BRIEF REPORT

Anatomy of the middle hepatic vein in a Sri Lankan cohort

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Abstract

Understanding the middle hepatic vein (MHV) anatomy and its drainage is vital for liver surgery. This study looks at Contrast enhanced CT scans of 65 Sri Lankan patients. The MHV drainages were classified in to three types measuring, the MHV diameter, common trunk length and tributaries. There were 58.46% males. 61.53% Had Type B drainage. Median common trunk length was 1.29cm and MHV diameter at IVC was 5.96mm. Findings show that MHV anatomy varies greatly emphasizing the importance of prior detailed surgical planning due to MHV branching variations.

Introduction

Liver, the largest organ in the body is divided into right and left lobes by the imaginary Cantlie's line (Middle hepatic fissure) which is drawn along the middle hepatic vein. There are two other main hepatic veins, right and left with multiple small branches known as short hepatic veins. The middle hepatic vein (MHV) drains segment IVa, IVb, V and VIII. Anatomical variations of the MHV are decisive in planning a hepatectomy, particularly living donor liver transplantation (LDLT).

Anatomical understanding of liver surgery has advanced along with LDLT. In split liver transplantation, the MHV is included in to the right or left hemi - liver. Thus the options vary from, right liver graft with or without MHV or left liver graft with or without MHV. When the MHV is included in to the left liver graft, the area drained by tributaries of the MHV in the right paramedian sector is impaired, as the MHV is known to be the major drainage vein for this sector. This can cause congestion of the liver parenchyma drained by it and liver dysfunction in the donor [1]. If the MHV is left in the donor congested area in the right liver graft is reported to result in poor liver function. If the anticipated graft congestion is more that 10% it is recommended to reconstruct significant tributaries. Hence, understanding the venous drainage of the middle hepatic vein and its variations in a population is a key in liver surgery.

Methodology

Computed tomographic (CT) scans of 65 patients who came to the Colombo North Center for Liver Diseases were evaluated. CT scans of cirrhotics, post operative patients and having liver lesions over 2 cm, CT images with artifacts and films with inadequate enhancement were excluded. 70 Second venous phase images were revived for the study.

Types of MHV drainages were classified according to previous classification [2,3], Figure 1 and 2
Type A -Independent drainage of RHV and drainage of LHV & MHV via a common trunk
Type B - Independent drainage of RHV, MHV and LHV to the IVC
Type C - Independent drainage of LHV and drainage of RHV & MHV via a common trunk
Type D - All other branching patterns

The diameter of the MHV was measured at the start of the trunk at the IVC. The length of the common trunk was measured from the draining point of the common trunk into the IVC to the ending point of the division of the common trunk as MHV and LHV/RHV. Significant tributaries draining to MHV was defined as a branch with a diameter more than 40% of the MHV. These were classified as right and left side tributaries.

Results

There were 58.46% (n=38) males in the cohort. The Median age was 60 (80-20) years. There were 30.77% (n=20)Type A, 61.53% (n=40)Type B, 1.53% (n=1) Type C venous drainages. Only 6.17% showed a deviation from the above classification (Type D). The median length of the common trunk in Type A or Type C was 1.29cm (range 0.59cm-1.78cm). The median diameter of the middle hepatic vein at the IVC was is 5.96mm (range 3.66mm- 8.91mm).

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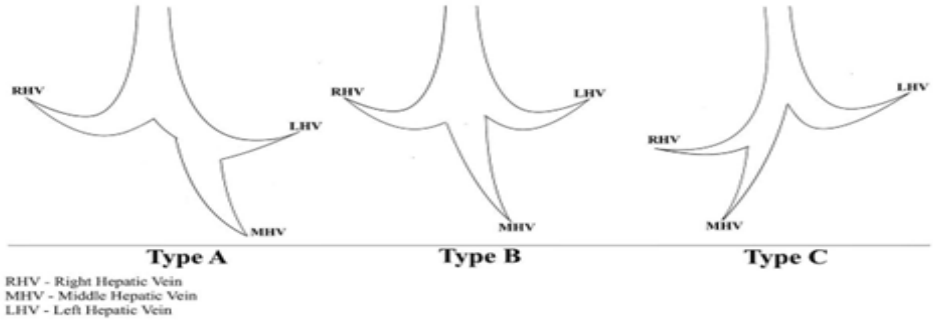

Figure 1: Type of middle hepatic vein drainage

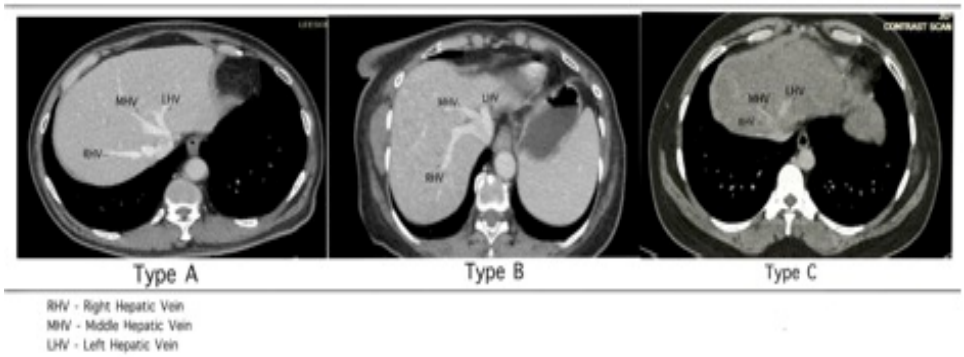

Figure 2: Images of CT scans of different MHV drainage

29.23% of patients had 2 branches and 63.07% of patients had 1 branch, 7.7% patients did not have any significant branch draining on to the left side of MHV from segment IV. 52.30% of patients had 2 branches, 46.16% patients had 1 branch, one (1.54%) patient did not have any significant branch draining to right side of the MHV.

Discussion

Middle hepatic vein anatomy is highly variable. In this cohort Type B drainage with independent drainage to IVC was the commonest draining method. In a previous study of a Caucasian cohort, 84% of the CT scans had a common MHV and LHV trunk before opening in to the IVC [4,5]. This is a favorable variation for left lobe grafts with the MHV. However in this cohort a common trunk was seen in 30% of the CT scans. Larger majority had three independent veins. Having three independent veins makes donors more versatile for left lateral grafts and right lobe graft with the MHV. In this cohort apart from one patient all the others had one or two branches draining the segment IV in to the middle hepatic vein. In these patients incorporating the MHV with the right lobe during hepatectomy can lead to segment IV congestion. Over 60% of the urban population has fatty liver in Sri Lanka [5]. In these patients taking the MHV during right hepatectomy may affect the actual functional residual volume and liver dysfunction.

Knowledge on the existence of MHV branching variation is essential to plan surgeries and radiological interventions and also to prevent complications.

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