



# **The Use of MRI, MRA and Angiography in the Diagnosis of ED Ischemic Stroke, SAH, and ICH Patients**

## **Learning Objectives**

- Review the important clinical and diagnostic findings (including those obtained via head CT) of ED patients who present with suspect ischemic stroke, subarachnoid hemorrhage, and intracerebral hemorrhage.
- Consider when and how other neuroimaging modalities such as MRI, MRA, and angiography may be utilized in ED patients who present with these suspected stroke diagnoses.

## **Background**

Patients frequently present to the Emergency Department (ED) with cerebrovascular accidents (CVAs) such as ischemic stroke, subarachnoid hemorrhage (SAH), and intracerebral hemorrhage (ICH). CT neuroimaging is commonly used to establish these diagnoses. The availability of computer-based digital imaging has allowed the emergency physician to initially review these CT images, discuss the apparent findings with radiology consultants, and to provide preliminary CT findings to neurology and neurosurgery consultants in order to develop an effective treatment plan. This technology has, therefore, enhanced the role of the emergency physician in diagnosing and treating ED CVA patients.

In addition to the use of CT neuroimaging, there is also the increased availability of other neuroimaging techniques such as MRI, MRA, and cerebral angiography. Although most often not indicated, there may be situations in which these tests may augment the information provided standard CT neuroimaging. This is important information for the emergency physician given that these additional diagnostic tests can be resource intensive and pose additional risk to these critically ill stroke patients

This lecture will include a review the major CT findings in ischemic stroke, SAH, and ICH patients. It will then address the special circumstances when the patient's clinical presentation and CT neuroimages may suggest the need for further neuroimaging to be performed in the ED, including the use of these tests.

## **Key Clinical Questions**

- How can CT interpretation be performed systematically in the diagnosis of ischemic stroke, SAH, and ICH in ED CVA patients?
- What are the findings commonly seen in patients with ischemic stroke, SAH, and ICH?
- When might other neuroimaging modalities such as MRI, MRA, and angiography may be indicated in ED CVA patients following CT neuroimaging?