



**A STUDY ON ACCESSORY SEGMENTAL BRANCHES TO THE RIGHT LOBE OF LIVER AND ITS SURGICAL IMPLICATIONS DURING LIVER TRANSPLANTATION**

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**ABSTRACT**

Main treatment modality for the patients with end stage liver disease is liver transplantation. Cadaveric donors contribute majority of transplanted livers apart from living donors who undergo partial hepatectomy. Presence of accessory segmental branches to the different segments of liver might pose various challenges to the surgeons during transplantation procedures. Present study was conducted with the objective of finding the presence of accessory segmental branches to the segments of right lobe of liver. Accessory branch to segment V was seen in 6 specimens (7.1%), segment VI was seen in 4 specimens (4.8%), segment VII was seen in 5 specimens (6%) and segment VIII was seen in 1 specimen (1.2%). Prior knowledge of presence of accessory branches to the various segments of liver is very essential for the surgeons during liver transplantation. This will prevent the accidental vascular injury, hemorrhage or compromise to the blood supply to the concerned segment of donor or recipient liver during transplantation.

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**INTRODUCTION**

Liver is divided into four portal sections such as right lateral, right medial, left lateral and left medial by four main branches of portal vein. Right lateral sector made up of segment VI and segment VII. Right medial sector includes segment V and segment VIII. Left lateral sector made up of segment III, segment IV and part of segment I. Left medial sector include segment II. Main portal vein divides in to right and left portal vein. Right portal vein again divides into right posterior portal vein supplying segments VI and VII and right anterior portal vein supplying segments V and VIII [1]. Living donor liver transplantation has been tried using right posterior segment graft to overcome graft size mismatch. This involves the use of segment VI and VII graft [2]. Surgeons must be aware of presence any accessory branches to the donor or recipient segments of liver used for transplantation. To achieve this, precise and reliable preoperative imaging of vascular system is mandatory before liver surgeries such as living donor liver transplantations, complex liver resection and interventional radiology with portal vein embolization technique [3]. So, the present study was conducted to observe the presence of accessory branches to various segments of right lobe of liver.

**MATERIALS AND METHODS**

The present study was conducted in 89 livers collected from Department of Anatomy and Forensic medicine, Mysore Medical College and Research Institute, Mysore. Specimens with intact hilar structures were collected irrespective of age sex and gender. Injured, decomposed and specimens with gross malformations were excluded from the study. Specimens collected by postmortem cases were thoroughly washed in running water to remove blood clots. Specimens were fixed in 5 % formalin. The gross dissection was done by following the guidelines of Cunningham's Manual [4]. Portal vein was separated from other structures at porta hepatis. Division of main portal vein was noted. Right portal vein was traced by dissecting the right lobe of liver and removing the parenchyma along the vein by piecemeal dissection. After observing the branching pattern of right portal vein, presence of any accessory branches to various segments of right lobe of liver were noted [5]. Descriptive statistics was done by measuring the discrete variables, mean and standard deviation.

**RESULTS**

Accessory branch to seg V was seen in 6 specimens (7.1%) (Fig 1). In 4 out of 6 specimens accessory branch was seen arising from RPV. In the remaining 2 specimens it was seen arising from RPPV. Accessory branch to seg VI was seen in 4 specimens (4.8%) (Fig 2). It was seen arising from seg V vein, RPV, seg VII vein and RPPV.

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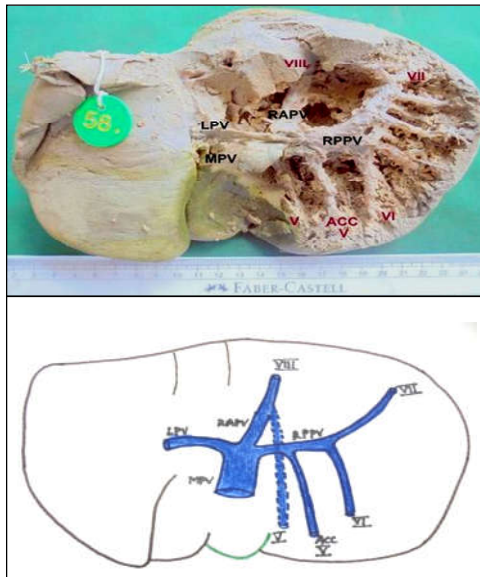


