

# Rouviere's Sulcus: An Important Landmark for Safe Dissection in Laparoscopic Cholecystectomy

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## A B S T R A C T

**Introduction:** Despite the advances in laparoscopic surgery, bile duct injuries continue to happen, and there has been no decline in the rates of injury. This study was performed to determine the frequency of demonstrable Rouviere's sulcus.

**Materials and Methods:** In this prospective study, a total of 100 consecutive patients who presented with symptomatic cholelithiasis and underwent laparoscopic cholecystectomy.

**Results:** In the present study it was observed that out of 100 study participants, about 66% were having Rouviere's Sulcus. Open type of Rouviere's Sulcus was present in 19% of the study participants. About 38% of the study participants had partial type of Rouviere's Sulcus and 9% had fused type.

**Conclusion:** It is important to identify Rouviere's sulcus, as it plays an important in preventing bile duct injuries and acts as a reference point for safe laparoscopic cholecystectomy.

**Keywords:** Rouviere's Sulcus, Open, Bile Duct, Cholecystitis

## INTRODUCTION

Laparoscopic cholecystectomy was first performed by Professor Erich Mühe of Germany, on September 12, 1985,<sup>1</sup> and has now become one of the most common operations worldwide. It remains one of the standard operating procedures taught to and performed by surgical residents.<sup>2</sup>

The incidence of bile duct injuries in laparoscopic cholecystectomy approaches 0.5%.<sup>3-5</sup> Despite the advances in laparoscopic surgery, bile duct injuries continue to happen, and there has been no decline in the rates of injury.<sup>6</sup>

Laparoscopic cholecystectomy is associated with more biliary, vascular, and visceral complications when compared with open cholecystectomy.<sup>7</sup> Given the serious nature of this complication, the surgeon must make every effort to minimize the risk of bile duct injury. Accurate identification of the hepatobiliary anatomy is critical in laparoscopic cholecystectomy. Most bile duct injuries are thought to occur due to misidentification of biliary anatomy as a result of misinterpretation and/or lack of understanding the anatomy.<sup>4,8</sup>

In 1924, M.H. Rouviere, a French surgeon, described a fissure that now bears his name.<sup>9</sup> Rouviere's sulcus is a 2-5 cm sulcus running to the right of the liver hilum anterior to the caudate lobe. It contains the right portal vein or its branches. The sulcus identifies the plane of common bile duct accurately (a fact substantiated by cholangiographic studies).<sup>9</sup> It can be identified in 80% of cases. This sulcus is taken as

the starting reference point for the commencement for a safe dissection.<sup>9,10</sup> In 1997, Hugh, et al. suggested that Rouviere's sulcus was a useful anatomic landmark in laparoscopic cholecystectomy.<sup>11</sup>

This study was performed to determine the frequency of demonstrable Rouviere's sulcus as well as to assess its different types.

## MATERIAL AND METHODS

This prospective study was conducted in department of General Surgery at Krishna institute of medical sciences, Karad over a period of two years. A total of 100 consecutive patients who presented with symptomatic cholelithiasis and underwent laparoscopic cholecystectomy were included in the study.

During laparoscopy Rouviere's sulcus was noted in the operative note. Open sulcus was defined as a cleft in which the right hepatic pedicle noted. Fused type in this the pedicle was not visualized. Partial type was sulcus present open only at its lateral end. Procedure continued in laparoscopy and dissection of Calot's done with help of Rouviere's sulcus was done. The outcome noted as whether we can proceed with laparoscopy or to convert in open procedure. Informed consent was taken from every study participant after the Institutional ethics committee permission was obtained. The study participants were explained about the purpose of the study.

Statistical analysis was performed with data in Microsoft excel sheet and analyzed with proportions.

## RESULTS

Most of the patients in the study (68%) were above 50 years old and 32% were <50 years (Table: 1).

64% of the study participants were females and 36% were males. As cholecystitis is very common among females so in present study maximum number of study participants were females (Table:2).

Out of 100 participants, Rouviere's Sulcus was found in about 66 study participants. Nearly 48.4% had Chronic cholecystitis, followed by acute cholecystitis in 27.2%. Empyema of gall bladder was seen in 16.6% and mucocele of gall bladder was seen in 7.5% respectively (table:3)

Partial Rouviere's Sulcus was more predominant amongst the patients with 38 (57.6%) of the cases showing this type, while 19 (28.8%) of the cases showed open type of Rouviere's sulcus and 9 (13.6%) showing fused type (Table: 4)s.

Age (Years)	Frequency	Percentage
<50years	32	32
>50years	68	68
Total	100	100

**Table-1:** Showing age wise distribution of study participants

Sex	Frequency	Percentage
Male	36	36
Female	64	64
Total	100	100

**Table-2:** Showing Sex wise distribution of study participants

Chief Complaints	Frequency	Percentage
Acute Cholecystitis	18	27.2
Chronic Cholecystitis	32	48.4
Mucocele of Gallbladder	5	7.5
Empyema of Gallbladder	11	16.6
Total	66	100

**Table-3:** Showing chief complaints of study participants who had Rouviere's Sulcus

Type of Rouviere's Sulcus	Frequency	Percentage
Open	19	28.8
Partial	38	57.6
Fused	9	13.6
Total	66	100

**Table-4:** Showing Type of Rouviere's Sulcus among study participants

## DISCUSSION

In present study it was observed that out of 100 study participants about 66% were having Rouviere's Sulcus. In another study, a slightly higher incidence of 78.3% participants had Rouviere's Sulcus.<sup>12</sup> while in another study, the findings were almost similar to the present study (68%).<sup>13</sup> About 82%, Rouviere's sulcus has been found by Hugh, et al study<sup>12</sup> and 84.5% in another study by Singh, et al.<sup>14</sup> It was observed in present study that nearly 64% of the

study participants were females and 36% were males. As cholecystitis is very common among females so in present study maximum number of study participants were females. The similar findings were observed in another study where females were more in number(70.6%) than males (29.4%).<sup>12</sup> In present study out of 100 participants, Rouviere's Sulcus was found in about 66 study participants. Near about 48.4% had Chronic cholecystitis, followed by acute cholecystitis in 27.2%. Empyema of gall bladder was seen in 16.6% and mucocele of gall bladder was seen in 7.5% respectively. In another study, it was observed that 70% study participants had chronic cholecystitis, 12% had acute cholecystitis, 9.6% had mucocele of the gallbladder, 7.2% had empyema of the gallbladder, and 1.2% study participants had gangrenous gallbladder.<sup>12</sup>

In present study it was found that open type of Rouviere's Sulcus was present in 19% of the study participants. About 38% of the study participants had partial type of Rouviere's Sulcus and 9% had fused type. The sulcus was absent in 34% of the study participants. In a study by Mumtaz, et.al open type was found in 54.9% of study participants, fused type was found in 24.4% of study participants. The sulcus was not seen in 20.7% of study participants.<sup>12</sup> In another study the predominant type of Rouviere's Sulcus was of fuse type seen in 55.96% of the study participants and open type was seen in 44.04%. The sulcus was absent in 31.87% of the study participants.<sup>13</sup>

## CONCLUSION

Rouviere's sulcus is a very important anatomical landmark for safe dissection in cholecystectomy. It is very difficult to identify the critical anatomy of the hepatobiliary tract during the process of laparoscopic cholecystectomy. Misidentification or lack of understanding of anatomy of hepatobiliary leads to bile duct injuries. Therefore, it is important to identify Rouviere's sulcus.

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