



Rouviere's Sulcus as Landmark during Laparoscopic Cholecystectomy

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ABSTRACT

Background: Rouviere's sulcus is a lesser known, but important anatomic landmark for safe cholecystectomy and avoiding common bile duct injury during laparoscopic cholecystectomy. The identification this important landmark was done by Henry Rouviere in 1924. He used as a reference point to guide the commencement of safe liver dissection.

The Rouviere's sulcus is a fissure in the liver between the right lobe and caudate process and is clearly seen during a laparoscopic cholecystectomy during the posterior dissection in majority of patients.

Material and Methods: The study was done in one hundred patients of gall chronic cholecystitis with cholelithiasis admitted for laparoscopic cholecystectomy. The standard four ports technique was used for laparoscopic cholecystectomy. Rouviere's sulcus will be looked for behind the infundibulum and it will be noted if it is presented or absent. If present, it will be observed whether the sulcus is represented only as a scar or as a slit or as a deep sulcus. Observation was also done if the Rouviere's sulcus was closed or open toward the porta hepatis.

Results: Out of these 100 patients, the Rouviere's sulcus was absent in 10% of patients, 7% had a scar, 24 patients had a slit, 59 patients had a deep sulcus.

Conclusion: We recommend that identification of Rouviere's sulcus should be done before dissection in Calot's triangle is started as a safeguard to extra hepatic biliary injuries at porta hepatis.

KEYWORDS : Rouviere's Sulcus, Anatomical landmarks, Safe laparoscopic cholecystectomy

Introduction

Laparoscopic cholecystectomy a minimum invasive procedure is the gold standard for surgical treatment of symptomatic gall stones. The benefits of laparoscopic cholecystectomy outweigh the open cholecystectomy. Still most of surgeons are of the view that bile duct injuries are more common with the laparoscopic cholecystectomy. Both patient and technical factors are considered responsible for biliary injuries. Patient factors for difficult cholecystectomy are obesity, congenital abnormalities of the extra hepatic biliary and vascular tree and acute cholecystitis. In technical factors is the knowledge of calot's triangle anatomy is important. To minimize the biliary tract injuries, various anatomical landmarks for safe cholecystectomy have been described.¹ Of the various anatomical landmarks a common anatomical landmark is Rouviere's sulcus. Peti and Moser concluded that Rouviere's sulcus is a lesser known, but important anatomic landmark for safe cholecystectomy and avoiding common bile duct injury during laparoscopic cholecystectomy.² The identification this important landmark was done by Henry Rouviere in 1924. He used as a reference point to guide the commencement of safe liver dissection.³ The Rouviere's sulcus is a fissure in the liver between the right lobe and caudate process and is clearly seen during a laparoscopic cholecystectomy during the posterior dissection in majority of patients. It corresponds to the level of porta hepatis where the right pedicle enters the liver. It has been recommended that all dissection be kept to a level anterior to this sulcus to avoid injury to bile duct. This is an extrabiliary landmark and does not get distorted due to retraction during laparoscopic cholecystectomy.³

Rouviere's sulcus is a cleft in liver is identified in about 90% of patients and can be seen by retracting the gall bladder infundibulum medially. The importance of Rouviere's sulcus as a landmark for safe laparoscopic cholecystectomy has not been uniformly identified.⁴ Now there is an increasing interest in identification of the Rouviere's sulcus and its relation to the right of porta hepatis. This sulcus can be seen in variable length, depth and shape but occasionally may be absent.⁵ This study was planned in 100 patients operated for laparoscopic cholecystectomy for description of Rouviere's sulcus and its importance as sole landmark during laparoscopic cholecystectomy.

MATERIAL AND METHODS

The study was done in one hundred patients of gall chronic cholecys-

titis with cholelithiasis admitted for laparoscopic cholecystectomy. Routine investigations and pre anaesthetic check up was done in all the patients. Patients with ASA grade IV and carcinoma gall bladder with gall stone were not included in the study.

The standard four ports technique was used for laparoscopic cholecystectomy. First port was 10 mm at umbilicus and was used for camera. The second 10 mm port was made at epigastrium just right lateral to falciform ligament. This port was used for dissection instrument and for delivery of gall bladder. Third port was 5 mm port made below right costal margin in midclavicular line. Another 5 mm fourth port was made under costal margin in anterior axillary line for fundal retraction. Gall bladder will be grasped from the infundibulum through 5 mm port and retracted cephalad for linear retraction and to open up the calots triangle for dissection. Rouviere's sulcus will be looked for behind the infundibulum and it will be noted if it is presented or absent. If present, it will be observed whether the sulcus is represented only as a scar or as a slit or as a deep sulcus. If the depth and breadth of the sulcus cannot be measured and is less than 5mm it is called as slit. The dimensions of the deep sulcus will be measured by its length, breadth, and depth with help of a marked feeding tube. In case of scar or slit only the length will be measured. Observation was also done if the Rouviere's sulcus was closed or open toward the porta hepatis. In the floor of the Rouviere's sulcus, it was observed that right hepatic pedicle is visible or not.

