Navigation guided optimal head position for microsurgical clipping of intracranial aneurysms

Asim Sheikh FRCS(SN)
University of Leeds UK, Leeds General Infirmary UK

Abstract

Intracranial aneurysms pose a challenge for treatment owing to their delicate structure, risk of rupture and an often varied anatomical orientation.

We present a novel technique of using heads up display with navigation guidance to select most optimal head position for clipping of intracranial aneurysms.

Introduction

Microsurgical clipping remains a gold standard treatment for intracranial aneurysms providing a durable curative treatment. In the current era of widespread endovascular treatment, aneurysms coming for open surgery, are complex and difficult.

All aneurysms are different in terms of their shape, orientation and anatomical relationship with adjacent structures. A standard head position is therefore inadequate in providing the most optimal view for each individual aneurysm. Just like an optimal projection is selected prior to endovascular treatment, a customized optimal head position is vital in having best surgical exposure of the aneurysm.

This results in head being positioned in a way that best projects the aneurysm neck and its branches. This makes the application of aneurysm clip, much easier and safer.

Example Case

We present a 51 year old lady who presented with an incidental aneurysm of the right middle cerebral artery at its bifurcation. Surveillance imaging revealed enlargement of the size of aneurysm. The aneurysm had a wide base and hence decision was made to treat it by way of surgical clip ligation.

The patient was counselled for surgery including the use of new novel technique of using navigation to obtain optimal head position. A standard pterional craniotomy was performed and the aneurysm was clip ligated using two clips. The patient made an uneventful recovery and was discharged on post operative day 2.

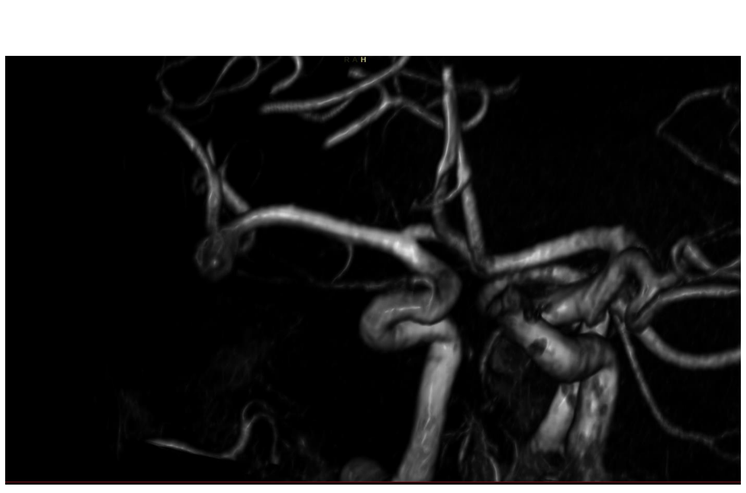


Figure 1. Pre op MRA scan showing MCA aneurysm

Surgical technique

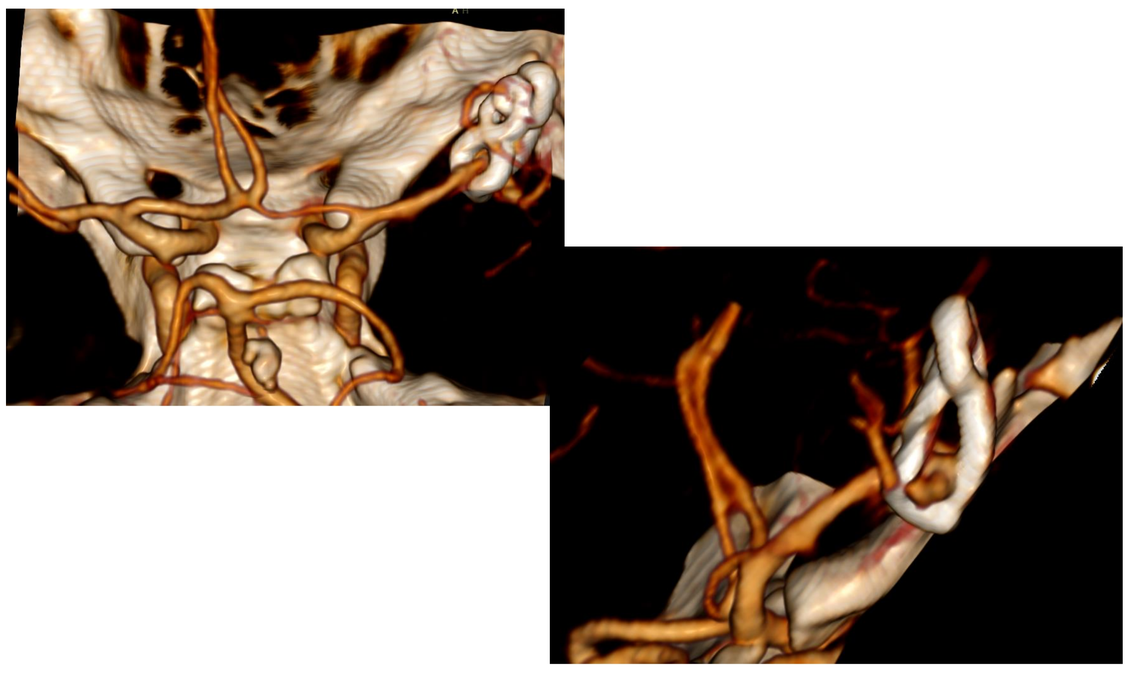
The patient was position supine with a shoulder roll and Brainlab navigation was set up. The navigation was then linked to Zeiss Kinevo microscope with head up display switched on. Under direct vision and with superimposed aneurysm, the head was turned until an optimal view of aneurysm neck and branches was obtained.

A standard pterional craniotomy was performed and targeted sylvian fissure split was made. The aneurysm was exposed and compared to intended projection as selected in navigation view.

Once fully exposed, the aneurysm was secured by application of two clips. Intra operative ICG angiography and post operative CT Angiogram revealed complete occlusion of the aneurysm and preservation of all branches.

The technique was utilized in subsequent consecutive 35 patients undergoing anterior circulation aneurysm clip ligation. The orientation of aneurysm neck and branches was an exact match to the intended optimal view as selected on navigation guidance in 100% of cases.

Figure 2. Post op CTA showing clip ligation



Surgical outcome

The patient in our illustrative case example made an uneventful recovery and was discharged on post operative day 2. She returned to work 6 weeks after her surgery.

In the next 35 consecutive cases, no adverse events or complication were noted. In 35 cases, no clip adjustment was needed after first application of the clip. Over all, the optimal head position made the application of clip easier, quicker and much safer.

Conclusions

Navigation and heads up display guided optimal head position is a very useful new technique to obtain optimal head position for best exposure of aneurysm neck and its branches.

Contact

Mr Asim Sheikh
Neurosurgery Department, Leeds General Infirmary
Great George Street, Leeds, UK
asim.sheikh@nhs.net

Scan me to watch the video