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Aneurysms of the Anterior communicating artery complex;Surgical Side selection based on CT Angiographic findings: Single center initial experience.

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Background

The anterior communicating artery (ACOA) complex accounts for 30% of intracranial aneurysms. The ACOA is the single most common artery to give rise to such pathology(1). Being a midline structure, approaching these lesions surgically from either side of the head can be strategized based on diagnostic imaging allowing better trajectories for aneurysmal neck exposure and clipping.

Objective

We sought to analyze success of surgical side selection for clipping of aneurysms of the anterior communicating artery complex based on information gathered from CT angiographic images.

Methods

20 patients with anterior communicating artery complex aneurysms confirmed radiologically by CTA and who underwent surgery via a pterional approach were the subjects of this study.

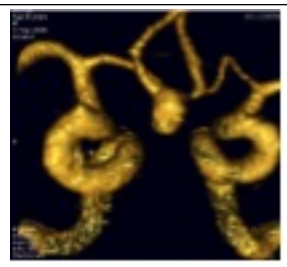
Study of the angioarchitechture of the whole complex focusing on aneurysm morphology, site, shape, direction of projection, size of the aneurysm as well as the surgical neck and its height from the skull base were examined in the produced images. Measurements and configuration of parent arteries forming the complex and associated anomalies were analyzed and

Results

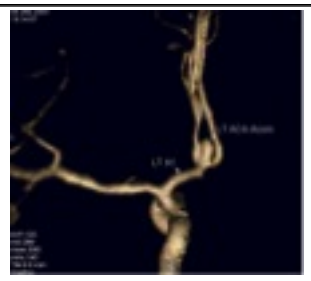
CTA clearly demonstrated all aneurysms with limitations in delineating those close to the skull base. Diagnosed aneurysms of the complex were saccualr ACOA aneurysms. 90% from the junction of a dominant A1 with the AcoA. Only 10% originated from the AcoA itself. Right and left dominancy of A1 was 40% and 50% respectively. Equal sized A1s were in 10% of cases. Aneurysms of AcoA it self had equal sized A1s. Those at junction of A1 and AcoA had a dominant ipsilateral A1 and projecting to the contralateral side. Common projections were anterior and superior. 95% were small (55% were less than 5mm) and 5% were large in size.

Small arteries and perforators were poorly delineated if at all. A hypoplastic A1 was the most common associated anatomical anomaly found in 16 patients. Absent A1 in 2 patients, found to be less than 0.5mm intraoperatively. Fenestration of the AcoA was found in 2 patients and a third A2 also in 2 patients.

Analysis of aneurysm projection, relation to A2 plane and ACOA complex configuration showed variable projections with either a closed or open A2 plane. Type 1 aneurysms were approached from dominant A1 side. Type 2 & 3 were approached from side at which proximal A2 was posteriorly displaced (open A2 plane) regardless to dominant A1 side. Superior and posterior aneurysms with



3D-CTA: Rt Anteriorly projecting A1-ACOA junction type 1 aneurysm

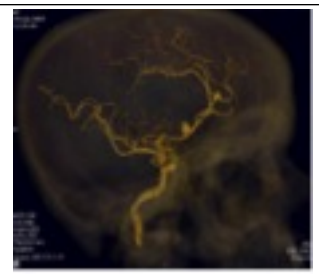


3D-CTA: Lt superiorly projecting A1-ACOA junction type 2A aneurysm

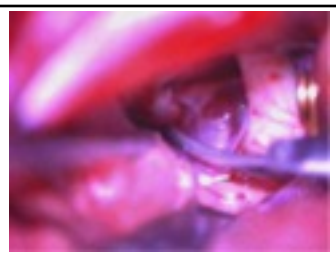
The projection of studied aneurysms in our series was categorized into 4 groups according to their relation to the A2 segment plane:

Type (1): Anterior to A2 arteries (55% of cases).
Type (2A): Between A2 arteries where both are symmetrical (15% of cases).
Type (2B): Between A2 arteries where one lies anterior to the other (15% of cases).
Type (3):Posterior to A2 arteries (15% of cases).

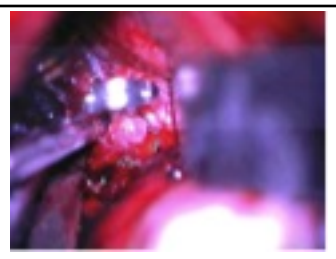
3D-CTA: Lt anteriorly projecting A1-ACOA type 2B aneurysm



3D-CTA: Posteriorly projecting ACOA type 3 aneurysm



Operative :Right side approach for anteriorly projecting aneurysm clipping



Operative: Left side approach for posteriorly projecting aneurysm clipping

CONCLUSION

Surgical side selection based on CTA images provided a safe and adequate angle for exposure and clipping of the aneurysmal neck by clearly showing the aneurysm morphology, dominant A1 and ACOA complex 3D spatial configuration as awhole, with the anticipation of potentially needed gyrus rectus resection and/or proximal A2 segment dissection and mobilization.

(1) Yasergil M, Fox J, Ray M, The operative approach to aneurysms of the anterior communicating artery, Wien springer verlag 2 (1975), pp.113-70.