CASE REPORT

DIAGNOSIS OF A RUPTURED CEREBRAL ANEURYSM ON 128 SLICE CT CEREBRAL ANGIOGRAPHY
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ABSTRACT: Conventional angiography is the gold standard for detecting cerebral aneurysm but multislice CT cerebral angiography has gained significant role in diagnosing cerebral aneurysms because of its non invasive nature and increasing sensitivity to detect aneurysms owing to latest technological advances. We report a case of ruptured cerebral aneurysm diagnosed on 128 slice CT cerebral angiography with intraoperative correlation.

KEYWORDS: 128 slice CT cerebral angiography, Aneurysms.

INTRODUCTION: Digital subtraction angiography (DSA) has been the standard of reference for the detection and characterization of intracranial aneurysms because of its high spatial resolution and large field of view, but it has the disadvantage of being invasive and operator dependent. As a result of recent innovations in CT scanner and workstation technology, Computed Tomographic Angiography (CTA) has become a useful, non-invasive imaging technique for evaluating cerebrovascular disease and can be first line investigation where CTA is available. We report a case of ruptured intracranial aneurysm detected on 128 slice CT cerebral Angiography with intraoperative correlation.

CASE HISTORY: A sixty four year old female with a acute history of severe headache and diagnosed as suffering from acute subarachnoid haemorrhage on plain CT, was referred for CT cerebral angiography for detection of ruptured cerebral aneurysms if any. CT cerebral angiography was performed on our 128 slice CT scanner. 60 ml of non-ionic contrast (OMNIPAQUE, 350mg/ml) and 25 ml of saline was infused through antecubital vein with power injector and bolus tracking was used to initiate scanning. Both arterial and venous phase were taken. Acquired images were analysed at PHILIPS BRILLIANCE Workstation. Images were viewed in multiple views and 3D reconstruction. A diagnosis of ruptured aneurysm arising from supraclinoid portion of left internal carotid artery was made (Figures 1 & 2). These findings were confirmed and intraoperative an aneurysm clip was positioned at the site of aneurysm. Postoperative CT cerebral angiography was performed to know status of the clip and aneurysm (Figure 3 & 4). There were no complications after surgery.

DISCUSSION: One of the most important causes of subarachnoid haemorrhage is ruptured cerebral aneurysm. Cerebral digital subtraction angiography has been used as the gold standard for aneurysm detection.[¹,²,³,⁴] However, DSA has the disadvantage of being an invasive study. The risk of acquiring a permanent neurologic deficit with cerebral angiography in patients with subarachnoid haemorrhage is around 0.1%.[⁵,⁶,⁷] Computed tomographic cerebral angiography is...
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a noninvasive imaging modality that is being increasingly used for the evaluation of suspected intracranial aneurysms. The introduction of 64 slice and 128 slice CT scanners has greatly advanced the role of CT angiography in neurovascular imaging.\cite{8,9,10}

The technique of CT angiography entails fast thin section volumetric spiral CT examination performed with a time optimized bolus of contrast medium.\cite{11} A bolus tracking method is used routinely to achieve optimal synchronization of contrast medium flow and scanning. Usually 70-80 ml of non-ionic contrast material is administered followed by a saline chase. Once the source images are acquired, CT angiography data can be evaluated by variety of techniques. The most widely used techniques are multiplanar reformation (MPR), thin-slab maximum intensity projection (MIP) and volume rendering. Sophisticated segmentation algorithms, vessel analysis tools and automatic lumen boundary definition are established techniques.

Aneurysm if identified is characterized according to shape as saccular, lobulated or fusiform. Signs of aneurysmal rupture like lobulated appearance, tit sign or contrast extravasation are documented. Imaging after surgical aneurysm clipping has traditionally been achieved with conventional catheter-based angiography. CT angiography may provide an acceptable alternative in many cases.\cite{12} It can often effectively depict aneurysm remnants, demonstrate patency, stenosis, or vasospasm in the adjacent parent vessels. Accurate detection and characterization of intracranial aneurysms is an essential prerequisite for surgical treatment planning.

Pitfalls of CT angiography include lack of visibility of small arteries, difficulty in differentiating the infundibular dilatation at the origin of an artery from an aneurysm, the kissing vessel artifact, demonstration of venous structures that can simulate aneurysms, inability to identify thrombosis and calcification on three-dimensional images, and beam hardening artifacts produced by aneurysm clips. Small perforating arteries with a diameter below 0.5 mm are not visible on CT angiograms.\cite{11,13}

Recent studies found higher overall detection rates of up to 97\%, and some authors already solely rely on the findings of CT angiography in patients with subarachnoid haemorrhage.\cite{11} Imaging after surgical aneurysm clipping has traditionally been achieved with conventional catheter-based angiography, CT angiography (CTA) may provide an acceptable alternative in many cases.\cite{14,15}

CONCLUSION: Digital subtraction CT angiography can be the preferred noninvasive modality for the evaluation of intracranial aneurysms in patients with acute subarachnoid haemorrhage because of its high diagnostic accuracy, short scan time and noninvasiveness.\cite{4,13,16} Negative CT angiography findings in a patient with SAH must always be corroborated with DSA. CTA is an accurate imaging technique for detection and characterization of intracranial aneurysms and has the potential to substitute, in most cases, for DSA.

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**Figure 1:** 3D CT angiography axial view image showing aneurysm arising from supraclinoid portion of left internal carotid artery (arrow).

**Figure 2:** 3D CT angiography oblique view showing the aneurysm (arrow).

**Figure 3:** Post-operative axial CT image showing the aneurysmal clip.

**Figure 4:** Post-operative CT angiography showing the aneurysmal clip.
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