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Original Research Article.

Cadaveric Analysis for Evaluation of Surgical Anatomy of Common Hepatic Artery: An Institutional Based Study

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ABSTRACT

Background: To assess the surgical anatomy of common hepatic artery.

Materials & Methods: 20 cadavers were enrolled for the current research and underwent dissection in the anatomy department. Analysis of all the specimens was done. Demographic and gender-related details of all the cadavers was recorded separately from record files. Preservation of all the cadavers was done in 10 percent formaldehyde solution. The length and diameter of the arteries were measured after their origin, position, and course were analyzed. Following investigation, all of the arteries from the celiac trunk were recorded in terms of their relationships. Using colored thread, all of the studied arteries were identified.

Results: Anatomic variation of common hepatic artery was seen in 20 percent of the specimens. While correlating the occurrence of variation of common hepatic artery with gender and with age group, non-significant results were obtained. Average length and diameter of common hepatic artery was 2.71 cm and 0.79 cm respectively.

Conclusion: It's a common phenomenon to encounter variations in the hepatic artery.

Key words: Cadaveric, Hepatic artery, Surgical.

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INTRODUCTION

Anatomical variations of the hepatic arteries and coeliac trunk are of considerable importance in liver transplants, laparoscopic surgery, radiological abdominal interventions and penetrating injuries to the abdomen. The frequency of inadvertent or iatrogenic hepatic vascular injury rises in the event of aberrant anatomy and variations. Arterial vascularisation of the gastrointestinal system is provided by anterior branches at three different levels of the abdominal aorta. Differences arising during several developmental stages in the embryonal process leads to a range of variations in these vascular structures.[1-3]

Patterns of arterial blood supply to the liver are variable. Modifications of the dominant scheme, in which the liver receives its total inflow from the hepatic branch of the celiac-axis, occurring 25% to 75% of cases. The aorta, left gastric artery, superior mesenteric artery, and other visceral branches may deliver blood to the lobes under different patterns. These vessels could be replacements, serving as the lobe's main arterial supply, or they could be auxiliary, existing in addition to the typical arterial supply.[4,5] Hence; the present study was conducted for assessing the surgical anatomy of common hepatic artery.

MATERIALS & METHODS

The present study involved evaluation of surgical anatomy of common hepatic artery. 20 cadavers were enrolled for the current research and underwent dissection in the anatomy department. Analysis of all the specimens was done. Demographic and gender-related details of all the cadavers were recorded separately from record files. Preservation of all the cadavers was done in 10 percent formaldehyde solution. The length and diameter of the arteries were measured after their origin, position, and course were analyzed. Following investigation, all of the arteries from the celiac trunk were recorded in terms of their relationships. Using colored thread, all of the studied arteries were identified. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Univariate regression curve was used for assessment of level of significance.

Table 1: Anatomic variation

Anatomic variation	Number of patients	Percentage of patients
Present	4	20
Absent	16	80
Total	20	100

Table 2: Correlation of anatomic variation with gender and with age group

Variable	Presence of anatomic variation	
	r-value	p-value
Gender	-1.212	0.128
Age group	-1.563	0.338

Pearson's correlation

Table 3: Length and diameter of hepatic artery specimens showing variation

Parameter	Mean	SD
Average length (cm)	2.71	0.88
Average diameter (cm)	0.79	0.23

RESULTS

Out of 20 cadavers, 12 belonged to the age range of 40 to 50 years. 13 cadavers were of male gender while the remaining 7 were of female gender. Anatomic variation of common hepatic artery was seen in 20 percent of the specimens. While correlating the occurrence of variation of common hepatic artery with gender and with age group, non-significant results were obtained. Average length and diameter of common hepatic artery was 2.71 cm and 0.79 cm respectively.

DISCUSSION

The liver is a large, highly vascularized organ in the right upper quadrant of the abdomen. It typically receives arterial support from branches of the celiac trunk (CT). The CT originates from the abdominal aorta and forms three major vessels: common hepatic artery (CH), left gastric artery (LGA), and splenic artery. After giving off the gastroduodenal artery, the CH continues toward the liver as the proper hepatic artery (PHA) before bifurcating into left and right hepatic arteries as it approximates the hepatic hilum. The right hepatic artery (RHA) supplies the right and caudate lobes– segments I, V-VIII– while the left hepatic artery (LHA) supplies the left and quadrate lobes– segments II-IV.[6-8] Hence; the present study was conducted for assessing the surgical anatomy of common hepatic artery.

In the present study, out of 20 cadavers, 12 belonged to the age range of 40 to 50 years. 13 cadavers were of male gender while the remaining 7 were of female gender. Anatomic variation of common hepatic artery was seen in 20 percent of the specimens.

An international classification describing the principal variations in the vascular anatomy of the liver was proposed by several authors, including Adachi in 1928, Michels in 1966, Hiatt in 1994 and Abdullah in 2006. Despite these studies, there are still some rare hepatic variations which are not found in these classifications.

Michels described the hepatic arterial anatomy and its variations using the results of 200 cadaveric dissections and identified 10 types of hepatic arterial anatomy: type I: normal pattern; type II: a replaced LHA from the left gastric artery; type III: a replaced RHA from the SMA; type IV: replaced RHA and LHA; type V: an accessory LHA; type VI: an accessory RHA; type VII: accessory RHA and LHA; type VIII: a replaced RHA or LHA with other hepatic artery being an accessory one; type IX: the hepatic trunk as a branch of the SMA; and type X: the CHA from the left gastric artery.[9, 10]

In the present study, while correlating the occurrence of variation of common hepatic artery with gender and with age group, non-significant results were obtained. Average length and diameter of common hepatic artery was 2.71 cm and 0.79 cm respectively.

CONCLUSION

It's a common phenomenon to encounter variations in the hepatic artery.

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