Multiportal endoscopic approach

There has been marked evolution in techniques in skull base surgery including the development of minimally invasive endoscopic supraorbital, transnasal, and more recently, transorbital approaches. These have been typically described as isolated, rather than concerted approaches. It is possible that rather than using these approaches alone, they could be combined with transnasal approaches to provide improved manipulation angles, shorter working distances, and optimal visualization of the pathology. The primary objective of this study is therefore to determine whether these pathways can be combined in “multiportal” approaches to further improve the surgeon's ability to access and manipulate pathology in the central anterior cranial fossa. METHODS: A study was performed on five cadaver heads. Each cadaver underwent an expanded endoscopic binasal approach with clivectomy, bilateral precaruncular transorbital approaches, and bilateral supraorbital craniotomies through an eyebrow incision. A total of 25 procedures were performed. Five endonasal, 10 transorbital, and 10 supraorbital procedures were performed using 0- and 45-degree 4-mm rigid endoscopes. Measurements were obtained from the nasal spine and anterior lacrimal crest to the pituitary gland (PG), optic chiasm (OC), and ipsilateral cavernous carotid artery (IpsiCavCa). Measurements from the anterior border of the orbital roof through the supraorbital approach to the PG and OC were also performed. Photographs were taken to demonstrate these approaches and angles of visualization. RESULTS: The precaruncular transorbital approach provided a uniformly shorter distance to the PG, OC, and IpsiCavCa compared with the endoscopic transnasal approach. The difference in the mean distances between these two approaches in the left and right sides were 2.38 cm (P=.000) and 2.56 cm (P=.000), respectively. The supraorbital approach to the PG and OC was shorter than the transnasal by a mean difference of 1.92 cm (P=.000) and 1.99 cm (P=.000) on the right and left side, respectively. There was no significant difference in the mean distances to the PG and the OC between the transorbital and supraorbital approaches. Use of these approaches in tandem provided an extra working port by which structures above and below the target organ were better visualized and more easily dissected with two-handed microsurgical techniques than through a single approach. CONCLUSIONS: The precaruncular transorbital approach provided rapid, direct, coplanar access to the clivus, sella, and suprasellar/parasellar regions. The supraorbital minicraniotomy augmented access to the planum sphenoidale, sella, tuberculum sella, and suprasellar regions. These approaches provided shorter working distances, improved visualization, and working angles that offer more direct access to the pituitary gland, suprasellar region, clivus, medial and lateral cavernous sinus than the endoscopic transnasal approach alone. The combination of endoscopic approaches to the central anterior skull base significantly improved instrument access, particularly to lateral targets, as well as better visualization of the vital structures in these regions. These ports provide the surgeon with a more expansive surgical field and improved the ability to perform two-handed microsurgical dissections [1)].

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Ciporen JN, Moe KS, Ramanathan D, Lopez S, Ledesma E, Rostomily R, Sekhar LN. Multiportal endoscopic approaches to the central skull base: a cadaveric study. World Neurosurg. 2010 Jun;73(6):705-12. doi: 10.1016/j.wneu.2010.03.033. PubMed PMID: 20934161.