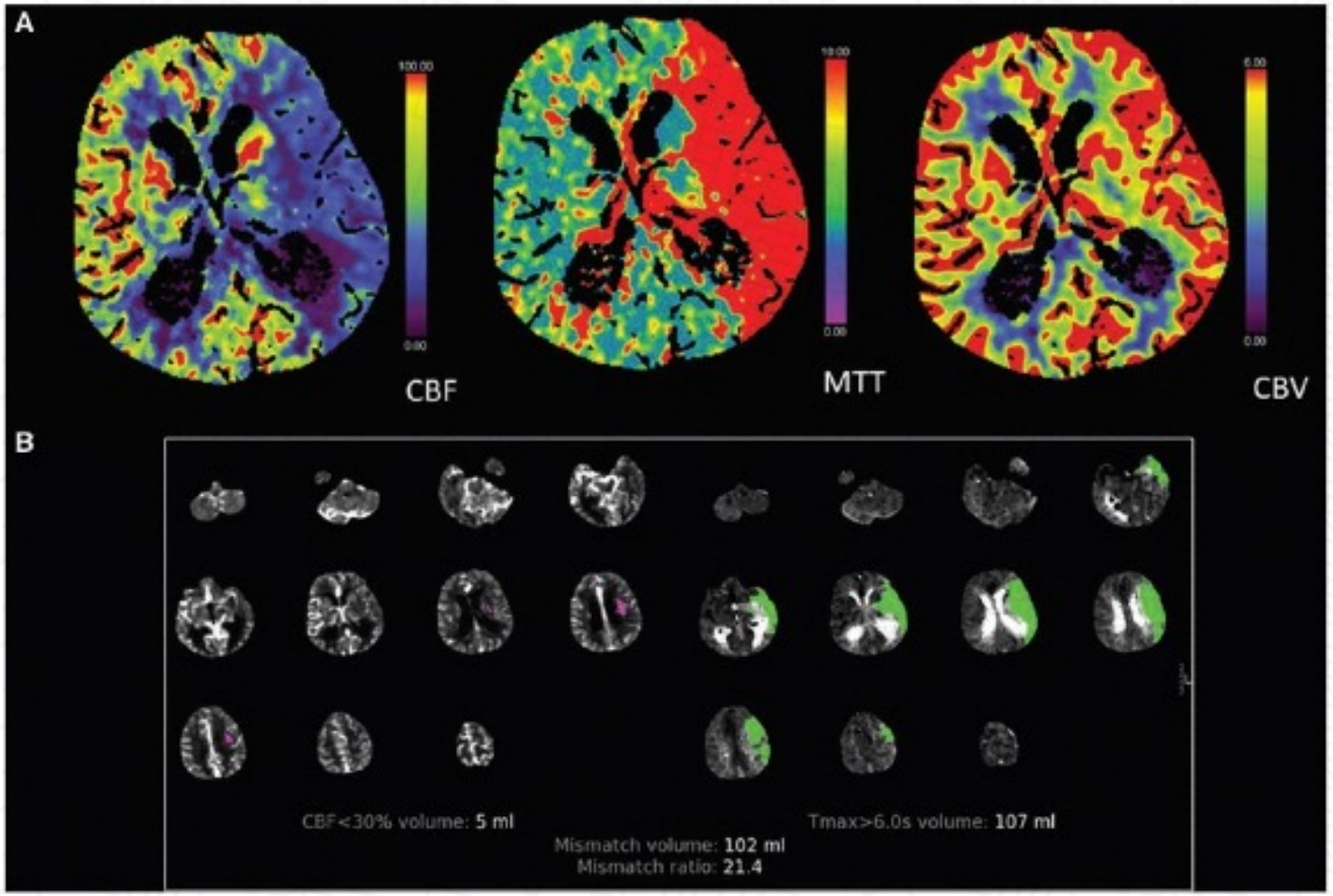
缺血半暗带：
可以挽救的脑组织

死亡脑组织：
<10 ml/100 g/min

梗死核心
rCBF < 30% (CT perfusion) or
ADC < 620 mm^2/s (Diffusion MRI)
or CBV < 1 ml/100 g
缺血低灌注区
Tmax > 6 s (perfusion CT or
perfusion MRI)
缺血半暗带
去除梗死核心区的缺血低灌注区

Clinical MRI of acute ischemic stroke. J Magn Reson Imaging. 2012. 36(2): 259–271.

