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# RELEVANCE OF ROUVIERE'S SULCUS IN LAPAROSCOPIC CHOLECYSTECTOMY: AN OBSERVATIONAL STUDY

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## ABSTRACT
**Aim:** Bile duct injury is one of the most devastating complications of laparoscopic Cholecystectomy. Safe dissection of callots triangle can be achieved by commencing the dissection anterior to Rouviere's sulcus .The purpose of our study is to determine the frequency of Rouviere's sulcus in our population and it relevance in safe dissection of laparoscopic cholecystectomy. **Patient and methods:** An observational descriptive study of patients who underwent Laparoscopic cholecystectomy from September 2016 to September 2018 was conducted at our hospital. Presence of Rouviere's sulcus was noted and classified according to the classification proposed by Singh and Prasad. **Results:** Out of a total of 382 patients Rouviere's sulcus was visualized in 242 patients (63.35%). 178 patients had a deep sulcus. 58 patients (23.96%) had a slit. 6 patients (2.48%) had a scar. No patient had bile duct injury. **Conclusion:** Rouviere's sulcus is a frequently present important extra biliary reference point to commence safe desection of callots triangle.

**KEY WORDS:** Laproscopic cholecystectomy, Rouviere's sulcus, Bile duct injury.

## INTRODUCTION
Laparoscopic cholecystectomy is one of the most common surgical procedures performed worldwide. It is now the gold standard treatment for symptomatic cholilethiasis. The most feared complication of this procedure is injury to bile duct. The incidence of bile duct injury (BDI) in laparoscopic cholecystectomy approaches 0.5%.[1, 2] They continue to happen and despite advances in technology there has been no decline in rate of injury.[3] Misidentification of biliary anatomy due to visual perception error is the most common cause (97%) of iatrogenic BDI.[4] Many strategies have been proposed to avoid this serious complication,[5, 6, and 7] and one of these is to identify and follow some anatomical landmark as reference point.[8, 9] One such important landmark is a sulcus which was identified by Henri Rouviere in 1924[10] which may guide the surgeon from where to commence safe dissection.

The aim of the present study was to determine the presence, frequency and type of Rouviere's sulcus in our population so that surgeons can utilize the benefits of this important landmark in laparoscopic cholecystectomy.

## METHODOLOGY
This was a prospective descriptive study conducted at MABMH from September 2016 to September 2018. 382 patients admitted for laparoscopic cholecystectomy for symptomatic gallstones were enrolled. In all patients history was taken and physical examination was done. Pre-op abdominal ultrasound, biochemistry and blood counts were done in all patients. Pre-anaesthetic check-up was done in all. The operation was done under GA with 4 port technique. Authors performed all operations. Rouviere's sulcus was observed for before commencing dissection. Photographic documentation of Rouviere's sulcus was done and type of sulcus described and recorded in operation notes as per the classification proposed by Singh and Prasad.[11] Any incidence of bile duct injury was noted.

## RESULTS
298 (78%) patients were females and 84 (22%) were male with a mean age of 48.4 years. Rouviere's sulcus was visualised in 242patients (63.35%). Deep sulcus was present in 178 (73.55%) patients. Of the deep sulcus cases, 152 (85.3%) had an open type of sulcus whereas the remaining 26(14.7%) had closed type of sulcus. 58(23.96%) patients had a slit. 6(2.48%) patients had a scar.

| Type of sulcus | | | No. of patients |
|---|---|---|---|
| Deep sulcus | | | 178 |
| | Open type | 152 | |
| | Close type | 26 | |
| Slit | | | 58 |
| Scar | | | 06 |
| **Total** | | | **242** |

## DISSCUSSION

Bile duct injury in one of the most serious complication associated with laparoscopic cholecystectomy and its pattern is more complex and occurrence more proximal as compared to open cholecystectomy.[5] Different factors predict the occurrence of BDI in laparoscopic cholecystectomy, some of them are inherent to the technique of laparoscopy such as lack of tactile feedback, 2-dimensional vision and lack of laparoscopic anatomy of gallbladder pedicle.[5, 12] Visual illusion,[4] spatial disorientation,[8] misidentification and loss of awareness reinforced by cognitive fixation and plan continuation[13] are probably most significant factors that predispose to surgical error. To avoid this Hugh borrowed some principles from maritime and aviation industries one of which is to start from a fixed point and use Rouviere's sulcus as an extra biliary fixed point to start dissection.[9]

Rouviere's sulcus was described in 1924 by Henri Rouviere. It is a 2-5 cm sulcus running to the right of liver hilum anterior to caudate process usually containing right portal triad or its branches .This cleft of liver has been called incisura dextra of Gans by Reynaud.[14]

The advantage of identifying Rouviere's sulcus lies in the fact that cystic artery and cystic duct lay anterio superior to the sulcus[15] and CBD below it, confirming anatomy of Callots triangle.[16] The sulcus is in line with cystic artery and cystic duct after completing dissection of Callots triangle. Minimal incidence of BDI has been reported in a large series of laparoscopic cholecystectomy by Hugh[8] and Kuldeep[17] when dissection is began ventral to this sulcus.

In our sample study population Rouviere's sulcus was present in 63.35% of patients. This is lower as compared to 90% reported by Arora[18] and 80% as has been reported by Hugh.[9] Pati and Mosser observed Rouviere's sulcus in 80% of patients.[19] Dahmane observed Rouviere's sulcus in 82% of patients.[20] Gans observed that incisura dextra was present in 73%of patients. The low frequency observed in our study is in accordance with the study conducted by Zubair et al in Pakistani population.[15]

Of the deep sulcus cases 85.3% had an open type of sulcus. This is in accordance with the study conducted by Singh and Prasad where 84.5% had an open type of sulcus.[11] In their study Dahmane observed open type of sulcus in 70% of livers.[20] Fused type was observed in only 14.7% of cases in our study whereas in the study by Zubair fused type was common.[15]

Scar type Rouviere's sulcus was present in 2.48% patients as compared to 6% in study by Singh and Prasad[11] and 7.78% in the study by Arora.[18]

Zubair et al did not consider the presence of white line as Rouviere's sulcus and said that its identification needs more experience especially in difficult cases with dense adhesions.[15]

## CONCLUSION

Rouviere's sulcus is an important extra biliary landmark identifiable in majority of patients. Using Rouviere's sulcus as a reference point to commence the dissection of CT may help avoid BDI during laparoscopic cholecystectomy.

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