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Life at the End of the Tunnel: Why Emergent CT Angiography Should Be Done for Patients With Acute Subarachnoid Hemorrhage

We read with interest the provocative recent editorial by Kallmes et al[1] condemning the use of CT angiography (CTA) in the work-up of patients with acute subarachnoid hemorrhage (SAH). We feel compelled to express our disagreement. Our experience with CTA as a first-line screening technique in these patients was published recently[2] and shows that CTA is a great tool not only for detecting aneurysms (sensitivity, 98%; specificity, 100%; positive predictive value [PPV], 100%; negative predictive value [NPV], 82.3%) but also to triage patients to the proper treatment method (surgical clipping versus endovascular coiling). If there is uncertainty regarding the potential for coiling, these patients should have conventional angiography to make this decision. Multiple aneurysms can be readily detected by CTA,[2] contrary to the statement by Kallmes et al that CTA will miss aneurysms that were the true source of the hemorrhage. If an aneurysm is detected at CTA but uncertainty persists regarding the source of a hemorrhage, intra-arterial cerebral, or digital subtraction, angiography (DSA) is indicated to search for another potential source of bleeding.

Kallmes et al express their concern that CTA does not routinely detect small arteries such as Huebner or the anterior choroidal artery. If the aneurysm is suitable for coiling on the basis of CTA, these patients have a DSA under general anesthesia at the time of the proposed coiling, and all branches are carefully scrutinized. Performing the diagnostic DSA at the same time as the proposed coiling avoids an unnecessary delay between these 2 procedures and optimizes the quality of the diagnostic study because it is done with the benefit of general anesthesia. At surgery, clipping is performed after a careful dissection, with recognition of all branches including perforators.

Kallmes et al correctly highlight the need for swift management of patients with SAH. CTA is done immediately after the recognition of a SAH on a plain CT of the head. This expedites an early triage to the appropriate management and, as mentioned above, avoids delay between the diagnostic angiogram and the coiling. The algorithm suggested in our study[2] has been used successfully in our institution for the last 3 years for more than 300 patients presenting with acute SAH. Not 1 patient has died or experienced an untoward clinical consequence as a result of a missed diagnosis, and the risk for a separate diagnostic conventional angiography was avoided in most patients.[3] Multiple other groups would agree with our opinion,[4-6] including the most recent publication by Westerlaan et al[4] who, in addition to reporting their own results with SAH and CTA (PPV, 99%; NPV, 90%; sensitivity, 96%; specificity, 98%; and accuracy, 96%), have summarized the literature to date.

Of course, CTA has its false-negative cases, not unlike any other imaging technique including DSA. For this reason, whenever a CTA result is negative in the face of an acute SAH, a DSA is indicated. Overall, a substantially lower number of patients with SAH need DSA. Although it might seem conveniently justifiable to perform a DSA for all patients, the recent advances in CT technology and the above publications make this approach highly unethical.

In consideration of the usefulness of CTA in cases of patients with SAH, our experience has clearly not been that of "death by nondiagnosis" but rather faster, safer, and cheaper (ie, better) care. We, too, are "angiographers" performing endovascular treatment of aneurysms at a tertiary medical center with a large neurosurgical service. When reading the editorial by Kallmes et al, one cannot help conclude that their protests are the obligatory last spasms of a dying, outclassed, antiquated way of practice that is the "diagnostic" catheter angiogram.

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