

Contralateral Supraorbital Keyhole Approach to Medial Optic Nerve Lesions: an Anatomo-clinical Study Harminder Singh MD; Walid I Essayed; Ajit Jada; Nelson Moussazadeh MD; Sivashanmugam Dhandapani; Sarang Rote MBBS, MS, MCh; Theodore H. Schwartz MD, FACS Stanford University School Of Medicine New York Presbyterian Hospital Weill Cornell Medical Center



Introduction

The objective of this clinical and cadaveric study is to describe the contralateral supraorbital keyhole approach to medial optic nerve pathology.

Methods

In 3 cadaver heads, bilateral supraorbital keyhole mini-craniotomies were performed to expose the ipsilateral and contralateral optic nerves. The extent of exposure of the medial optic nerve was assessed. In 2 patients, a contralateral supraorbital keyhole approach was used to remove pathology of the contralateral medial optic nerve and tract.

Results

In comparing the left versus the right supraorbital approach, the medial portion of the optic nerve was much better visualized from the contralateral side in all cadavers (Fig. 1A and C). While we were able to perform bilateral medial optic nerve decompression of up to 1 cm from a unilateral craniotomy, the risk of retraction-induced injury to the ipsilateral optic nerve was higher.

The ipsilateral approach to the optic nerve allowed for proximal superomedial decompression. However, avoiding any injury to the optic nerve itself or to its vasculature was difficult to achieve from this route. As the decompression was carried away distally and inferiorly, the tangential view of the optic nerve prohibited further safe dissection and drilling. When approached contralaterally, the previous decompression was revealed to be circumferentially and longitudinally incomplete in all specimens (Fig. 1C, Nerve A). Fig.1 Cadaveric dissection demonstrating a supraorbital keyhole craniotomy: The left optic nerve (black A) and right optic nerve (black B) are shown in each image (A–D).



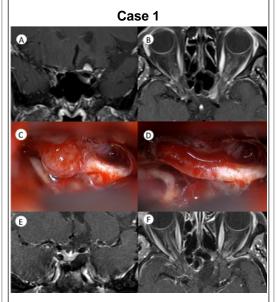
A: Supraorbital left-sided keyhole approach. B: Decompression of the medial optic canal on both sides, and 1 cm of the orbital roof was removed bilaterally. C: Supraorbital keyhole craniotomy on the right side in the same cadaver. The optic nerves and the chiasm are now visualized from the contralateral side. D: Extended medial decompression of the left optic nerve was performed from the contralateral side.

Clinical Case Examples

We present 2 clinical examples in which a contralateral supraorbital keyhole approach was used to treat a lesion medial to the optic nerve and tract, a prechiasmatic lesion and a postchiasmatic lesion

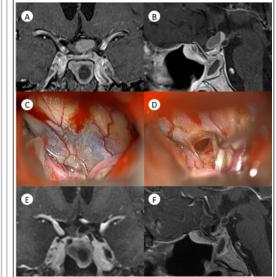
Case 1: Recurrent meningioma on the medial aspect of the optic nerve on the left side

Case 2: Cystic lesion compressing the left optic tract.

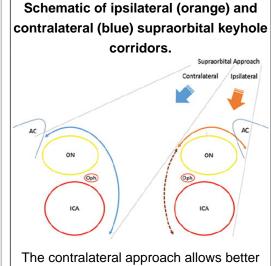


Contralateral approach to recurrent meningioma on the medial aspect of the optic nerve on the left side.

Case 2



Contralateral approach to a cystic lesion compressing the left optic tract.



The contralateral approach allows better control of the medial wall of the optic canal, while the ipsilateral route offers only a tangential view (hashed arrow). AC = anterior clinoid; ICA = internal carotid artery; ON = optic nerve; Oph = ophthalmic artery.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Identify pathology that can be suitably targeted using this approach 2) Get introduced to the concept that the approach is actually better suited to expose contralateral optic nerve, and in particular, its medial aspect, which is difficult to reach using an ipsilateral approach.

Conclusions

In selected cases, a contralateral supraorbital keyhole approach can be used to safely and effectively decompress the superior and medial optic canal and should be the preferred surgical approach.