急性缺血性脑梗死的灌注评估



1. 梗死体积（缺血核心＜70ml）

2. 缺血组织体积/梗死组织体积＞1.2

3. 绝对可逆缺血组织（半暗带）体积＞10ml.

Stroke. 2020;51:00–00. DOI: 10.1161/STROKEAHA.120.032020

脑出血的影像表现

CT

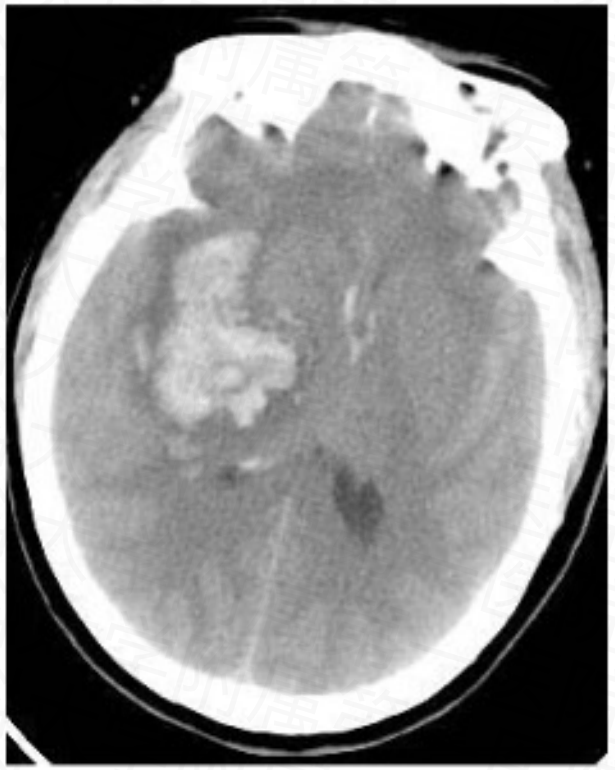
Computed Tomography

FIRST CHOICE

急 性 期

密度高、边缘清

水肿少、占位效应轻



急 性 期

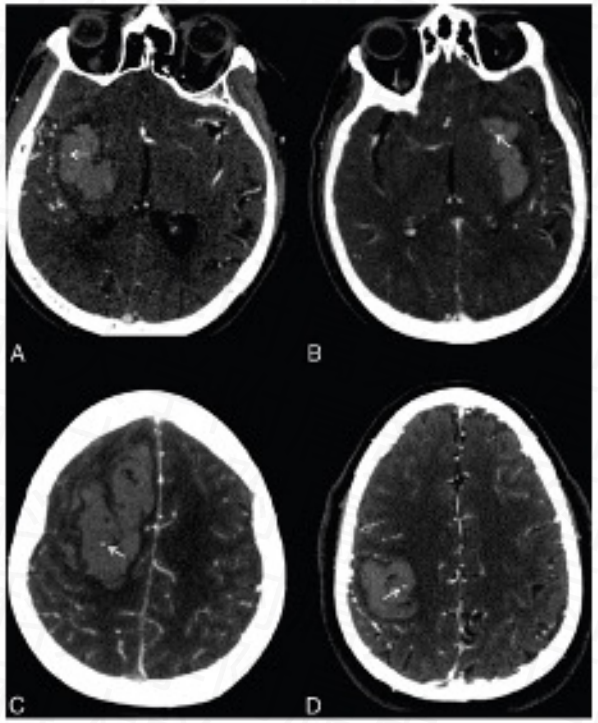
