

Common Hepatic Artery Variations: A Cadaveric Study

Datta D.¹, Tripathi A.^{1*}, Anand C.¹, Singh AP², Jain S.³, Khare S⁴

¹Assistant Professor, ³Professor, ⁴Professor and Head,
Department of Anatomy, Subharti Medical College, Meerut, UP, India.

²Assistant Professor, Department of Anatomy,
Heritage Institute of Medical Sciences, Varanasi, UP, India.

ABSTRACT

Preamble: Common Hepatic Artery, one of the branches of the Coeliac trunk, is prone to variations, thus challenging the Surgeons during operative procedures of the Gastric, Hepatic and Biliary Apparatus.

Aims: The aim of this study was to attempt a study of such variations of the Common Hepatic Artery.

Material and Methods: The Common Hepatic Artery was studied in 20 cadavers; 15 males and 5 females; at Department of Anatomy, Subharti Medical College, Meerut, India, after routine MBBS dissection, as per protocol.

Results: Variation in blood supply to the liver was noted in one female cadaver. Two Hepatic arteries were found to arise from the Celiac Trunk. One coursed to the right and gave the Gastroduodenal Artery and Right Gastric Artery and continued towards the porta hepatis. The other artery after giving the Left Gastric Artery coursed through the lesser omentum away from the common bile duct and was deposited in the fissure for ligamentum venosum and thus into the left lobe, thereby supplying it. The portal vein was found to travel between these two arteries.

INTRODUCTION

Coeliac Trunk (CT) is classically described as trifurcating after arising ventrally, as a short stump from the aorta, and in a study by Yi et al, was shown to do so completely into LGA, SA and CHA in 87.6%, incompletely ie bifurcating in 12.2% and completely absent in 0.2% of cases.¹

Such variations in blood supply to the liver present challenges to general, transplant and onco surgeons, and in particular to those involving interventional radiologists for infusion therapy and transarterial chemo-embolization of liver cancers.²

AIMS

The present descriptive work was planned to study the variations in Common Hepatic Artery.

MATERIALS AND METHODS

Twenty (20) Cadavers; fifteen (15) of them being males, the remaining females; used for routine MBBS dissection classes, at Department of Anatomy, Subharti Medical College, Meerut, were selected randomly for this study. The Coeliac Trunk and its

Keywords: Common Hepatic Artery, Variations, Coeliac Trunk.

Abbreviations:


Common Hepatic Artery (CHA), Right Hepatic Artery (RHA), Left Hepatic Artery (LHA), Coeliac Trunk (CT), Left Gastric Artery (LGA), Right Gastric Artery (RGA), Splenic Artery (SA), Gastroduodenal Artery (GDA), Cystic Artery (CA), Portal Vein (PV).

*Correspondence to:

Dr. Alok Tripathi,
Assistant Professor, Department of Anatomy,
Subharti Medical College, Meerut, UP, India.

Article History:

Received: 19-04-2017, **Revised:** 08-05-2017, **Accepted:** 26-05-2017

Access this article online	
Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2017.3.3.085	

branches were dissected according to Cunningham's Manual of Anatomy, Vol.2.³

OBSERVATIONS

In one of the female cadavers, two Hepatic arteries were found to arise from the Celiac Trunk (Fig. 1).

One coursed to the right and gave the Gastroduodenal Artery and Right Gastric Artery and continued towards the porta hepatis behind the common bile duct in the lesser omentum.

At the porta, it continued into the right lobe, thereby supplying it, after giving a Cystic Artery to the gall bladder behind the cystic duct (Fig. 2 & 3).

The other artery after giving the Left Gastric Artery coursed through the lesser omentum away from the common bile duct and was deposited in the fissure for ligamentum venosum and thus into the left lobe, thereby supplying it. The portal vein was found to travel between these two arteries (Figs. 2 & 3).

