

Occipital Artery to PICA Bypass for Revascularization of Distal PICA Territory: Comparative Assessment of Ease of Bypass to different Segments of PICA

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Introduction

Revascularization of the distal posterior inferior cerebellar artery (PICA) territory using occipital artery (OA) as a donor is a valuable option for treating complex aneurysms involving the vertebral artery-PICA junction or proximal PICA. Of all PICA segments, P3 is most widely used for OA-PICA bypass due to its easy accessibility and optimal anastomotic location. However, such a bypass is not feasible when the P3 segment is absent. This study aims to evaluate the feasibility of bypass to P1 vs. P3 segments of PICA for revascularization of the distal PICA territory.

Methods

A lateral sub-occipital craniotomy and C1 laminectomy was performed on 16 cadaveric specimens. The OA was harvested and the feasibility of anastomosis to P1 and P3 segments of PICA was assessed considering the following parameters: (i) presence/absence of the segment, (ii) caliber match, (iii) number of perforators at each segment and (iv) requirement for cerebellar retraction.

Results

OA-P1 end-to-end anastomosis was successfully performed in all specimens while OA-P3 end-to-side anastomosis could only be performed in 11 specimens(68.7%). 5(31.3%) specimens had absent P3s. The average diameters of the P1 and P3 segments were 1.73mm and 1.56mm, while the median number of perforators found was 1 and 3, for P1 and P3 segments, respectively. OA-P1 anastomosis did not require retraction in any of the specimens, while OA-P3 bypass required cerebellar retraction in 54.5% specimens.

Conclusions

Our investigation reveals that OA-P1 bypass is feasible and a useful alternative to OA-P3 bypass, especially in cases where P3 is absent, for revascularization of distal PICA territory. The advantages of OA-P1 over OA-P3 bypass include a better caliber match, having fewer perforators allowing greater mobility, requiring lesser arachnoid dissection, obviating the need for cerebellar retraction and being technically less challenging as it offers an option for an end-to-end bypass, instead of an end-to-side anastomosis.

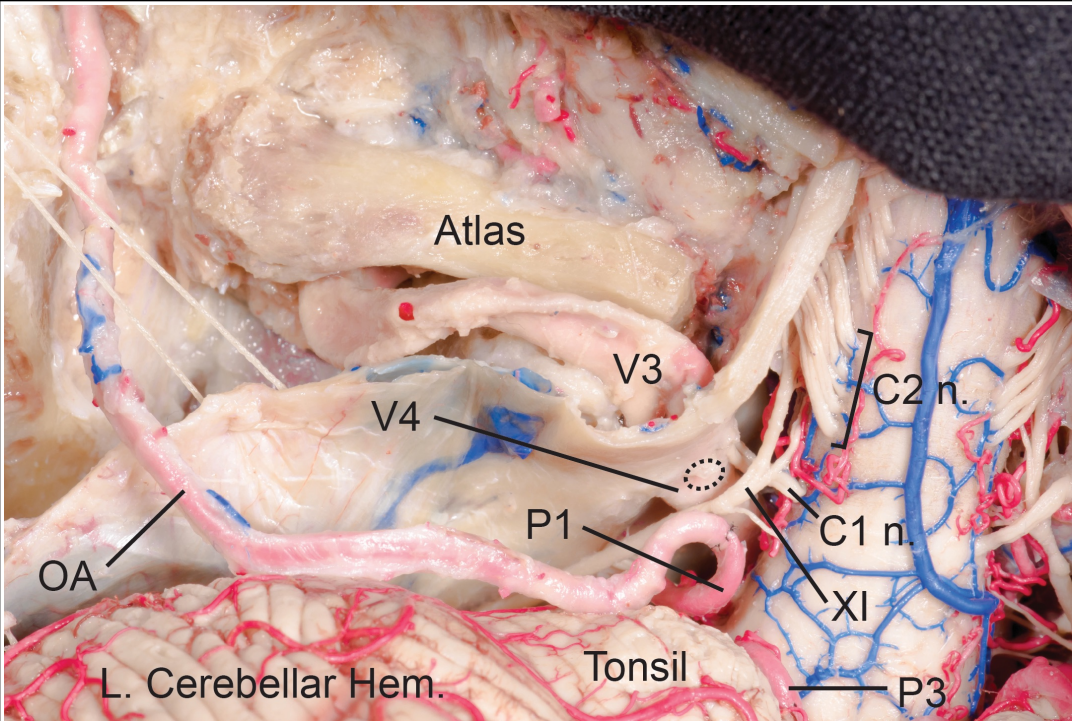


Figure 1. Cadaveric surgical simulation specimen depicting an end-to-end OA-P1 bypass.
Hem.,Hemisphere; L., Left; n., Nerve; OA, Occipital Artery

Learning Objectives

1. To learn the different options available for the management of proximal PICA aneurysms.
2. To understand the utility of OA-P1 bypass in addressing proximal PICA aneurysms.
3. To understand the advantages of Oa-P1 bypass over OA-P3 bypass.