A COMPARISON OF ANTERIOR CIRCULATION ANEURYSM CLIPPING WITH AND WITHOUT TEMPORARY OCCLUSION

Dr. Noor-ul-Huda Maria

FCPS Resident Neurosurgeon
Disclosures

- I have no disclosures to make
INTRODUCTION

Temporary occlusion using temporary clip is a method used in aneurysm surgery to achieve the following objectives which in turn lead to a better surgical result:

• To Avoid aneurysmal rupture
• To reduce intra-aneurysm pressure thus facilitating dissection
• To allow evacuation of intramural calcification and thrombosis before definitive clipping in large aneurysms
• Especially important in managing giant aneurysm

Whenever a temporary occlusion is applied, there are several risks concerned mostly with consequent ischemia and the related phenomena affecting the safe occlusion time that includes the presence of collaterals and the site of application of the clip that will shorten the safe period.

• By “Safe Period/Occlusion Time” we mean before the appearance of the “penumbra” where the blood flow is ~25ml/100g/min.

• It is prudent to evaluate the possibility to avoid using the temporary clipping to avoid the possible risks while getting equally good results and uneventful procedure.
METHODOLOGY

- **56 patients** with *anterior circulation aneurysm*, half of whom underwent temporary arterial occlusion during their elective clipping procedure and the other half did not.
- Potential risk factors to affect outcome were considered.
- **Outcome Assessment**: Effects of temporary occlusion on long-term clinical outcome were evaluated using the *Glasgow Outcome Scale (GOS)*.
- We used “delayed surgical intervention” strategy for ruptured aneurysm.
- Patients in our setup patients at the time of surgery were “better grade” (at least grade 2 SAH).
- **Total Mean temporary artery clipping time** was 13.1 minutes for anterior communicating artery aneurysm and 4 min for middle cerebral artery aneurysm.
- Procedure performed under general anaesthesia with muscle relaxation and local instillation for incision and frame application.
- Pterional approach was used.
- Anesthesia was maintained with continuous injection of propofol at 4–10 mg/kg/h and remifentanil at 0.1–0.3 mg/kg/min.
RESULTS

• 85% patients who had temporary clipping had a good outcome and made a complete recovery at last follow-up (GOS 5); similarly in no occlusion group 88% had a good outcome and a complete recovery at last follow-up.

• 10% of patients were moderately disabled (GOS 4) in TAO group vs 8% in non occlusion group;

• 3% of patients were severely disabled (GOS 3) in TAO vs 2% non TAO

• 1% of both group were in a vegetative state (GOS 2), or had died (GOS 1)

• TAO time had no effects on overall long-term clinical outcomes (P [ 0.59]).

- GOS: Glasgow Outcome Score
- TAO: Temporary Arterial Occlusion
**GOS: Glasgow Outcome Score**

**TAO: Temporary Arterial Occlusion**
<table>
<thead>
<tr>
<th>GOS</th>
<th>With TAO</th>
<th>Without TAO</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>85%</td>
<td>88%</td>
</tr>
<tr>
<td>4</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>3</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>2</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>1</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

GOS: Glasgow Outcome Score
TAO: Temporary Arteral Occlusion
CONCLUSION

• This study demonstrated only slight difference between application of temporary clipping versus no clipping in anterior circulation aneurysm surgery.

• It is suggested that every patient should be evaluated preop regarding his/her own factors and the aneurysm itself should also be evaluated regarding shape, size, origins, the parent vessels, collaterals, anatomical variations etc.

• It is opined that for a surgeon who has not got a huge exposure and long experience, temporary occlusion can be safely practiced as the risk of rupture and inadvertent damage maybe more for a relatively novice vascular surgeon.
DISCUSSION

• We want to emphasise here is at the importance of a neurosurgeon’s own expertise while opting for aneurysmal clipping without performing temporary occlusion.

• It should also be noted that regardless of the length of experience the results of TAO were found comparable between the teams of surgeons with longer experience and huge exposure vs those who had relatively shorter experience but were more interested in cerebrovascular surgery.

• The last point proves that if the postop results do not vary hugely with and without TAO then for a surgeon with a relatively shorter experience it is recommended to use TAO as it is safe.

• It should be clear that one needs to be vigilant enough to use temporary occlusion if he/she faces any confusion and difficulty in anatomical dissection and aneurysmal clipping to avoid any inadvertent irreversible damage. While avoiding TAO is beneficial, it is not a bad idea to apply TAO if one is not clear and comfortable with his/her technique as it may later prove to be a bigger mistake.

• It should be clear that various other factors are also involved in the postop morbidity and mortality, varying from patient specific to peri and postop considerations.
• Temporary occlusion is an important maneuver for vascular surgery but has inherent risk
• It is important to consider avoidance of temporary occlusion and study and compare the outcomes of aneurysmal surgery done without TAO vs with TAO
• We conducted one such comparative study and drew a versatile conclusion that enlightened our approach. We applied the Glasgow Outcome Score to evaluate our outcome
• We suggest that is better to avoid TAO if a neurosurgeon does not face any per-op difficulty and the chances of clipping without any inadvertent damage are fair
• In a case where a neurosurgeon is facing difficulty, it will be fine enough to lower the threshold of TAO application instead of causing a major damage