Endoscopic Anatomy of Superior Hypophyseal Arteries

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Introduction

The endoscopic endonasal approach (EEA) has become a routine corridor to the suprasellar region. The superior hypophyseal arteries (SHA) are intimately related to lesions in the suprasellar space, such as craniopharygiomas and meningiomas. Here we aim to investigate the surgical anatomy and variations of the SHA from the endoscopic endonasal perspective.

Methods

Thirty anatomical specimens with vascular injection were used for endoscopic endonasal dissection. Number of SHAs, origin, course, branching, anastomoses, and area of supply were collected and analyzed.

Results

We found a total of 192 SHAs arising from 60 internal carotid arteries (ICA) for an average of 3.2 SHAs arising from each ICA. The first SHA was the primary SHA in almost all cases (98%) as it supplied the infundibulum, optic chiasm, and proximal optic nerve. Two thirds of the first SHAs originated proximal to the distal dural ring, with 50% arising from the carotid cave and 50% from the proximal clinoidal ICA segment. The typical “candelabra” pattern in 3 branches (infundibular, recurrent optic, and descending) was found in just a third of primary SHA. The most common was a tree-like pattern (50%) with 3 or more branches; the descending branch supplied the diaphragm in 48%, the gland in 41%, both in 7%, and was absent in 25%. Circuminfundibular vascular anastomoses were found in all but one specimen.

Conclusions

The first SHA constantly supplies the optic chiasm and proximal optic nerve. Compromising this artery may cause a visual deficit. Unilateral injury to the primary SHA will likely not affect the infundibulum given the almost universal circuminfundibular anastomoses. Sacrifice of the descending branch will have no consequences when irrigating the diaphragm. Detailed understanding

Learning Objectives

Anatomy of superior hypophyseal arteries and clinical relevance.

References

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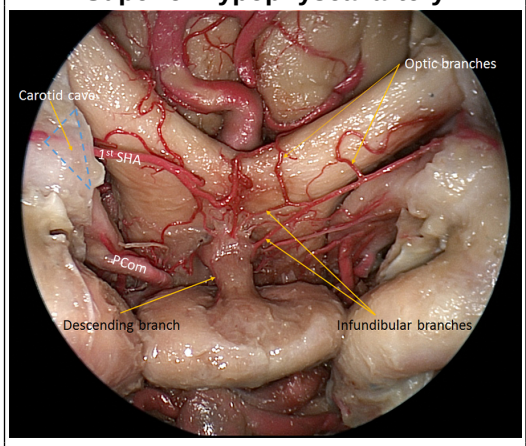
Superior hypophyseal artery



The dissection shows superior hypophyseal arteries (SHA) from both sides. Both first SHAs originate from the ICAs proximal to the upper rings, with clearly visible carotid cave (blue triangle) on the right carotid. SHA sends off optic branches to the optic chiasm, proximal optic nerve, and even anterior portion of optic tract (right SHA), infundibular branches to the upper stalks and anastomose with one from the other sides or with the other SHA from the same side. Descending branch can be seen on the right side of pituiatry stalk, and , in this case, feeding the gland.