RESULTS

During the laparoscopic cholecystectomy the observations recorded are depicted in table 1.

Table 1. Rouviere's Sulcus

Observation	No. Of Patients
Absent	10
Scar	07
Slit	24
Sulcus	59

The first observation was whether the sulcus was present or absent. If the sulcus was present it was observed whether it was a scar, slit and deep sulcus. It was observed that sulcus was present in majority of the patients and absent in only a few patients. If it was a deep

sulcus, it was further classified into open closed sulcus depending on whether its medial end was open towards the porta hepatis making the porta hepatis visible or closed towards the porta hepatis.

Discussion

The Rouviere's Sulcus was described as landmark for right hepatic resections initially but later was described as one of the anatomical landmarks for safe laparoscopic cholecystectomy.⁶

The Rouviere's sulcus was a relatively unknown anatomical landmark in the liver. During laparoscopic Cholecystectomy Rouviere's sulcus is clearly visible and is frequently used as anatomical landmark. The importance of identifying Rouviere's sulcus lies in the fact that the cystic duct and the cystic artery lies invariably anterosuperior to the sulcus, conforming the anatomy of the Calot's triangle. Rouviere's sulcus is now considered to be first landmark that should guide the start of the discussion of the Calot's triangle during laparoscopic cholecystectomy and is said to help in preventing bile duct injuries. However, the Rouviere's sulcus may not always present, and when present, it is seen in different forms and shapes.

In this study Rouviere's sulcus presence or absence was seen in every patient during laparoscopic cholecystectomy. If Rouviere's was present, it was classified into a scar, slit and deep sulcus. Deep sulcus was further classified into open and closed types depending on whether it was open or closed at its medial end. In open variety of Rouviere's sulcus the porta hepatis may be visible. Gans observed that incisura dextra was present in 73% of patients. Hugh et al could find Rouviere's sulcus in 90% patients. Pati and Mosser had observed Rouviere's sulcus in eighty percent cases.² In our study we observed that Rouviere's sulcus was absent in 10% of patients and present in 90% of patients in various shapes as described. This incidence of Rouviere's sulcus presence is equivocal to as reported by Hugh et al.⁸

The first description of Rouviere's sulcus is scar type. If only a white line is visible it is described as scar type of sulcus. The previous studies have mentioned this white line but not its incidence. Henry Rouviere in his study had mentioned about the scar as a superficial white line which possibly represents the sulcus.⁹ Hugh et al observed in his study that the sulcus was fused in some patients and considered this as line of fusion of sulcus but did not calculate the percentage of this white line in his study.⁷ Zubair at all had found that this white line was a useful landmark for the commencement of safe dissection of the cystic duct and cystic artery to avoid the bile duct injury. But they did not consider the presence of white line as Rouviere's sulcus and said that this needs more experience to identify the white line correctly specially in difficult cholecystectomy patients with dense adhesions.⁸ Scar type of Rouviere's sulcus was seen in 7% of patients. The second variety of Rouviere's sulcus is slit type.

The Rouviere's sulcus which is narrow and shallow in depth is called as slit type. Henry Rouviere mentioned about a fine groove on the inferior surface of liver but made no note its incidence.⁹ In our study we found that 24% of patients had a slit type of Rouviere's sulcus. This slit variety has not been identified in any other study.

The third type of Rouviere's sulcus is deep type. The sulcus which was deep having a measureable length, breadth and depth is called as deep type. The deep sulcus was further classified into an open sulcus or a closed type. The open sulcus was defined as a cleft, which was opened throughout its length up to the porta hepatis while the closed type of sulcus was defined as a cleft which was opened only at its lateral end. This deep variety of Rouviere's sulcus is most common and is present in 59% of patients.

Conclusion

Out of the hundred patients Rouviere's sulcus was present in 20% of males and 80% were females. All the patients were age group 21-72. Out of these 100 patients, the Rouviere's sulcus was absent in 10% of patients, 7% had a scar, 24 patients had a slit, 59 patients had a deep sulcus. We recommend that identification of Rouviere's sulcus should be done before dissection in Calot's triangle is started as a safeguard to extra hepatic biliary injuries at porta hepatis.

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