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A STUDY ON THE NUTRIENT FORAMEN OF HUMERUS BONE

Anatomy

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ABSTRACT

Background And Purpose: Morphological analysis of nutrient foramen of humerus bone in Udaipur region, **Material And Methods-** Research study, Place of study- Department of Anatomy, R.N.T. Medical College, Udaipur on 80 dry humeri, **Result:** The majority of humeri showed one nutrient foramen, which was found in 91.25%, followed by 6.25% with double foramen . Nutrient foramen was absent in 2.5% of the humerus. The majority (65%) of nutrient foramen was found on the anteromedial surface followed by medial border (21.25%). All nutrient foramina were directed downward. away from the growing end. **Conclusion:** The single nutrient foramen was predominant and majority of nutrient foramina were found in anteromedial surface. The importance, location and number of nutrient foramen of the humerus bone should be taught to First year MBBS Students while teaching for better clinical application.

KEYWORDS

humerus; nutrient foramen; nutrient artery; diaphysis.

INTRODUCTION

All bones have foramina for the entrance of the blood-vessels; these are known as the nutrient foramina. These foramina lead to nutrient canals through which vessels entering the bone and supply the medullary cavity. Their sites of entry and direction are almost constant and directed away from the dominant growing ends .[1] In long bones the nutrient foramen is found in the shaft, and in irregular bones it is found in other locations. In Long bones there are four sets of arteries as nutrient artery, epiphyseal, metaphyseal and periosteal arteries. Nutrient vessels enter the bone through these foramina and divide into ascending and descending branches in the medullary cavity and supply bone marrow and inner two-thirds of the compact bone. [2] Normally, nutrient foramen in humerus present near the mid-point of the anteromedial surface of its diaphysis along the medial border [3, 4] but different researches shows it is also presents in other surfaces, anterolateral and posterior of humeral diaphysis .[3]

Knowledge about the nutrient foramen is essential for microvascular surgery and orthopaedic surgeries, bone graft procedures and also in medico-legal cases. Knowledge of the nutrient foramen is also very important for Anatomist for proper teaching to the first year MBBS students for clinical application.[5,6]

The main objective of this study is to find out the number, location, and direction of the nutrient foramen of the humerus. This type of study will aid in forensic department for bone identification, surgery department for bone grafting, medical student to understand the nutrient foramen of humerus with its direction.

MATERIAL AND METHOD

This study was conducted on 80 adult humerii collected from Department of Anatomy R.N.T. Medical College, Udaipur, Rajasthan, during may 2022 to August 2022. Damaged bones and pathologically deformed bones were excluded from the study.

Procedure : The nutrient foramen was observed in all surfaces and borders of humerus bone and noted in paper, for the determination of number ,direction and location of nutrient foramen.

OBSERVATION

Among 80 bones studied, 50 were left sided and 30 were right sided.

Table 1 Number Of Nutrient Foramen On Humerus.

No. of nutrient foramen	Right		Left		both
	No	Percentage	No	Percentage	Percentage
1	45	90	28	93	91.25
2	3	6	2	7	6.25
Absent	2	4	-	-	2.5

Table 2 Location Of Nutrient Foramen On Humerus.

Location Of Nutrient Foramen	Right	Percentage	Left	Percentage	Both	Percentage
Anteromedial surface	40	80	12	40	52	65
Medial border	6	12	11	36.6	17	21.25
Lateral border	4	8			4	5
Anterior border	-		3	10	3	3.75
Posterior surface	-		4	13.3	4	5

The majority of humerii showed one nutrient foramen, which was found in 91.25%, followed by 6.25% with double foramen . Nutrient foramen was absent in 2.5% of the humerus. The majority (65%) of nutrient foramen was found on the anteromedial surface followed by medial border (21.25%). All nutrient foramina were directed downward. away from the growing end.

DISCUSSION

The location of the nutrient foramen of the humerus was not constant; it may present on medial border, anteromedial, anterolateral, or posterior surfaces. This study was performed to determine the number of nutrient foramen in humerus . This study will help surgeons planning the surgical intervention of the shaft of the humerus, which will possibly reduce the chances of nonunion or delayed union.

About 2% of humerus didn't show the presence of nutrient foramen which corresponds to the study performed by Mansur et al. (1.98%) and Kizilkananta et al.(1.98%). [7,8] In the present study the single nutrient foramen were present in 91.25% of humeri which was contrast to Chandrasekaran et al.(76.74%)[9], Anusha et al.(72%)[10], Parmar et al.(72%)[11], Yaseen et al. (88.5%)[12], and almost similar to Khan et al. (90.67%)[13], Muralimanju et al. (93.8)[14], The nutrient foramen were located predominantly on antero-medial surface depicted by the study of Mansur et al. (88.86%), Chandrashekharan et al. (89.92%) supported 91.5% of present study and different from Solanke et al.[15] reported only 67%. Nutrient artery enters through nutrient foramen present in bone and the damage to nutrient artery may lead to delayed union following fracture of shaft of humerus.[11]

The anatomical knowledge of nutrient foramen is important for orthopaedic surgeons during operations on the humerus like bone grafting and microsurgical bone transplantation .[4] Precise location of nutrient artery before elective surgery also plays an important role in arterial anastomoses for vascularized grafts .[14]

CONCLUSION

The study showed more numbers of single nutrient foramina present in anteromedial surface of humerus directed downward. These type of study will help in surgical procedure of fracture, trauma and will give knowledge about variation of nutrient foramen present, so that operator may not confused during operation.

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