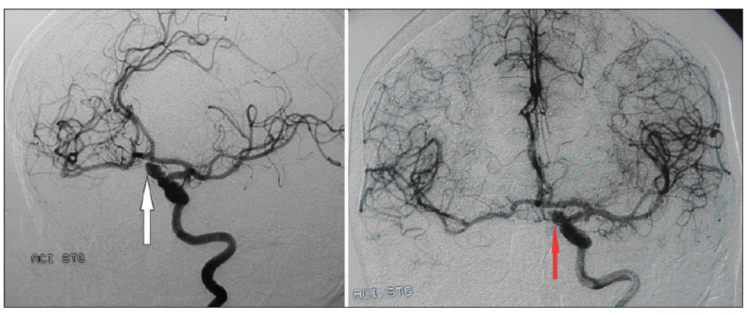
Surgical Nuances

Microsurgical Clipping of Ophthalmic segment of ICA aneurysm -

Embracing newer technologies and strategies for a better outcome

Ophthalmic segment aneurysms present unique challenges to a neurovascular team. Microsurgical clipping for these aneurysms continues to pose severe challenges because of difficult proximal control and poor visualization of the aneurysm neck due to overlying important neural and osseous elements.

The complex surgical anatomy and several factors such as size and projection of the lesion, choice of the surgical approach, relationships between the aneurysm and perforator vessels, site of proximal control, and potential improvement or worsening of visual symptoms add to the difficulties. In such complex cases, surgical nuances frequently determine the final outcome.[2]



This article has highlighted some of the newer and innovative strategies practiced for such aneurysms at EHCC.

We routinely prepare for a short cardiac arrest induced by adenosine to control bleeding from a ruptured aneurysm or if temporary clipping is not possible for proper clip placement. To induce cardiac arrest,0.4 mg/kg of adenosine, followed by 10 ml of normal saline, is injected as a rapid bolus in an antecubital vein. This induces an approximately10-second arrest. During this short period, the operative field is cleared by suction, and a temporary clip(s) or a so-called pilot clip is applied in place.

During this time:

(a) The inspiratory concentration of oxygen is increased to 100%

(b) Barbiturate (thiopental) is administered as an intravenous bolus (3-5 mg/kg) to reduce brain metabolism and oxygen consumption. A second, smaller dose of thiopental may be administered before occlusion of the same artery, if reperfusion is provided before that.

Armamentarium

Ultrasonic Aspirator: The ultrasonic aspirator is made in different forms by different manufacturers. It can be used with various oscillating heads on soft (tumor) or hard (bony) tissue to locally and precisely destroy tissue and remove it. The new entry is the bone that can be cut from the skull base with precision and without the kicking and shaking associated with the high-speed drill. There is no danger of catching nearby cottonoids as there is with a rotating drill head. This is very practical in tight areas surrounded by crucial structures, such as removing the anterior clinoid process.

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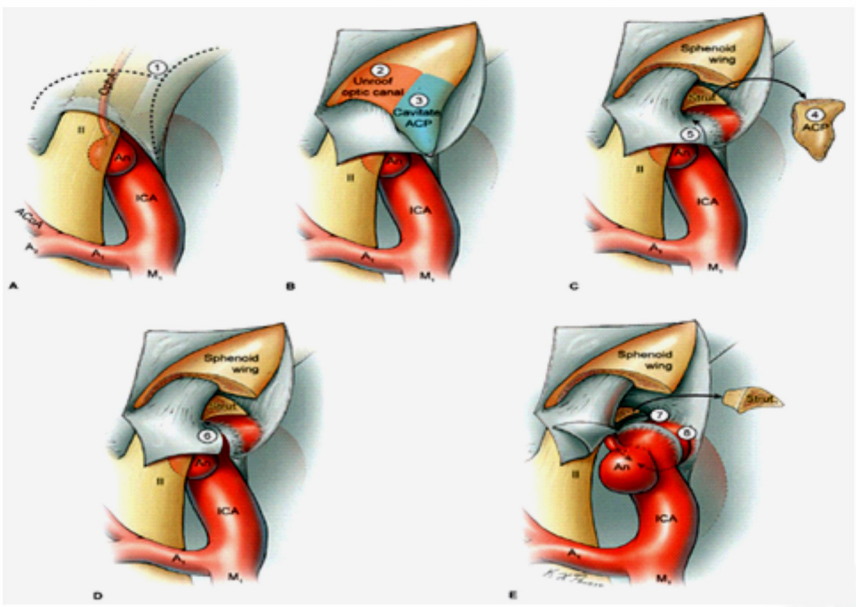
Indocyanine green angiography:

Microscope integrated near-infrared indocyanine green video angiography (ICG) has been used effectively in EHCC for all aneurysms. This technology allows the assessment of the cerebral vasculature in the arterial and venous phases under the microscope's magnification. A playback facility is available if needed.



Surgical technique

Lateral supraorbital craniotomy

A retractor less surgery is done for Para clinoidal aneurysms, and the greatest roadblock is the edematous brain and the constant fear of aneurysm re-rupture. Thus, in ruptured aneurysms, more time is initially spent on obtaining a slack brain, and more CSF needs to be released. At EHCC, we sequentially open peri optic, optico carotid cistern followed by fenestration of lamina terminalis to remove enough CSF.

The optic canal is unroofed with an ultrasonic aspirator. Early decompression of the optic nerve not only relieves pressure and distortion from the aneurysm but also improves the nerve's tolerance to clinoidal dissection later. Bone forming the optic roof is thinned with the ultrasonic claw, dissected from the optic sheath, and fractured away from the optic nerve with a 1mm Kerrison punch. The optic canal is unroofed to the medial wall and then 1 cm anteriorly.[3]

Conclusion

The amalgamation of superior anaesthesia, a high level of micro neurosurgery, and the adoption of newer technologies give better outcomes in ophthalmic segment aneurysms.

References

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