Figure 1 Accessory branch to seg V from RPPV and its schematic representation

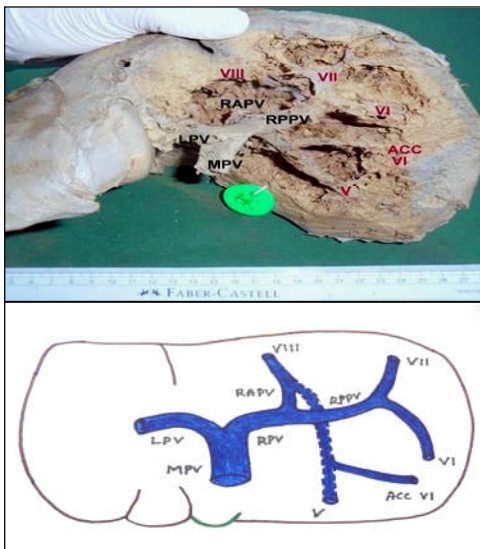


Figure 2 Accessory branch to seg VI from seg V vein and its schematic representation

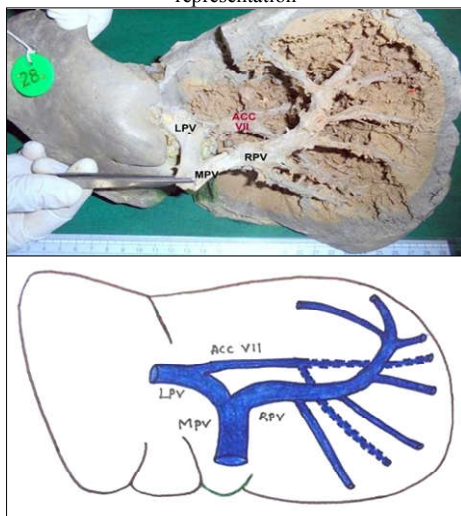


Figure 3 Accessory branch to seg VII from LPV and its schematic representation

Accessory branch to seg VII was seen in 5 specimens (6%) (Fig 3). In 3 out of 5 specimens it was arising from RPPV, in

one specimen it was arising from LPV and in another specimen it was seen arising from MPV. Accessory branch to seg VIII was seen in one specimen (1.2%) and it was seen arising from RPPV (Fig 4).

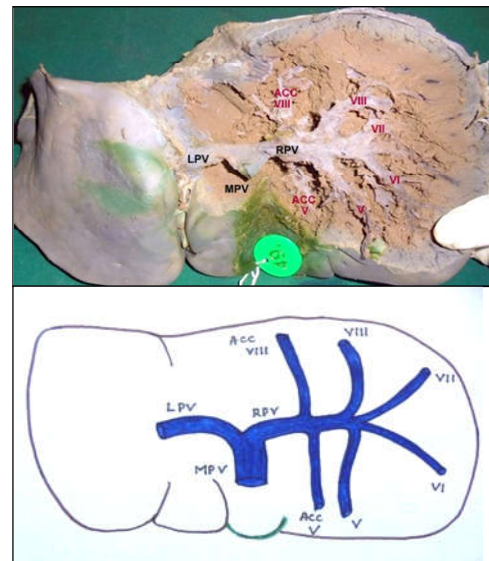


Figure 4 Accessory branch to seg VIII from RPPV and its schematic representation

## DISCUSSION

Thorough analysis of arterial and venous anatomy is a vital step before undertaking liver transplantation surgeries. In the present study accessory branch to seg V was seen in 7.1%. Accessory branch to seg VI was seen in 4.8% which correlated with the work done by Koc Z *et al.* [6]. Accessory branch to seg VII was seen in 6% which is in agreement with the work done by Maheswari K [7] and accessory branch to seg VIII was seen in present study in 1.2%. (Table 1)

Table 1 Comparison of Presence of Accessory Branches To Right Lobe With Previous Studies

Studies	Accessory branches to right lobe			
	Seg V	Seg VI	Seg VII	Seg VIII
Present study	7.1%	4.8%	6%	1.2%
Koc Z <i>et al.</i> [5]	0%	2.4%	0.6%	0%
Maheswari K[6]	0%	0%	8%	0%
Atasoy C and Ozyurek E[9]	0%	1%	0%	0.8%

Presence of accessory segmental branches to the various segments of liver might pose various challenges to the surgeons during transplantation procedures in the form of injury to the vessel, hemorrhage or compromise of blood supply to the donor or recipient segment [8]. Accessory segmental branches traversing the interlobar boundary crosses hepatectomy plane. This is important as accessory branch may be the dominant vessel supplying the particular segment [9].

## CONCLUSION

Detailed analysis of vascular anatomy of various segments of liver is very important before performing resection of any segment of liver. It is essential for surgeons and radiologists to be aware of the anatomical basis of intra-hepatic portal venous system to ensure safe hepatic surgery and to carry out radiological interventions.

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**Conflict of interests:** None

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