In all the remaining 19 cadavers, the origin of the CHA was from the CT and its branches and course was as normally described.³

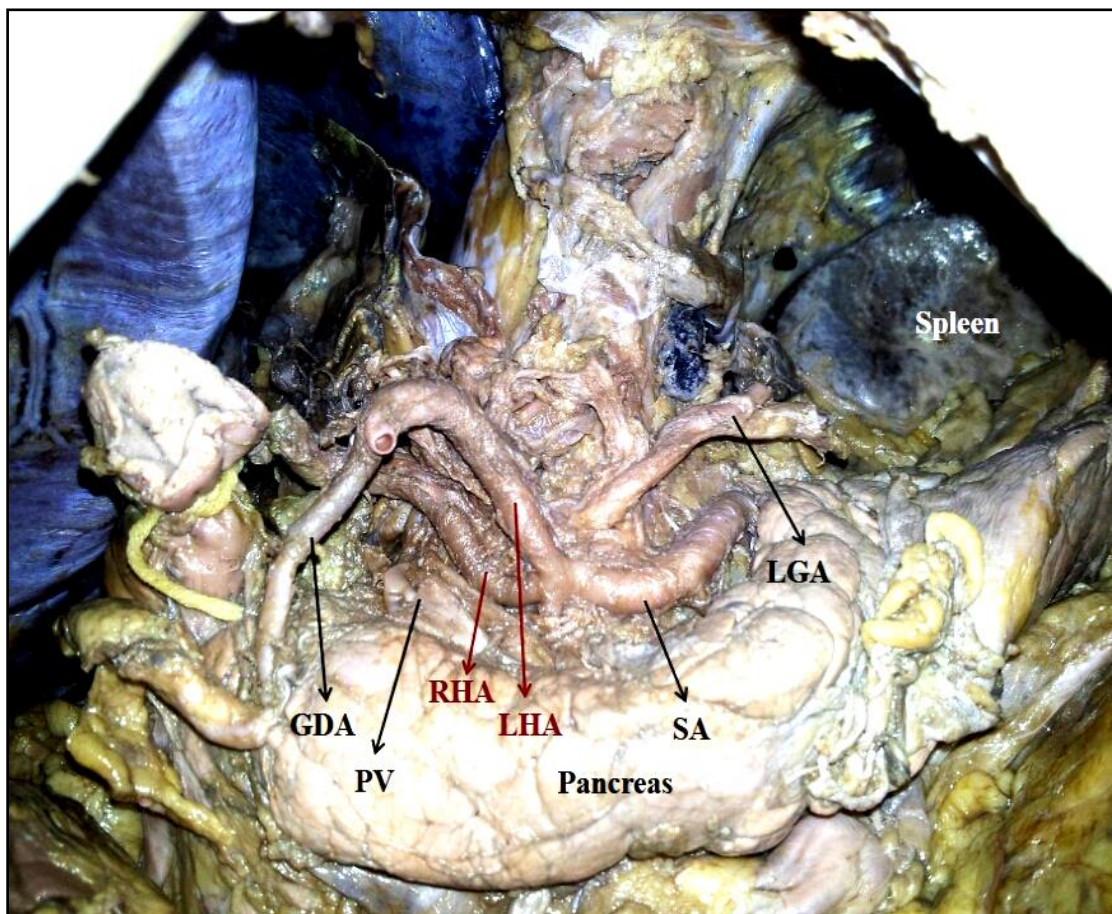


Fig. 1 Showing both the Hepatic Arteries originating from the Coeliac Trunk

[LGA- Left Gastric Artery; SA- Splenic Artery; GDA- Gastro Duodenal Artery; LHA- Left Hepatic Artery; RHA- Right Hepatic Artery; PV- Portal Vein]

