



Unruptured Paraclinoid Aneurysm Treatment Effects on Visual Function: Systematic Review and Meta-analysis

Mina Asaid¹, Anthea H. O'Neill^{5,6}, David Bervini², Ronil V. Chandra^{3,4,6}, Leon T. Lai^{1,3,6}

■ **OBJECTIVE:** Postoperative visual outcomes following repair of unruptured paraclinoid aneurysms (UPAs) are not well defined. We aim to investigate the influence of treatment modality on visual function.

■ **METHODS:** A systematic literature analysis using the Ovid Medline and EMBASE databases was performed, encompassing English language studies (published between 1996 and 2016) reporting treatment outcomes for UPAs. Rates of visual morbidity (new, permanent postoperative deficit, worsening preoperative deficit); angiographic (occlusion, recurrence, retreatment) and clinical outcomes (death, disability, post-treatment subarachnoid hemorrhage) were recorded. Random effects meta-analysis was performed.

■ **RESULTS:** Twenty-eight studies reported visual outcomes, with data for 1013 endovascular and 691 microsurgical patients. In patients with normal vision undergoing elective repair of UPAs, rates of postoperative visual morbidity were higher following microsurgical (10.8%; 95% confidence interval [CI] 8.5–13.7) than endovascular (2.0%; 95% CI 1.2–3.2) interventions, $P < 0.001$. In those presenting with preoperative visual impairment, surgery was associated with a modest advantage in visual recovery compared with endovascular therapies (65.2% vs. 48.9%, $P < 0.03$). There were no differences in visual morbidity following treatment with any of the endovascular modalities. Meta-analysis of comparative

studies suggested a trend toward poor visual (ES = 0.42; 95% CI 0.08–2.09) and clinical outcomes (ES = 0.57; 95% CI 0.07–4.44) following microsurgery and a trend toward angiographic recurrence (ES = 2.52; 95% CI 0.80–7.90) and retreatment (ES = 1.62; 95% CI 0.46–5.67) after endovascular interventions.

■ **CONCLUSION:** In patients with normal vision undergoing repairs for UPAs, there is a positive correlation between visual outcomes and endovascular treatments. When visual compromise is present, surgery provided modest advantage in visual recovery. However, definitive conclusions were not possible due to data heterogeneity.

INTRODUCTION

Clinical studies of unruptured intracranial aneurysms typically use the modified Rankin Scale (mRS) or Glasgow Outcome Scale (GOS) as a measure of postoperative outcome.^{1,2} However, in the context of aneurysm-related visual dysfunction and post-treatment visual morbidity, mRS and GOS do not reflect the true neurologic recovery in a patient who is otherwise neurologically intact but has acquired reduced postoperative visual function (e.g., mRS 1, no significant disability, able to carry out usual activities, despite some symptoms; GOS 5, good recovery, resumption of normal life despite minor deficits).

Key words

- Endovascular
- Intracranial aneurysms
- Meta-analysis
- Microsurgery
- Paraclinoid aneurysms
- Visual complications

Abbreviations and Acronyms

- CI: Confidence interval
 CTA: Computed tomography angiography
 DSA: Digital subtraction angiography
 GOS: Glasgow Outcome Scale
 MRA: Magnetic resonance angiography
 MINORS: Methodological Index for Non-Randomized Studies
 mRS: modified Rankin Score

SAH: Subarachnoid hemorrhage

UPAs: Unruptured paraclinoid aneurysms

From the ¹Department of Neurosurgery, Monash Health, Melbourne, Australia; ²Department of Neurosurgery, University Hospital Inselspital and University of Bern, Bern, Switzerland; ³Department of Surgery and ⁵Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Australia; ⁴Interventional Neuroradiology Unit, Monash Imaging, Monash Health, Melbourne, Australia; and ⁶Monash Neurovascular Institute, Melbourne, Australia

To whom correspondence should be addressed: Leon T. Lai, Ph.D.
 [E-mail: leon.lai@monashhealth.org]

Citation: *World Neurosurg.* (2017) 106:322–330.
<http://dx.doi.org/10.1016/j.wneu.2017.06.135>

Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

1878-8750/\$ - see front matter © 2017 Elsevier Inc. All rights reserved.

Pretreatment consent obtained from patients undergoing elective microsurgical or endovascular repair of unruptured paraclinoid aneurysms (UPAs) necessitates a discussion regarding the risks of procedure-related death and disability, angiographic outcomes, and the potential need for further treatment. Visual outcomes in the immediate and delayed postoperative period, however, are not well defined and therefore do not reliably influence pretreatment discussion or the choice of intervention modalities.

Using a systematic review and meta-analysis of the published literature, we investigated the treatment effects on vision following elective repairs of UPAs. The primary outcome measure was postoperative visual function (stable, improved, or worsened). Secondary outcome measures included treatment related clinical (death or disability, post-treatment subarachnoid hemorrhage [SAH], and 30-day mortality) and angiographic progress (degree of aneurysm obliteration, recurrence, and retreatment).

