

**Research Article**

**Advantage of the Rouviere's Sulcus as an Anatomical Marker  
for Safe Dissection in Laproscopic Cholecystectomy**

**\*Talal Almas, \*Eyad Mansour**

**and \*\*Muqaddas Shahzad Qazi**

**\*Royal College of Surgeons in Ireland**

**\*\*House Officer, Jinnah Hospital, Lahore**

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**Corresponding Author:** Talal Almas, Royal College of Surgeons in Ireland

*E-Mail: talalalmas@Rcsi.Com/Talalalmas.Almas@Gmail.Com, Phone: +3530834212442*

**ABSTRACT**

**Objective:** To evaluate the prevalence of Rouviere's sulcus in our population.

**Study design:** A Case Series.

**Location and duration:** In the South Surgical Department of Mayo hospital, Lahore for a duration of one year from July 2017 to July 2018 after the approval from the ethical committee.

**Methodology:** Consecutive patients with symptomatic cholelithiasis and who were operated on with laparoscopic cholecystectomy were selected for the study. The type and frequency of Rouviere's sulcus were recorded in an operational note. The open-type of sulcus was delineated as a cleft in which the right hepatic pedicle was seen and the entire length of the sulcus was open. The fused-type sulcus is defined as a cleft where the pedicle cannot be visualized or is only open at the lateral end of the sulcus.

**Results:** A total of 160 subjects who underwent laparoscopic cholecystectomy were selected for the analysis. The open-type Rouviere sulcus was visualized in 48 patients and the furthest, disparate type was fused in 61 patients. Therefore, collectively, a total of 109 patients (68.13%) demonstrated the presence of Rouviere's sulcus.

**Conclusion:** Rouviere sulcus is an imperative extra-biliary sign that can be defined as open or fused in most patients. Defining the sulcus prior to commencing the dissection of the Calot triangle can help prevent bile duct injury, improving surgical prognosis.

**Key Words:** laparoscopic cholecystectomy, extrinsic landmark, lesion of bile duct, Calot's triangle, Rouviere sulcus.

**INTRODUCTION**

<sup>1</sup>Laparoscopic cholecystectomy has been accepted and adopted categorically by surgeons around the world since the late 1980s and is now the gold standard employed for the symptomatic treatment of cholelithiasis. Unfortunately, the obvious benefits for most patients have been

underestimated due to the increased risk of bile duct injury (BDI) seen in the early days of laparoscopic cholecystectomy.

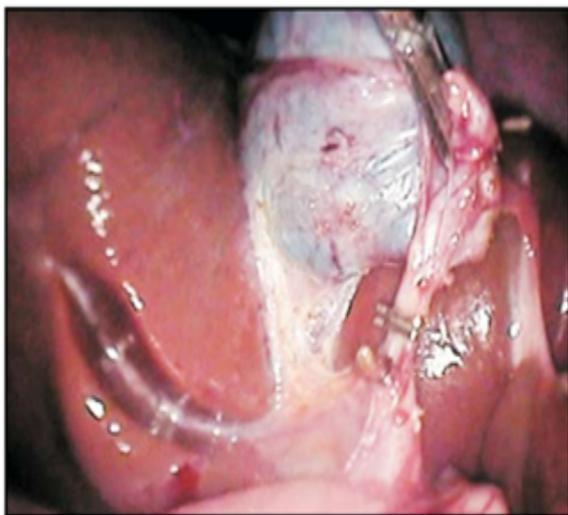
<sup>2-4</sup>Many strategies have been proposed to circumvent this serious complication of the procedure, one of which is the use of anatomical

markers as reference points. <sup>6-8</sup>One of the important reference points is a hollow used by Henri Rouviere in 1924, which is also used as a reference point for guiding the initiation of safe dissection. The reference point is a cleft in the liver that progresses to the right of the hilum at the front of the caudate process with the right portal pedicle and accurately determines the plane of the common bile duct. <sup>9</sup>Rouviere was found in 78% of the population in the developed world. Given the exceeding importance of the Calot's triangle in safe dissection, <sup>10</sup>our goal was to determine its frequency in our population, so that surgeons can consider this anatomically imperative landmark while performing laparoscopic cholecystectomy.

#### MATERIALS AND METHODS

This prospective descriptive study was performed in 160 consecutive patients with symptomatic cholelithiasis and who had undergone laparoscopic cholecystectomy in the South Surgical Department of Mayo hospital Lahore for the duration of one year from July 2017 to July 2018 after the approval from the ethical committee. The type and frequency of Rouviere sulcus was then recorded. The open-sulcus type was described as a cleft in which the right hepatic pedicle was visible and sulcus was open throughout its length (Fig. 1).

