INTRODUCTION
The common hepatic artery usually arises from the coeliac trunk (85% of cases), but may also arise directly from the aorta or from the left gastric artery, superior mesenteric (3% of cases). The blood supply to the liver is unique, 80% being derived from the portal vein and 20% from the hepatic artery. There are many anatomical variations and knowledge of which is essential for the safe surgery on the liver. The blood supply to the right lobe of the liver may be partly or completely supplied by a right hepatic artery arising from the superior mesenteric artery (2).

This study also explains the variations of right hepatic artery in two cases.

METHODS
During routine hepatopancreatico biliary surgeries (50) done from the period of 2013 to 2018 at Department of Surgical Gastroenterology, Kanyakumari Government Medical College, Asaripallam, Tamil Nadu, we came across 2 cases of variations of right hepatic artery which was picked up and studied.

RESULTS
Out of 50 hepatopancreatico biliary surgeries, only 2 cases (4%) showed the presence of replacing right hepatic artery originating from superior mesenteric artery.

DISCUSSIONS

Table 1. Uflacker’s Classification (3)

<table>
<thead>
<tr>
<th>Coeliac Trunk Variations</th>
<th>Uflacker’s Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classic Coeliac trunk</td>
<td>TYPE I</td>
</tr>
<tr>
<td>Hepato Splenic trunk</td>
<td>TYPE II</td>
</tr>
</tbody>
</table>

Table 2. Micheal’s And Hiatt’s Classification (4,5)

<table>
<thead>
<tr>
<th>Hepatic artery variation</th>
<th>Micheal’s classification</th>
<th>Hiatt’s classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Normal Anatomy</td>
<td>Type I</td>
<td>Type I</td>
</tr>
<tr>
<td>2. Replaced left hepatic artery originating from left gastric artery</td>
<td>Type II</td>
<td>Type II</td>
</tr>
<tr>
<td>3. Replaced right hepatic artery originating from superior mesenteric artery</td>
<td>Type III</td>
<td>Type III</td>
</tr>
<tr>
<td>4. Coexistence of Type II and III</td>
<td>Type IV</td>
<td>Type IV</td>
</tr>
<tr>
<td>5. Accessory left hepatic artery originating from left gastric artery</td>
<td>Type V</td>
<td>Type II</td>
</tr>
<tr>
<td>6. Accessory right hepatic artery originating from superior mesenteric artery</td>
<td>Type VI</td>
<td>Type III</td>
</tr>
<tr>
<td>7. Accessory left hepatic artery from left gastric artery and accessory right hepatic artery from superior mesenteric artery</td>
<td>Type VII</td>
<td>Type IV</td>
</tr>
<tr>
<td>8. Accessory left hepatic artery from left gastric artery and replaced right hepatic artery from superior mesenteric artery</td>
<td>Type VIII</td>
<td>Type IV</td>
</tr>
<tr>
<td>9. Common hepatic artery originating from superior mesenteric artery</td>
<td>Type IX</td>
<td>Type V</td>
</tr>
<tr>
<td>10. Right and left hepatic artery originating from left gastric artery</td>
<td>Type X</td>
<td>NOD</td>
</tr>
</tbody>
</table>

NOD – Not Otherwise Described

The anatomical variations in the coeliac trunk and the
superior mesenteric arteries were first studied by Adachi in 1928 (6).

Embryologically each dorsal aorta gives paired ventral splanchnic branches which supply the yolk sac, the primitive gut and its derivatives. With the fusion of the dorsal aortae, during the fourth week of intrauterine life, the ventral branches fuse and form a series of several unpaired segmental vessels; which run in the dorsal mesentery of the gut and are connected by the ventral longitudinal anastomosing channel.

With the formation of the longitudinal anastomotic channel, numerous ventral splanchnic branches are withdrawn and ultimately only three branches persist as coeliac artery to the foregut, superior mesenteric artery to midgut and inferior mesenteric artery to hind gut.

According to Tandler, the 11th and 12th ventral segmental roots disappear. The 10th and 13th roots remain connected via ventral anastomosis. The common hepatic left gastric and splenic arteries usually originate from the longitudinal anastomosis. These branches are usually separated from the 13th root (the future superior mesenteric artery). If the separation takes place at a higher level, branches of coeliac trunk are displaced to one of the superior mesenteric artery (7,8,9,10).

McGregor has stated that the hepatic artery may come from superior mesenteric artery or from aorta directly. The vessel divides near the liver into right and left branches which supply the respective lobes. One or other of these vessels may arise from superior mesenteric artery, aorta or left gastric artery. Such vessels may have unusual relationships in the right free border of the lesser omentum and present hazards in cholecystectomy(11).

In the study by Yang et al., replaced or accessory right hepatic arteries originated from coeliac trunk, common hepatic artery or gastro duodenal artery in about 1.54% of cases(12).

Henry Hollinshead has commented that aberrant hepatic arteries are far more common than are indicated. The percentage of aberrant right hepatic arteries which are the sole supply to the right lobe is greater(13).

In Flint’s series about 4/5th were replacing vessels, presumably supplying the entire right lobe. Flint has described that 32% of left hepatic were aberrant and 26% of right hepatic arteries were aberrant. (14).

Thompson estimated that aberrant left hepatic occur in about 25% of cases and aberrant right hepatic arteries only about half as frequently that is in about 12 to 13 percent (15).

Dassel and his colleagues found aberrant arteries much more frequently but in about that ratio :43% of cases had aberrant left hepatic arteries and 24% had right one. (16).

Keith L. Moore has stated that a common variety of right or left hepatic artery that arises as a terminal branch of hepatic artery proper may be replaced in part or entirely by an aberrant (accessory or replaced) artery arising from another source. The most common source of an aberrant right hepatic artery is superior mesenteric artery (17).

Henry Gray has stated that more commonly a replaced right hepatic artery or an accessory right hepatic artery arises from superior mesenteric artery. (18).

The present study is correlating with Micheal’s type III classification.

**FIGURE 1**

**CONCLUSION**

An intact hepatic artery is the gateway to successful hepatobiliary surgery. Introduction to laparoscopic cholecystectomy has stimulated a renewed interest in the anatomy of hepatic artery. Surgeons undertaking hepatobiliary surgery must know their hepatic artery anatomy to recognize the multiple variants for safe surgery and low morbidity. Radiological procedures and treatment of penetrating injuries involving perihepatic area requires a good knowledge of the variants in hepatic vascular structures. Computerized Tomographic angiography helps to clearly delineate the vascular anatomy preoperatively which would help the surgeon in anticipating a vascular anomaly.

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**DECLARATIONS**

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Conflict of interest: none declared

Ethical approval: not required

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