脑出血并破入脑室

急 性 期

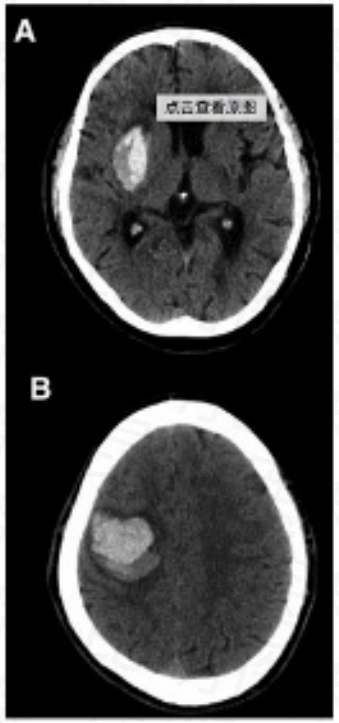
脑出血并破入蛛网膜下腔

提示血肿扩大的影像表现

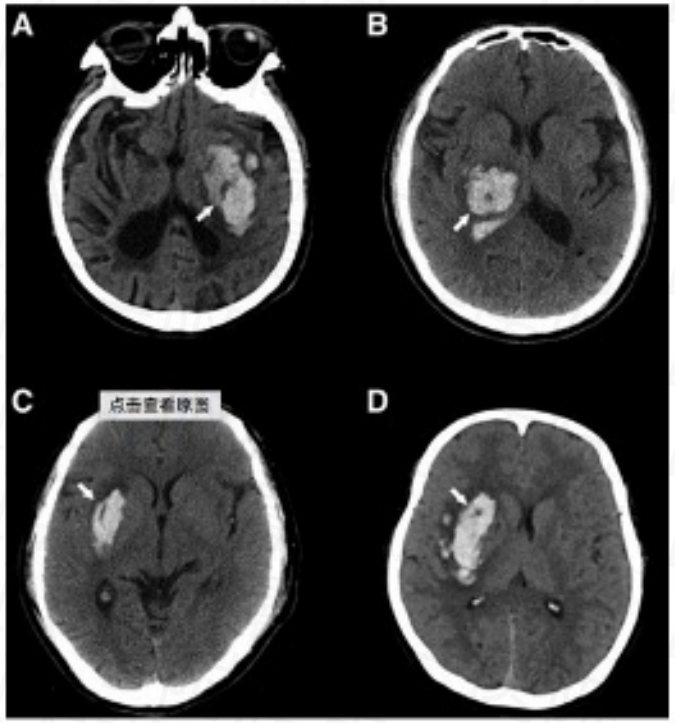
■ CTA点状征



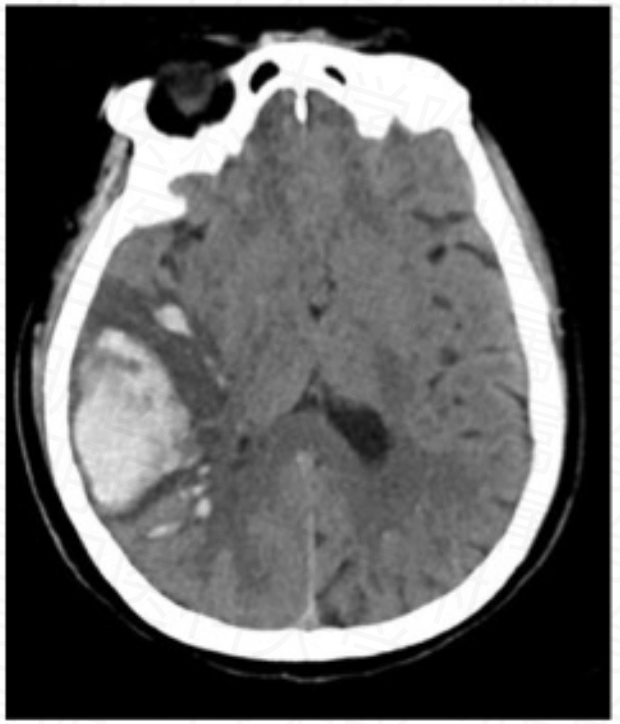
■ 混杂征



■ 黑洞征



■ 岛征

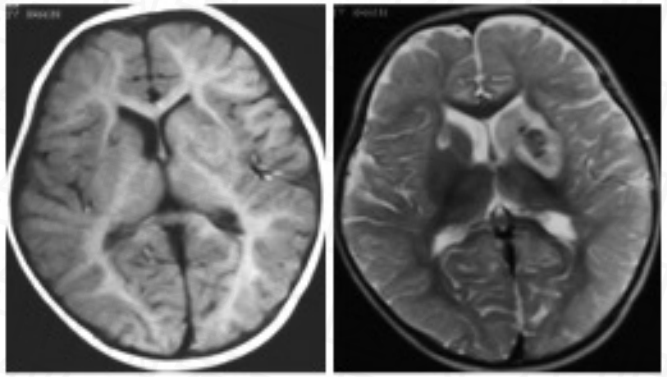


Stroke. 2016.
中国脑出血诊治指南.2017.
AHA/ASA美国自发脑出血诊疗指南.2016.