**Fig. 1. Open type of Rouviere's Sulcus with visible right portal pedicle**



The fused-type is defined as not showing the pedicle or which is open only at the lateral end of the sulcus (Fig. 2).

**Fig. 2. Partially fused Rouviere's Sulcus (Open at its lateral end)**



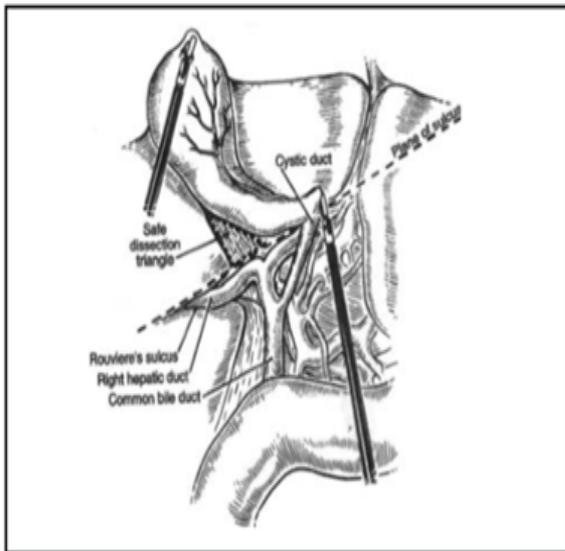
#### RESULTS

A total of 160 patients undergoing laparoscopic cholecystectomy were selected for the study. Of the 160 patients, the presence of the Rouviere sulcus was observed in 109 patients (68.13%); from amongst, the fused subtype was observed in 61 patients (55.96%) and the open subtype in 48 patients (44.04%). No sulci were observed in 51 (31.87%) patients.

#### DISCUSSION

The advantages of laparoscopic cholecystectomy have been widely discussed in the surgical literature. This surgical intervention in particular, however, has also yielded more complex or unknown complications in the era of open surgery. <sup>1</sup>One of the most serious complications is bile duct injury, which can result from careless incisions of the region. In the first period of the study, laparoscopic cholecystectomy was associated with a greater than 2% risk of biliary tract lesion, which decreased to 0.3-0.4% with the gradual increase in experience and acclimatization to the novel surgical protocol. In addition, in the laparoscopic period, the biliary lesion pattern became more complex and proximal (towards the hepatic portal).

**Fig. 3. Diagram showing**



<sup>2-4</sup>Significant morbidity associated with this technique appears to be due to a lack of knowledge about the laparoscopic anatomy pertaining to the gallbladder pedicle, and a lack of two-dimensional vision and lack of sense of touch. In general, BDI results are thought to be caused by poor visualization and poor dissection of anatomical structures, but despite the vast experience in the employment and execution of this modality of surgery, the prevalence of common bile duct damage remains chronically and exceedingly high in the hands of experienced surgeons. Hugh et al described some hereditary factors in the procedure, uniquely susceptible to surgical failure and, most importantly, the surgeon's spatial orientation disorder. <sup>6-8</sup>To avoid this, he used empirical principles developed by the maritime and aerospace industries, one of which started at a fixed point and used the Rouviere's sulcus as an extra bile fixed point to commence the dissection. <sup>9</sup>The importance of defining the Rouviere's sulcus lies in the fact that the cystic canal and cystic artery are always encountered during the course of this surgery. Thus, its presence anterior to the sulcus is also indicative of the Calot's triangle (Figure 3). <sup>14</sup>Hugh et al and Kuldip et al further demonstrated the incidence of minimal bile duct injury in large laparoscopic cholecystectomy series at the beginning of ventral

dissection of this trough. We also used this anatomical reference point in mesohepatectomy for hepatocellular carcinoma. The visualization frequency of Rouviere sulcus is lower than the 90% indicated by Hugh, since it contains the white-line indicating the furrow region. <sup>10-12</sup>The authors didn't just consider the existence of the white line as Rouviere trough because it required experience to accurately identify it and, therefore, could be perplexing in abstruse cases with a multitude of adhesions in most patients. <sup>13</sup>The sulcus can, therefore, prove to be a pivotal anatomical marker for safe dissection of the cystic canal and artery to prevent lesions in the bile duct.

### CONCLUSION

Rouviere sulcus is an important extra-biliary sign that can be defined as open or fused type in most patients. Defining before the beginning of the dissection of the Calot triangle can help in preventing bile duct injury, drastically reducing the risk of secondary complications and improving the surgical prognosis.

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