

**IJCRR**

Vol 05 issue 14

Section: Healthcare

Category: Research

Received on: 06/06/13

Revised on: 23/06/13

Accepted on: 14/07/13

**RIGHT HEPATIC ARTERY BRANCHING OFF FROM SUPERIOR MESENTERIC ARTERY – A CASE REPORT**B. M. Bannur<sup>1</sup>, B.B. Patil<sup>1</sup>, Prerna Gupta<sup>1</sup>, Neeraj Gupta<sup>2</sup>, Sahana B.N.<sup>1</sup>, Nagaraj M.<sup>1</sup><sup>1</sup>Dept of Anatomy BLDE, B M Patil Medical college, Bijapur Karnataka, India<sup>2</sup>Dept. of Forensic Medicine, BLDE, B. M. Patil Medical college Bijapur Karnataka, India

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**ABSTRACT**

The anatomical variations of the abdominal viscera are important due to its clinical importance. Various types of vascular anomalies are frequently found in human abdominal viscera during cadaveric dissection and diagnostic radiological imaging. The present report describes a variation in the branching pattern of right hepatic artery. Here right hepatic artery was arising from superior mesenteric artery, which was a direct branch from abdominal aorta. It was measuring 7 cm and was running behind portal vein. It is crucial for surgeons and radiologists to detect presence of a replaced right hepatic artery, not only for liver transplantation but before any abdominal surgery, as this unnoticed variant is vulnerable to inadvertent ligation.

**Keywords:** Right hepatic artery, Superior mesenteric artery, Liver transplantation.

**INTRODUCTION**

Hepatic artery is a branch from coeliac trunk which in turn is a branch from abdominal aorta. The hepatic artery provides origin to the right gastric, gastroduodenal and occasionally posterior superior pancreaticoduodenal arteries. The hepatic artery can be subdivided into the common hepatic artery from coeliac trunk to origin of gastroduodenal artery and hepatic artery proper from that point to its bifurcation. Hepatic artery proper is accompanied with the portal vein posteriorly and the bile duct on its right side. Close to the porta hepatis the hepatic artery proper divides into right hepatic artery and left hepatic artery which supply the physiological right and left lobes of the liver. Thus usually right

hepatic artery is a branch of hepatic artery proper.<sup>1</sup>

**CASE REPORT**

In a routine dissection of an adult male cadaver it was observed that right hepatic artery was branching off from the superior mesenteric artery and crossing posterior to the portal vein (Figures 1 and 2). This artery was identified as a replaced right hepatic artery because it was providing the sole arterial supply to the right lobe. The length of the replaced RHA was 7 cm from the superior mesenteric artery to the liver and was running behind the portal vein. The liver was normal in appearance.

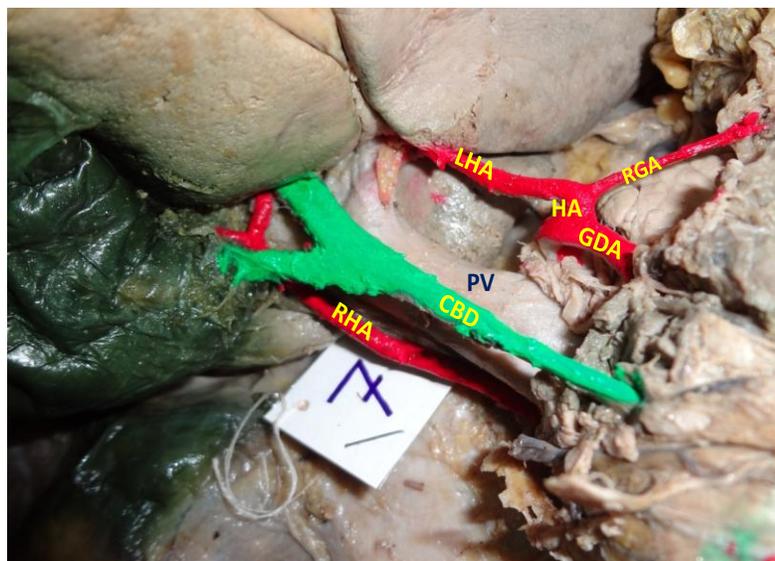


Fig – 2

RHA - Right hepatic artery

LHA - Left hepatic artery

GDA - Gastroduodenal artery

CBD - Common bile duct

RGA - Right gastric artery

HA - Hepatic artery

PV - Portal vein

## DISCUSSION

Right hepatic artery is defined as *replaced*, if the artery does not originate from an orthodox position and provides the sole supply to the right lobe of the liver, but if the artery supplies a lobe in addition to its normal artery then it is called as an accessory artery.

According to Grays anatomy the replaced right hepatic artery from superior mesenteric artery has been documented in 10- 15% cases.<sup>1</sup>

Kornasiewicz et al. In their study on 40 cases of liver transplant found replaced right hepatic artery arising from superior mesenteric artery in 5% cases.<sup>2</sup>

Shin Hwang et al. In their study on 197 cases in living donor liver transplantation found replaced right hepatic artery in 18.3% cases.<sup>3</sup>

Amadeo Marcos et al. In their study on 95 donors for evolution of technique for arterial revascularization found replaced right hepatic artery in 13.7% cases.<sup>4</sup>

This variant can be attributed to the abnormal persistence or regression of an embryonic artery. During embryonic development, the aorta gives off ventral segments, four of which become the celiac, splenic, common hepatic, and superior mesenteric arteries. A longitudinal ventral artery anastomoses these segments. The replaced right hepatic artery originates from the persistence of the longitudinal ventral arterial segment connected to the superior mesenteric artery.<sup>5</sup>

This variant is of no clinical meaning unless the superior mesenteric artery becomes compromised. In superior mesenteric artery occlusion if the collateral circulation fails symptoms of gut necrosis will appear. In such case if replaced right hepatic artery is present than liver will also become necrotic.<sup>6</sup>

This anatomical variant must be identified prior to procedures such as laparoscopic cholecystectomy to prevent vascular or biliary damage, especially if the replaced RHA runs

anterior to the common hepatic duct.<sup>7</sup> Angiography of the celiac and mesenteric arteries will define the vasculature pre-operatively.<sup>8</sup> Preoperative detection of an aberrant RHA in prospective transplant donors and recipients is essential for the proper management of living donor liver transplantation, as transplantation of the right lobe is heavily favoured over the left, and the aberration affects the safety of both donor and recipient.<sup>9</sup>

The presence of a replaced right hepatic artery proximal to the bile ducts also may reduce the risk of post-operative ischemia in the biliary tract of the donor, an occurrence that is speculated to be caused by the loss of crucial feeding branches from the main or left hepatic artery during retrieval.<sup>10</sup> In contrast, caution must be applied where the recipient possesses a replaced right hepatic artery. Despite the development of branch patch reconstruction techniques, one study reported a higher incidence of postoperative hepatic artery thrombosis and stenosis in liver transplant recipients possessing a replaced right hepatic artery. The suspected cause was reduced blood flow in the common hepatic artery, thinner due to lack of the right hepatic arterial branch.<sup>11</sup>

## CONCLUSION

It is crucial for surgeons and radiologists to detect presence of a replaced right hepatic artery, not only for liver transplantation but before any abdominal surgery, as this unnoticed variant is vulnerable to inadvertent ligation resulting in ischemia and tissue necrosis during complicated surgical procedures.

## ACKNOWLEDGEMENT

Authors acknowledge the help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed. Authors are grateful to IJCRR editorial

board members and IJCRR team of reviewers who have helped to bring quality to this manuscript.

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