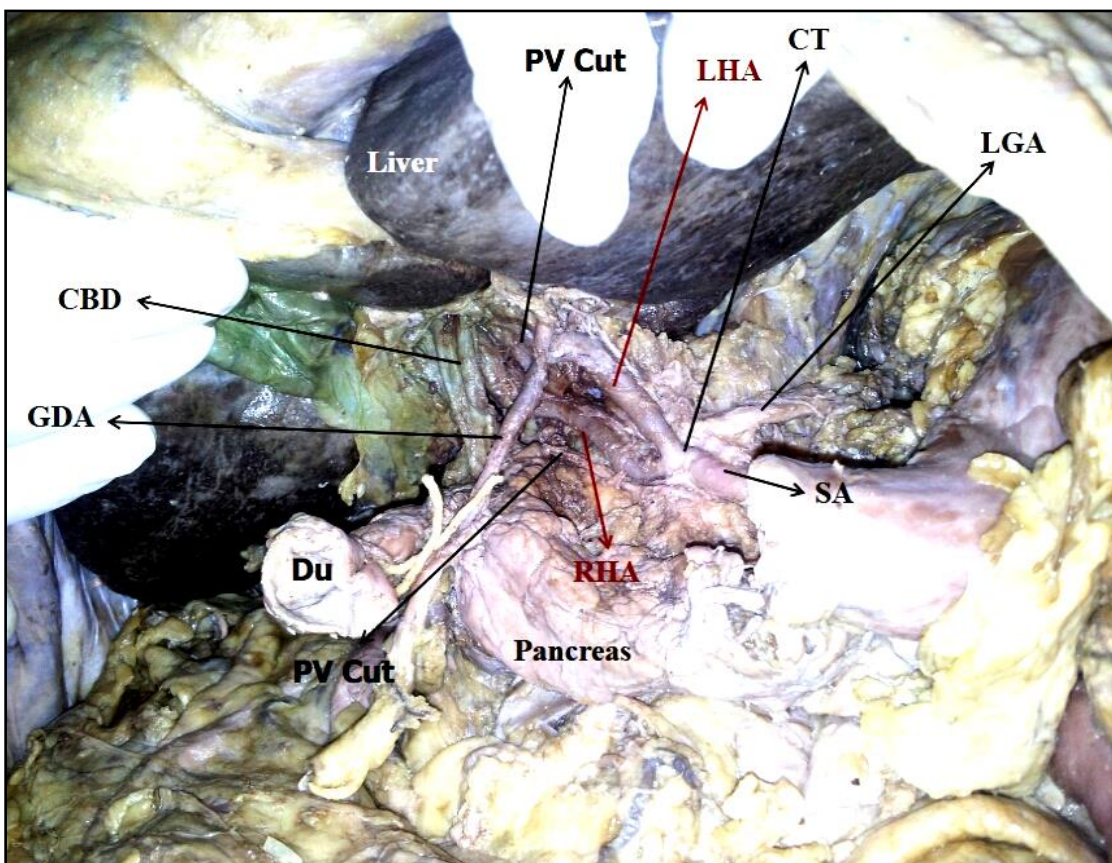


Fig 2. Showing the Right Hepatic Artery coursing behind the CBD to the Porta Hepatis

[CT- Coeliac Trunk; LGA- Left Gastric Artery; SA- Splenic Artery; GDA- Gastro Duodenal Artery; LHA- Left Hepatic Artery; RHA- Right Hepatic Artery; Du- Duodenum (cut); PV- Portal Vein; CBD- Common Bile Duct]