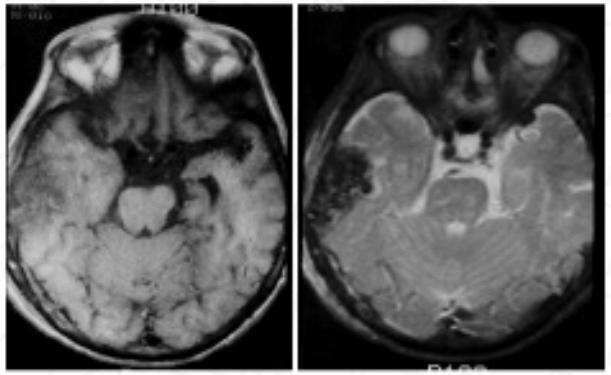
脑出血的影像表现

MRI

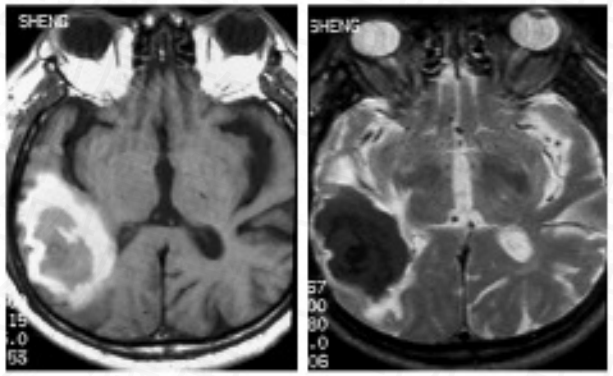
Magnetic
Resonance
Imaging



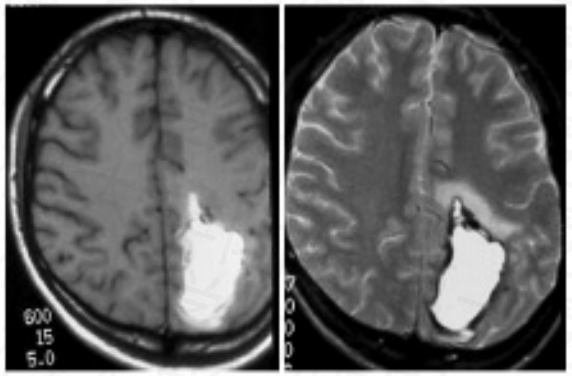
超急性期
含氧Hb，T1等、T2高



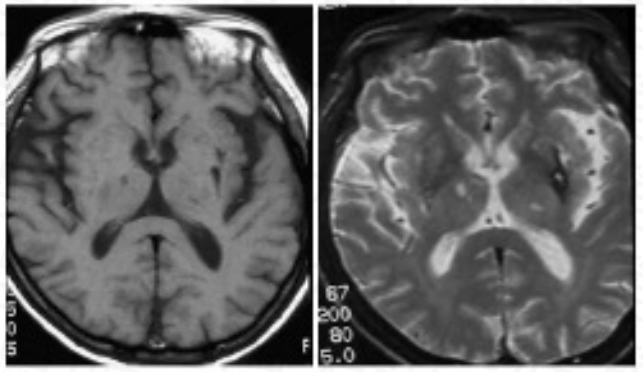
急性期
脱氧Hb，T1低、T2低



亚急性早期
中央：等T1/短T2 **外围**：短T1/长T2



亚急性晚期
中央：短T1/长T2 **外围**：短T1/短T2



慢性期