METHODS

Study Selection Criteria

We developed and adhered to a protocol, using both key words and MeSH terms combined using Boolean operators, for a population, intervention, comparison, and outcome search method within the Ovid Medline and EMBASE databases to identify articles relevant to the visual, clinical, and angiographic outcomes following microsurgical or endovascular treatment of UPAs (Table 1). A Preferred Reporting Items for Systematic Reviews and Meta-Analyses search style was adhered to (Figure 1).³ Paraclinoid aneurysms were defined as those arising from the internal carotid artery segment between the distal dural ring and the origin of the posterior communicating artery. Manuscripts published in English between 1 January 1996 and 12 December 2016 were eligible for inclusion. To minimize selection bias, only studies with 10 or more patients were considered. In studies where both ruptured and unruptured aneurysms were reported, care was taken to extrapolate only data that were relevant to UPAs. Studies for which data extraction was not possible were excluded. The reference lists of the final included manuscripts and published review articles were also searched to identify additional data sources. Study authors were not contacted to obtain incomplete or unpublished data.

Data Synthesis and Analysis

Standardized data sheets were used, and data extraction (sample size, demographics, treatment types, aneurysm size and location, preoperative visual deficits, postoperative visual outcomes, time to post-treatment follow-up, clinical outcomes, angiographic occlusion rates at follow-up, aneurysm recurrence, retreatment, 30-day mortality and post-treatment SAH) was performed by 2 independent researchers (M.A., A.O.N.). Any disagreement between the reviewers was resolved in consensus meetings with a third author (L.L.).

Outcomes Measures

Primary outcomes were recorded for normal or impaired preoperative visual function, stable or improved vision following treatment, and the presence of a new visual deficit in the postoperative period. Visual morbidity was defined as any new, permanent deficit related to visual acuity or field postoperatively, or worsening of a

Table 1. Literature Search Strategy Using PICO Format

MEDLINE and EMBASE Search Strategy	
1	exp Intracranial Aneurysm/ or intracranial aneurysm\$.mp. or exp Carotid Artery, Internal/ or exp Ophthalmic Artery/ or exp Carotid Artery Diseases/
2	(Paraophthalmic aneurysm\$ or internal carotid artery or carotid-ophthalmic aneurysm\$ or Paraclinoid aneurysm\$ or superior hypophyseal artery aneurysm\$ or ophthalmic aneurysm\$.mp.
3	1 and 2
4	exp Neurosurgical Procedures/ or exp Microsurgery/ or microsurgery mp. or exp Vascular Surgical Procedures/ or (neurosurgery or microsurgical or surgical clipping).mp.
5	exp Embolization, Therapeutic/ or exp Endovascular Procedures/ or exp Cerebral Angiography/ or exp Balloon Occlusion/ or exp Angioplasty/ or (endovascular coiling or endovascular procedure\$ or embolization or Guglielmi).mp.
6	4 or 5
7	Treatment Outcome/ or exp Glasgow Outcome Scale/ or exp Intraoperative Complications/ or exp Postoperative Complications/ or exp Outcome Assessment (Health Care) or exp Recurrence/ or exp Retreatment/ or exp Vision Disorders/ or exp Visual Acuity/
8	(Treatment outcome or outcome assessment or Glasgow outcome scale or perioperative complication or postoperative complication\$ or recurrence or retreatment or visual disorder or visual acuity or visual complication\$.mp.
9	7 or 8
10	3 and 6 and 9
11	Limit 10 to English language and from 01/01/1996 to 12/12/2016

preoperative deficit. This was required to be clearly defined within the body of the manuscript and directly attributable to either the endovascular or microsurgical procedure. Preoperative deficits and improvement were recorded only when clearly stipulated within the manuscript in text or table form. The size of the aneurysm dome was categorized according to the International Study of Unruptured Intracranial Aneurysms criteria into <7 mm (small), 7–12 mm (medium), 13–24 mm (large), and ≥25 mm (giant).⁴

Secondary outcomes were recorded for both angiographic and clinical outcomes following treatment. An independent clinical outcome was defined as GOS₅, mRS 0–1 or equivalent qualitative description (e.g., “no morbidity”). A death or disability outcome was defined as a GOS_{1–4}, mRS_{2–6} or equivalent qualitative description, if this was worse than the preoperative status. Thirty-day mortality was defined as death within 30 days of an endovascular or microsurgical procedure due to treatment-associated causes. Patient-focused angiographic outcomes included aneurysm occlusion, recurrence, retreatment, and post-treatment SAH. Aneurysm occlusion was recorded when ≥95% occlusion of the targeted aneurysm was demonstrated on postoperative imaging (as identified by computed tomography angiogram [CTA], magnetic resonance imaging angiogram

Download English Version:

<https://daneshyari.com/en/article/5633995>

Download Persian Version:

<https://daneshyari.com/article/5633995>

[Daneshyari.com](https://daneshyari.com)