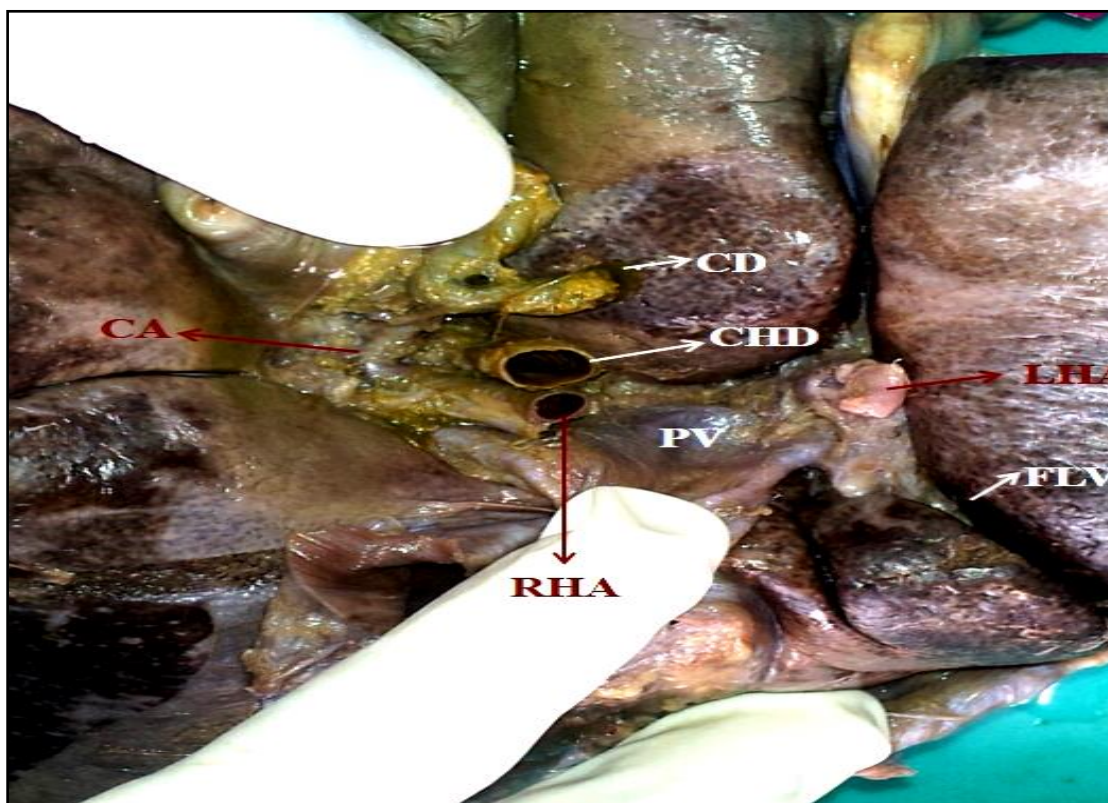


Fig. 3 Showing the Left Hepatic Artery coursing into Fissure for Ligamentum Venosum

[LHA- Left Hepatic Artery; RHA- Right Hepatic Artery; PV- Portal Vein; CHD- Common Hepatic Duct; CD- Cystic Duct; CA- Cystic Artery; FLV- Fissure for Ligamentum Venosum]

DISCUSSION

Developmentally, the Hepatic Artery variations can be attributed to differential regression or continuous growth of the parts of primitive vessels, arising ventrally from the dorsal aorta and forming a longitudinal anastomosis.⁴

Khamiso Altaf Hussain Talpur et al in a study of Extrahepatic Biliary System anatomical variations and congenital anomalies during laparoscopic cholecystectomy found that the variations in Hepatic Artery Supply to liver were 14%.⁵ Siraj Saadaldin Abdullah et al in a study on Liver Transplant patients found variations in Hepatic Artery to the tune of 31.9%.⁶

An International classification of vascular Anatomy of Liver was proposed by Michels⁷, and subsequently modified by Hiatt et al.², the salient feature being naming of the variation where the name of the origin site abbreviation (CH) is simply connected to the name of the vessel from which it arises by a hyphen. If variant hepatic arteries of the same origin show different anatomic locations or courses, the anatomic course is attached to the end of the type of CHA variation within parentheses. As such in our study, double hepatic artery ie both the Hepatic Arteries arose from the CT and does not fit into the original Michel's Classification.

CONCLUSION

The study of variations in blood supply to the liver assumes significance due to the increasing interventions in this region, starting from General Surgeries through Laparoscopic, Angiographic, Onco and Transplant Procedures.. The authors plan to extend this study by utilizing Digital Subtraction Angiography in combination with Percutaneous Angiography to study the vascular anomalies in a more objective manner.

REFERENCES

1. Yi, S. Q.; Terayama, H.; Naito, M.; Hirai, S.; Alimujang, S.; Yi, N.; Tanaka, S. & Itoh, M. Absence of the celiac trunk: case report and review of the literature. *Clin. Anat.*, 21(4):283-6, 2008.
2. Hiatt, J. R.; Gabbay, J. & Busuttil, R. W. Surgical anatomy of the hepatic arteries in 1000 cases. *Ann. Surg.*, 220(1):50-2, 1994.
3. Romanes GJ., *Cunningham's Manual of Practical Anatomy*, Oxford Univ Press, 15th Ed. Vol. II, 216- 222.
4. Hill, M.A. 2017 *Embryology Book - Text-Book of Embryology 10*. https://embryology.med.unsw.edu.au/embryology/index.php/Book_Text-Book_of_Embryology_10
5. Khamiso Altaf Hussain Talpur, Abdul Aziz Laghari et al. Anatomical variations and congenital anomalies of Extra Hepatic Biliary System encountered during Laparoscopic Cholecystectomy, *J Pak Med Assoc.* 60(2): 89-93, 2010.
6. Siraj Saadaldin Abdullah, Jean-Yves Mabrut et al. Anatomical variations of the hepatic artery: study of 932 cases in liver transplantation. *Surg Radiol Anat* (2006) 28: 468–473.
7. Michels, N. A. Newer anatomy of the liver and its variant blood supply and collateral circulation. *Am. J. Surg.*, 112(3):337-7, 1966.

Source of Support: Nil.

Conflict of Interest: None Declared.

Copyright: © the author(s) and publisher. IJMPP is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882. This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Datta D., Tripathi A., Anand C., Singh AP, Jain S., Khare S. Common Hepatic Artery Variations: A Cadaveric Study. *Int J Med Res Prof.* 2017; 3(3): 411-13. DOI:10.21276/ijmrrp.2017.3.3.085