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A MORPHOLOGICAL STUDY OF HYPOGLOSSAL CANAL AND ITS RELATION WITH OCCIPITAL CONDYLE IN NORTH INDIAN DRY SKULLS

Anatomy

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ABSTRACT

The hypoglossal canal is a bony canal in the occipital bone of the skull also known as anterior condylar canal. Hypoglossal canal (HC) is situated above the occipital condyle at its junction of anterior one-third and posterior two-third. The boundaries of the anterior condylar canal are jugular tubercle superiorly and occipital condyle inferiorly. Present study conducted in the Department of Anatomy, Saraswati medical college, Uttar Pradesh. Study conducted on 106 dry skulls was collected from the Department of Anatomy. Study was used to evaluate the relation between the anterior condylar canal (hypoglossal canal) and occipital condyle. According to the position of the canal in relation with occipital condyle, Canal was categorised in to three types. Anterior third, Middle third and Posterior third of the occipital condyle. In our study we found majority of the HC on right and left side present in relation with the anterior third of the occipital condyle. In the present study the difference between the right and left side was found insignificant (p value 0.145). The relation between the hypoglossal canal and occipital condyle must be studied since it allows the passage of hypoglossal cranial nerve, which supplies musculature of the tongue. Neurosurgeons performing surgery at this area should be more familiar with the anatomy and variations of this region. Before the surgery involving the craniovertebral junction, the morphological and location of the hypoglossal canal must be evaluated.

KEYWORDS

Anterior Condylar Canal. Hypoglossal Canal, Craniovertebral Junction, Condylectomy, Intracranial, Extracranial.

INTRODUCTION:

The hypoglossal canal is a bony canal in the occipital bone of the skull also known as anterior condylar canal. Hypoglossal canal (HC) is situated above the occipital condyle at its junction of anterior one-third and posterior two-third. The boundaries of the anterior condylar canal are jugular tubercle superiorly and occipital condyle inferiorly. [Bulsara KR et la.,2008] It is the passageway for the hypoglossal nerve accompanied by meningeal branch of ascending pharyngeal artery and an emissary vein from the basilar plexus of veins [Bayat Parvindokht et al., 2015]. Lesions in the ventral part of cranio cervical region are accessed by crossing the occipital condyles [Gapert R et al., 2009]. Thus, it is important for the anatomist, neurosurgeons, forensic experts and clinicians to know about the relation of hypoglossal canal in relation with the occipital condyle [Gapert R et al., 2009].

MATERIALS AND METHODOLGY:

Present study conducted in the Department of Anatomy, Saraswati medical college, Uttar Pradesh. Study conducted on 106 dry skulls was collected from the Department. Study was used to evaluate the relation between the anterior condylar canal (Hypoglossal canal) and occipital condyle. According to the position of the canal in relation with occipital condyle, Canal was categorised in to three types. The types of the anterior condylar canal in relation with occipital condyle as follows

i) Anterior third
ii) Middle third
iii) Posterior third of the occipital condyle.

The position of the right and left anterior condylar canal are evaluated separately. Institutional ethical committee approval was taken before the commencement of the study.

STATISTICAL ANALYSIS:

Results were analysed by SPSS 16th version software, non-parametric chi square test (χ^2) was used to compare between the right and left sides regarding symmetrical structures and $p<0.05$ was considered as statistically significant.

RESULT:

In the present study we have analysed the type of anterior condylar canal or hypoglossal canal (HC) in 106 dry skulls. We found HC among the right side of 106 skulls 88 (75.86%) were present in relation with anterior third of the occipital condyle. 28 (24.13%) were present in respect with the middle third of the occipital condyle. Whereas on the left side we found 78(67.24%) present in respect with anterior third and 38(32.75%) was present middle third of the occipital condyle. There is no Hypoglossal canal in relation with the posterior third of the occipital condyle. By the analysis of chi square test (χ^2), In the present study the difference between the right and left side was found insignificant (p value 0.145).

Table: showing the hypoglossal canal in right and left side (HC) of the study.

	Anterior	Middle	Posterior	X 2 Value	P Value
Right	88 (75.86%)	28 (24.13%)	-	2.117	0.145
Left	78 (67.24%)	38 (32.75%)	-		

DISCUSSION:

The region of hypoglossal canal in the base of the skull is subjected to pathological changes. To perform any surgery in this region of skull, the neurosurgeons must have sufficient knowledge about the anatomy and relation of the hypoglossal canal. The relation of the hypoglossal canal and occipital condyle is important to perform transcondylar approach. The intracranial and extra cranial opening of the hypoglossal canal is important while performing surgeries. In a study conducted by [Bayat Parvindokht et al., 2015], the hypoglossal canal was more frequently present in the Anterior and middle third with respect to the occipital condyle. study results of [Fathi et al.,1992] shows that the position of the canal is predominantly present in the middle third of the occipital condyle. A similar result was seen in the study by [Wen et al.,1997]. In our study we also found majority of the HC on right and left side present in relation with the anterior third of the occipital condyle. Our study results coincide with the abovementioned study results. In the present study the difference between the right and left side was found insignificant (p value 0.145). The position of the hypoglossal canal is important during condylectomy [Brusati R et al., 2010], if the canal is located too dorsally it might damage the hypoglossal nerve and causing hindrance in the condylectomy procedure [Muthukumar N et al., 2005].

Conclusion:

The relation between the hypoglossal canal and occipital condyle must be studied since it allows the passage of hypoglossal cranial nerve, which supplies musculature of the tongue. Neurosurgeons performing surgery at this area should be more familiar with the anatomy and variations of this region. Therefore, anatomical morphometric studies

and radiological investigations should be performed to contribute to the knowledge of this area. Before the surgery involving the craniovertebral junction the morphological and location of the hypoglossal canal must be evaluated.

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