



# Far-Lateral Approach for Occipital Artery-Posterior Inferior Cerebellar Artery Bypass: Case Series with Special Reference to the Caudal Loop as an Optimal Recipient

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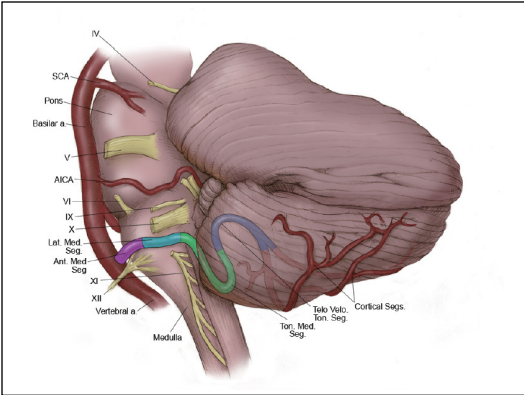
## Introduction

Occipital artery (OA)-posterior inferior cerebellar artery (PICA) bypass has been used for posterior fossa revascularization. OA-PICA bypass is technically challenging because of its deep and narrow surgical corridor. When the caudal loop of PICA is unavailable as an optimal recipient, OA-PICA bypass could be more challenging.

## Methods

The authors simulated OA-PICA bypass using 5 adult cadaveric specimens. The complex microsurgical anatomy of the lateral foramen magnum was examined in stepwise dissections, and feasibility of OA-PICA bypass to various segment of PICA was assessed through far-lateral approach. In addition, 7 patients underwent OA-PICA bypass surgery for hemodynamic ischemia or ruptured dissecting aneurysm (DA) of the posterior fossa. In these cases, clinical significance of the caudal loop as an optimal recipient, and technical difficulty of bypass procedure related to anatomical variation of the caudal loop were evaluated.

**Figure 1. Anatomical segmentation of PICA**

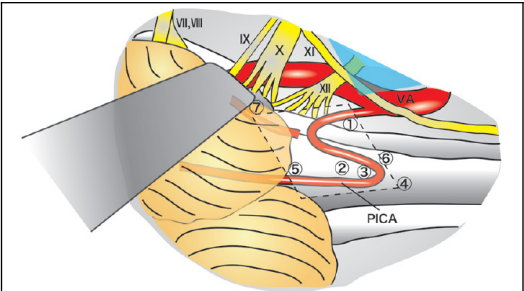


## Results

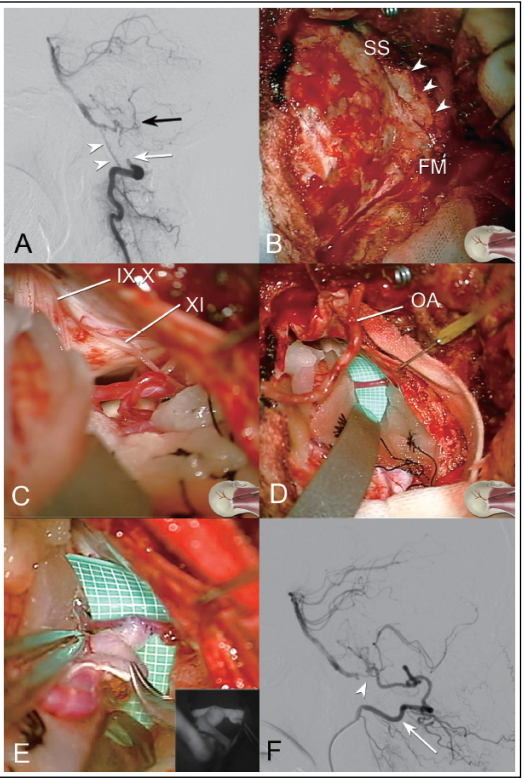
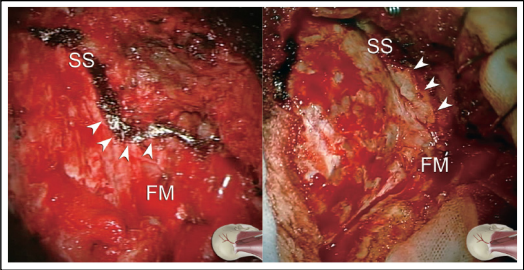
The caudal loop as an optimal recipient was available in 4 out of 7 cases, where OA-PICA bypass was less demanding even when resection of the condylar fossa was incomplete. In the other 3 cases, the caudal loop was missing and the other segment was selected as a recipient. OA-PICA bypass was also completed through the surgical corridor provided by the far-lateral approach, although one bypass of the most difficult case was occluded on the next day.

**Figure 2. Right suboccipital approach with or without far-lateral exposure for OA-PICA bypass**

**Figure 3**



Schematic imaging of anatomical variation of PICA in terms of feasibility of OA-PICA bypass surgery.



A 58-year-old man with medically intractable ischemia of the vertebrobasilar system. (A) The left vertebral artery is occluded. The PICA lacks the caudal loop (black arrow). (B) Right lateral suboccipital craniotomy and a far-lateral approach (arrowheads). (C) The lateral medullary segment of PICA observed through the rootlets of the lower cranial nerves. (D) Preparation of the vessel for bypass. The wide operative view is enabled by resection of the condylar fossa. (E) Completion of OA-PICA bypass. ICG videoangiography confirms a successful bypass (inset, bottom right). (F) Postoperative selective left occipital angiography. The anastomosis site is indicated by the white arrowhead.

## Conclusions

Technical feasibility of OA-PICA bypass depends on presence of the caudal loop of PICA as an optimal recipient. Far-lateral approach is recommended particularly when the bypass is demanding because of anatomical variation of PICA.

## References

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## Discussion

A previous study by Macci et al. found that in a series of 80 cadaveric specimens, 28% (22) were missing a caudal loop, suggesting that absence of the caudal loop is relatively common. The far-lateral approach provided adequate surgical exposure and maneuverability of all the potential anastomosis sites. This approach concluded with removal of the condylar fossa with rongeur instruments without resection of the occipital condyle or jugular tubercle—minimizing bone resection.