



The Use of Catheter-based Digital Subtraction Angiography in the Initial Workup of Vascular Etiology for Spontaneous Intracranial Hemorrhage

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Introduction

Intracranial hemorrhage (ICH) is associated with the highest rates of morbidity of all strokes. A subset of ICH occurs secondary to an underlying vascular abnormality, and effective recognition and management of these lesions may prevent rebleeding. Despite the prevalence of non-invasive studies including magnetic resonance imaging (MRI) and computed tomographic angiography (CTA), digital subtraction angiography (DSA) remains the gold standard for detecting these lesions. The use of DSA in the workup for ICH is limited by its risks; however, MRI and CTA are limited in their ability to resolve small vascular lesions.

Methods

Retrospective review of a prospectively maintained database of 396 patients presenting with spontaneous ICH at our institution between 7/2013-7/2014 identified 115 patients who underwent DSA as part of the workup. Patients with concurrent subarachnoid hemorrhage were excluded, and the remaining 84 ICH patients were analyzed. DSA was performed as first-line investigation in young patients without significant medical co-morbidities.

Results

The median age of patients was 57 years old, 54% had a diagnosis of hypertension, and 18% were diabetic. Only 31% of the patients were on anti-platelet therapy, and 14% were on anti-coagulation at the time of presentation. A vascular etiology was found in 26% of the patients evaluated with DSA, including cerebral aneurysm (4%), arteriovenous malformation (13%), arteriovenous fistula (1%), venous sinus thrombosis (4%), vasculopathy (2%), and pseudoaneurysm (1%). Importantly, in patients with positive DSA, 32% had negative findings on non-invasive imaging studies. Only one patient (1%) suffered a complication, a groin hematoma that was managed conservatively without further complication.

Conclusions

DSA remains essential in the diagnosis of vascular etiology for ICH, particularly in a preselected high-yield population of young patients with low rates of medical co-morbidities. In this population, DSA can be safely performed and may minimize the need for multiple non-invasive studies and may expedite treatment of these lesions.

Learning Objectives

- DSA can be safely performed and may minimize the need for multiple non-invasive studies and may expedite treatment of these lesions.
- A significant proportion of vascular lesions may be missed if only non-invasive studies are used in patients with ICH.
- A clear vascular etiology for ICH can be found on DSA in 26% of patients.