囊变区：长T1/T2 **囊壁环**：长T1/短T2

蛛网膜下腔出血的影像表现

CT

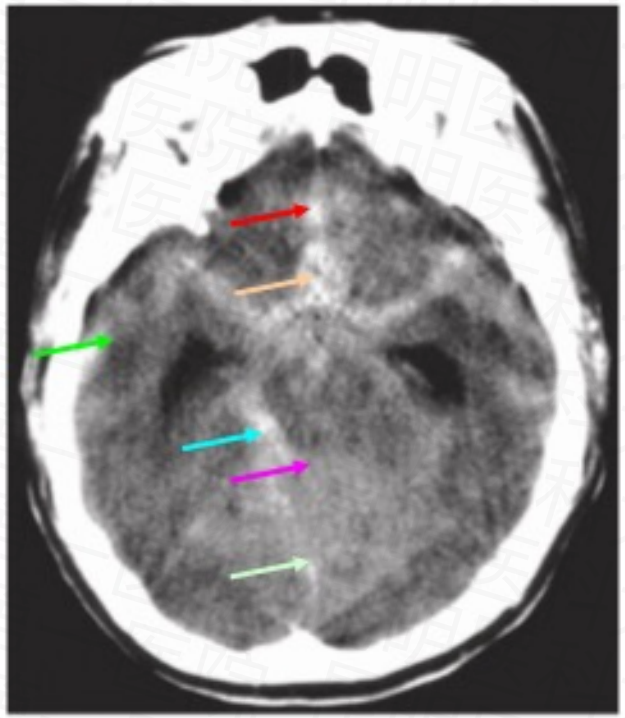
Computed Tomography

FIRST CHOICE

可检出90%以上的SAH

- 大脑外侧裂池
- 前纵裂池
- 鞍上池
- 桥小脑角池
- 环池
- 后纵裂池

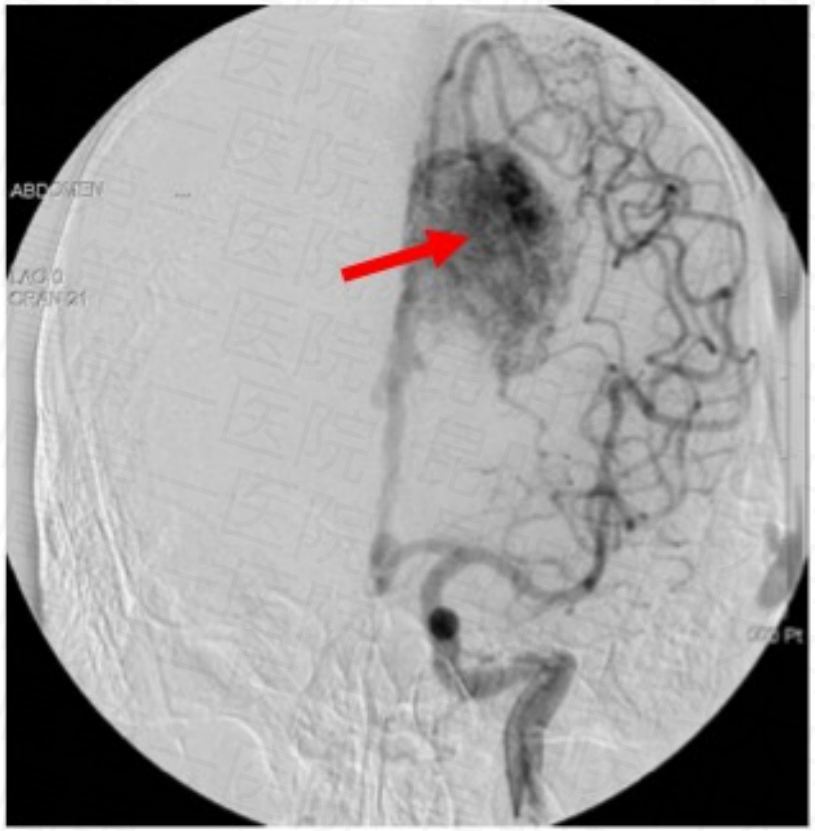
高密度出血征象



蛛网膜下腔出血的影像表现

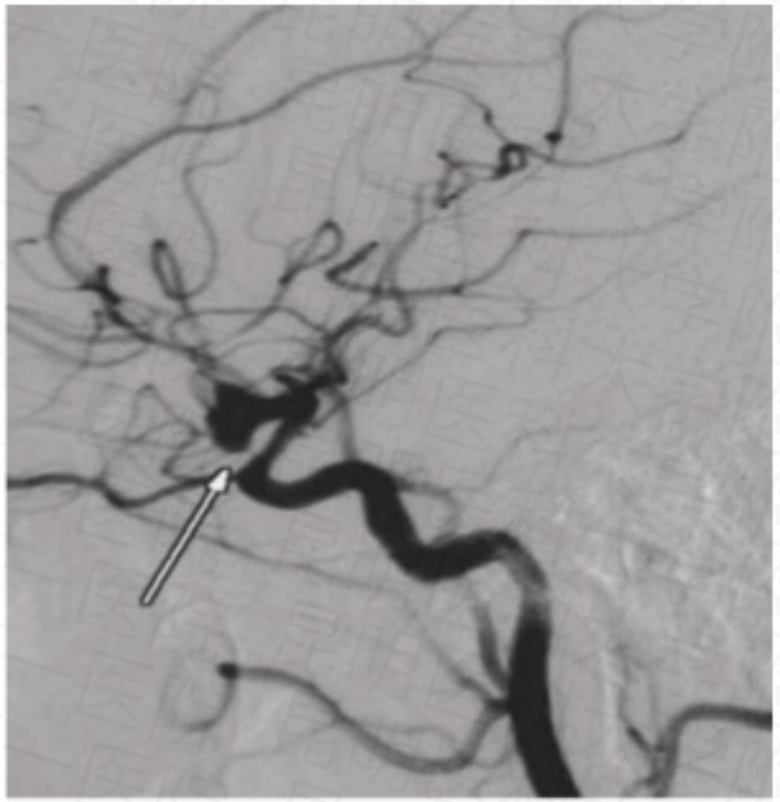
CTA

CT
A angiography



DSA

Digital
Subtraction
Angiography



思考

- 一位70岁老人早餐时突发右侧偏身肢体麻木无力，送到医院应立即选择的影像学检查是什么？

☐ 头颅CT　☐ 头颅MRI　☐ 头颅CTA　☐ 头颅PWI

Take Home Message

- 脑卒中的诊断：急性卒中样起病的神经系统功能缺损症状体征+影像学表现
- 影像学检查首选头颅CT排外脑出血
- 脑梗死急性期有条件应进行灌注成像，分析缺血半暗带以判断有无组织溶栓窗
- 脑梗死尚可通过MRI的表现分析发病机制
- 脑出血及蛛网膜下腔出血均首选头颅CT检查

谢谢！

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副主任医师 · 硕士生导师
昆明医科大学第一附属医院神经内科