

ORIGINAL RESEARCH

A Study Of Duplication Of Optic Canal In Human Skull In Uttar Pradesh Region

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ABSTRACT

Introduction: The optic canal is present at the apex of the orbit and is formed by the two roots of the lesser wing of sphenoid. It connects the orbit to the middle cranial fossa. Duplication of the optic canal is a very uncommon anomaly seen at various ages in both the sexes.

Material and method: The presence of duplication of Optic canal was studied in 54 human skulls of Uttar Pradesh region, collected from the Rohilkhand Medical College, Bareilly and Integral Institute of Medical Sciences and Research, Lucknow.

Result: Duplication of optic canal was found in only two skulls both of which were unilateral.

Conclusion: Knowledge about the optic canal is of great clinical significance to an ophthalmologist as well as the neurosurgeon while performing surgical exploration of the Optic canal during decompression or tumor removal.

Keywords: Optic canal, accessory optic canal, cranium, cranial fossa.

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INTRODUCTION

The opening of the optic canal in the middle cranial fossa may be occasionally duplicated resulting in a “larger canal” through which Optic nerve with

its meningeal covering passes and a “smaller accessory canal” which transmits the Ophthalmic artery. This accessory optic canal when present, generally lies inferolateral to the main optic canal, which retains its normal position. The accessory optic canal is often referred to as the Ophthalmic canal. Bilateral duplication is an extremely rare condition and as reported by Rewa Choudhary et al¹ has been methodically reported in only four cases. The unilateral duplication though rare may more often be encountered. The present study was done to find out the incidence of duplication of the Optic canal in the skulls of Uttar Pradesh region. The direction of the accessory canal in relation to the main canal was observed. The morphometric measurement of the dimensions of the canal was also noted.

MATERIALS AND METHODS

The following study was conducted in the Department of Anatomy at Rohilkhand Medical College, Bareilly and Integral Institute of Medical Sciences and Research, Lucknow, Uttar Pradesh, India. Material for this study consisted of 54 dry skulls of both sexes taken from the Department of Anatomy and Forensic Medicine. In each skull the duplication of the optic canal was observed and its patency was checked by passing a probe. The measurements of the maximum transverse and vertical diameter as well as the length of the optic canals were taken using a sliding caliper. It was further noted whether the optic canals were complete or incomplete, unilateral or bilateral.

STATISTICAL ANALYSIS

Only descriptive statistics was used to generate results.

RESULT

Out of the 54 skulls examined 2 (3.7%) possessed double optic canal. The duplication was unilateral in both the cases one being present on the right side and the other on the left side. The separation of the two canals was complete on the left side and partial on the right side. It was observed that the main canal occupied its usual position while the accessory canal

was lying inferolateral to it in both the cases. The length of the duplicated Optic canal measured along the medial wall was between 8-10mm in our study as compared to 10-12mm stated by Wolff.² Its transverse diameter was between 6-8 mm while its vertical diameter was between 4-6 mm. The thickness of the bony septa separating the two canals was about 1 mm. These dimensions were comparable to a similar study done by Girish V Patil et al.³ Both these canals were found to lie parallel to each other. It was further noted that while the main canal (optic canal) maintained its usual position being directed postero-medially and upwards, the smaller accessory canal (ophthalmic canal) was found lying infero lateral to the main optic canal as shown in figure-1.

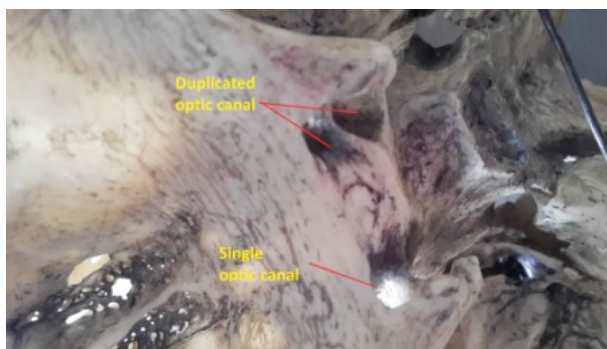


Figure-1: Right side duplicated optic canal

DISCUSSION

Duplication of optic canal may occasionally be encountered. However bilateral duplication is rarely seen. Le Double⁴ postulated that the duplication of optic canal is due to ossification of meninges covering the optic nerve. White⁵ refuted this postulation by reporting three cases in newborn. Augier⁶ was of the view that accessory foramen may be due to presence of an aberrant ophthalmic vein or an Inferior ophthalmic vein as a shallow groove leads to the site of cavernous sinus. Keyes⁷ postulated that the large bony projection in the inferolateral wall of optic canal duplicates it. Other notable contributors in this field were Berlis et al⁸ who reported an incidence of 2.5% of duplication of optic canal by using axial computerized tomography scan. Mandvi Singh⁹ after studying 435 Japanese found the duplication in 13 skulls of which 7 were bilateral. She concluded that duplication was more commonly seen in male skull bones of around 30 years of age, being more frequent on the left side. Orhan Magden A et al¹⁰ in another study on 369 skulls found only 2 cases of duplication, one unilateral and one bilateral. Bilateral duplication of Optic canal an extremely rare condition was also documented by Warwick¹¹

CONCLUSION

The knowledge regarding the duplication of the optic canal can be very useful while doing surgical exploration of the optic canal during tumor removal or decompression. If not aware of the possibility of an accessory optic canal it may commonly be mistaken for clinoid process pneumatization, posterior ethmoidal air cell or caratico clinoid foramen. Keeping in view the findings of the study it is also recommended to undertake a preoperative angiography prior to optic canal exploration to find out the course taken by ophthalmic artery.

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