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Celebrating 35 Years of the AJNR

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Digital Subtraction Cerebral Angiography by Intraarterial Injection: Comparison with Conventional Angiography

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For 4 months, a prototype digital subtraction system was used to obtain images of the cerebral vasculature after intraarterial contrast injections. In 12 intraarterial injections were recorded with both a digital subtraction unit and a conventional direct magnification film-screen system. The digital subtraction and conventional film subtraction images were compared and graded for quality and information by three skilled observers. In addition, quantitative measurements of contrast performance and spatial resolution were obtained on both the digital system and the conventional film-screen system. In a clinical setting, both the digital subtraction and the conventional film-screen systems provided similar quality images and angiographic information. Contrast-detail curves demonstrated that digital subtraction angiography formed conventional film technique for low-contrast objects. Digital subtraction angiography also reduced the time required to obtain the angiogram, markedly reduced film cost, and lowered the contrast agent burden.

Digital subtraction imaging of the extra- and intracranial cerebral vasculature after intravenous injections of contrast material is becoming an established screening procedure [1-3]. Patient motion, superimposition of multiple contrast agent burden, and suboptimal resolution [4] restrict the diagnostic value of this method. Early work has suggested, however, that digital subtraction imaging of intraarterial contrast injections can provide images of superior diagnostic quality to obviate conventional film-screen angiography, thus reduce film cost, and possibly decreasing time required for the examination [5]. For 4 months, we have evaluated intraarterial cerebral digital subtraction angiography (DSA). In selected instances, a comparison of digital and film-screen angiography was made in the same patient. In addition, quantitative measurements of contrast resolution and contrast sensitivity were obtained for both the digital and film-screen systems.

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Subjects and Methods

Equipment

The DSA unit (DF 100, DSA) which included a progressive interlaced with a 9-inch (22.8 cm) fluoroscopy unit (Fluoricon 300, G.E. Medical Systems) and a 100, G.E. Medical Systems) x-ray tube (Maxi 100, G.E. Medical Systems).

Conventional 1.8-2.0 mAs and Cronex 4 film (duPont, Inc.) 125, G.E. Medical Systems).



Falx and Interhemispheric Fissure on Axial CT: II. Recognition and Differentiation of Interhemispheric Subarachnoid and Subdural Hemorrhage

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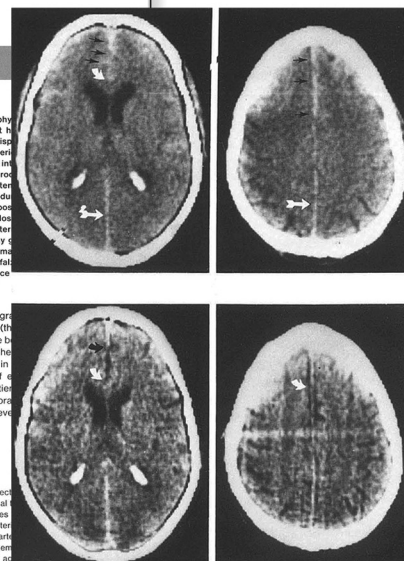
Interhemispheric hyperdensity or unenhanced computed tomography (CT) scans of the head have been considered a sign of subarachnoid hemorrhage, the "falx sign." It has also been identified as a normal feature and has also been seen with interhemispheric hemorrhage. To determine the differential features of interhemispheric subarachnoid hemorrhage and 32 patients with interhemispheric subdural hemorrhage were reviewed. Subarachnoid hemorrhage produced interhemispheric hyperdensity only, with a zigzag contour and external calvarium to the rostrum of the corpus callosum. Interhemispheric subdural hemorrhage produced unilateral crescentic hyperdensities that are largest in the posterior part of the fissure, behind and above the splenium of the corpus callosum. Spheric hyperdensity in children is more complex. Because the anterior falx is narrow in younger patients, subarachnoid hemorrhage may be difficult to recognize. They produce asymmetric thickening of the falx extension over the tentorium. They are, however, of great significance and generally seen in abused patients and carry a poor prognosis.

Interhemispheric hyperdensity on unenhanced computed tomography (CT) scans of the head has been originally described as a sign of subarachnoid hemorrhage [1-4] (the "falx sign"), but other causes of interhemispheric hyperdensity have since been identified, including the normal falx [5-7] and interhemispheric subdural hemorrhage. We have also noted transient interhemispheric hyperdensity in cerebral edema. To determine the differential CT features of these conditions, 50 patients with subarachnoid hemorrhage, 32 patients with interhemispheric subdural hemorrhage, and three children with cerebral edema were reviewed. On the basis of this material, criteria have been developed to differentiate these processes from the normal falx.

Materials and Methods

Subarachnoid Hemorrhage

CT scans of 50 patients with subarachnoid hemorrhage were retrospectively reviewed. Criteria for selection were: (1) initial scan within 3 days of onset; (2) spinal fluid evidence of a source of hemorrhage (e.g., aneurysm or arteriovenous malformation [AVM]) or (3) CT evidence of blood within subarachnoid spaces (interhemispheric fissure). In addition, at least one of the following criteria was required: (1) angiographic evidence of a source of hemorrhage (e.g., aneurysm or arteriovenous malformation [AVM]) or (2) surgical and/or postmortem confirmation of hemorrhage. There were 23 males and 27 females, varying from 3 months to 81 years of age. Findings in this group were compared with those in 200 normal patients (see part 1 of this article [5]).



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