



Predictors of Difficulty in Laparoscopic Cholecystectomy

Bhupendra Prasad*

Consultant General and Laparoscopic Surgery, India

***Corresponding Author:** Bhupendra Prasad, Consultant General and Laparoscopic Surgery, India.

Received: July 30, 2020

Published: October 22, 2020

© All rights are reserved by **Bhupendra Prasad.**

Laparoscopic cholecystectomy (LC) since its inception in 1987, has dramatically replaced conventional open cholecystectomy. LC has rapidly become the gold standard for routine gall bladder removal. Management of biliary tract disease has evolved from being a major procedure to a relatively safe and tolerable day care procedure today, offering early return to full activity.

LC though safe and effective, yet can be difficult at times. Various problems faced are difficulty in creating pneumoperitoneum, accessing peritoneal cavity, releasing adhesions, identifying anatomy, anatomical variation and extracting the gall bladder. LC with these problems along with time taken more than normal we considered as difficult.

LC is the most common difficult laparoscopic surgery performed by surgeons all over the world. This study is based on the assumption that difficulty can be predicted and its design is directed towards identification of these predictors.

Umbilical port entry

Difficult umbilical port entry was associated pre-operatively with previous history of upper abdominal surgeries, body mass index (BMI) more than 30 and presence of upper abdominal scars/hernias.

Obesity and the presence of abdominal fat causes obvious difficulty in the placement of the umbilical port as the umbilicus is displaced downwards and thereby it is difficult to identify the umbilical fascia and so is significantly associated with difficulty in umbilical port entry and creating pneumoperitoneum.

Upper abdominal surgeries and presence of upper abdominal scars or hernias (indicators of previous upper abdominal surger-

ies) may cause formation of intra-peritoneal adhesions that may lead to increased probability of injury and bleeding while placement of umbilical port.

Gall bladder grasping

Difficulty in gall bladder grasping was associated significantly with contracted gall bladder, distended gall bladder. A distended gall bladder or a gall bladder filled with stones is not easily grasped because it tends to slip away. Presence of inflammation around the gall bladder makes the wall friable and oedematous, thus posing problems to grasping.

Adhesiolysis and calots triangle dissection

Preoperatively, the need of adhesiolysis was heralded by abnormal Liver function tests (LFT), elevated amylase, age > 65 years, male sex, if the attack was recurrent, history of previous surgery, post endoscopic retrograde cholangiopancreatography (ERCP). Intraoperatively, non visualisation of gall bladder, inflamed gallbladder, presence of intraperitoneal adhesions and ductal anomalies.

Calot's triangle difficulty was associated with age > 65, male sex, history of previous attacks, post ERCP, abnormal LFT, elevated amylase contracted gall bladder, presence of peri-pancreatic fluid, presence of multiple stones, presence of cirrhosis on ultrasound, non visualisation of the gall bladder, inflamed gall bladder, intra peritoneal adhesions and presence of ductal anomalies.

Increasing age is associated with an increased probability of multiple attacks of cholecystitis and also increased frequency of upper abdominal surgeries. Therefore, there is increased incidence of fibrosis and adhesions in the hepatic hilum.

I will also agree in concurrence with Nachnani, Supe., *et al.* [1] who have proposed that male sex is associated with more intense

inflammation or fibrosis resulting in denser adhesions thus a more difficult dissection.

Similarly, history of previous attacks, post ERCP status, non visualisation of gall bladder, peri cholecystic and peri-pancreatic fluid are associated with significant inflammatory process that causes difficulty in dissection of the Calot's triangle and adhesiolysis. Ishizaki, *et al.* [2] in their study have found post ERCP status to be a significant predictor of difficulty in adhesiolysis and Calot's triangle dissection.

Abnormal LFT and elevated amylase signify ongoing hepatitis, cholangitis and pancreatitis that pose difficulty in dissection due to oedema. Alphonat, *et al.* [3] and Kama, *et al.* [4] have demonstrated a similar association in their study. They have also obtained elevated total count as a predictor for difficulty but the same association was not obtained in our study probably because of higher cut off values of elevated total count.

Presence of an overhanging liver edge leads to obstruction in the proper visualisation of the gallbladder, thus causing difficulty in Calot's triangle dissection.

Cirrhosis causes distortion of the normal anatomy of the liver and neovascularisation, thus posing problems in retraction of liver and dissection of the Calot's triangle. Palanivelu, *et al.* [5] in their study, has also found a similar association.

Duct and artery clipping

Difficulty in duct clipping is significantly associated with history of upper abdomen surgery, post ERCP and presence of upper abdomen scars/hernia at preoperative evaluation. The presence of cirrhosis on ultrasound, non visualised gallbladder, presence of intra peritoneal adhesions, presence of ductal anomalies and arterial anomalies were predictive.

Difficulty in cystic artery clipping is associated with non visualised gallbladder, presence of ductal anomalies, presence of arterial anomalies and intra operative bleeding.

Upper abdominal surgeries and cirrhosis of the liver lead to significant fibrosis and anatomical distortion in the area. In this situation, it is difficult to identify and delineate the cystic duct and artery. Thus, there is difficulty in clipping these structures.

The non visualisation of gall bladder may be due to dense pericholecystic adhesions or an intra-hepatic gall bladder. The hepatic

artery and duct tend to be more difficult to identify and clip in these situations. Contemporary literatures on the same lines are not available.

The presence of arterial and or ductal anomalies leads to obvious difficulty in artery clipping.

Jongsiri N., *et al.* [6] have also associated the presence of anatomical variations with difficulty in clipping.

Gall bladder extraction

Difficulty in gallbladder extraction was associated with distended gallbladder and presence of multiple stones. A distended gallbladder or the presence of multiple stones leads to difficulty in the extraction of the specimen through the small incision thus leading to the need to aspirate the gallbladder, extend the epigastric port and the increased probability of gallbladder perforation during these maneuvers. Singh, *et al.* [7] and Gabriel, *et al.* [8] also are in concurrence with our findings.

Sex variation

In my opinion, the presence of male sex was associated significantly with difficulty in adhesiolysis, and Calot's triangle dissection. Further drains were more frequently used in males.

According to Yol S., *et al.* [9] men with symptomatic gall bladder are more prone to inflammation and fibrosis with the same disease intensity thus leading to difficulty in dissection as is reflected in our study. They obtained higher levels of collagen, hydroxyproline, macrophages, mast cells and eosinophils in gallbladder wall and pericholecystic tissue which might explain the male fibrogenic propensity.

Russel, *et al.* [10] have suggested that men tend to present late as they pay less attention to subtle symptoms, therefore, may have more advanced disease.

Non visualisation of gallbladder

Gallbladder not being visualised on initial introduction of scope was significantly associated with difficulty in gallbladder grasping, difficulty in adhesiolysis, difficulty in Calot's triangle dissection, difficulty in duct clipping, difficulty in artery clipping, associated significantly with use of drain and use of sutures.

Gallbladder not being visualised on initial introduction of scope was mostly due to dense adhesions around the gallbladder. Adhesions due to severe inflammation causes distortion of anatomy

leading to difficult clipping of artery and duct and hence use of sutures.

Conclusion

This study demonstrates that a scoring system predicting the difficulty in LC is feasible. There is a need for further prospective study for the validation of this score. There is scope for further refinement to make the same less cumbersome and easier to handle. Further study shall be directed towards the same.

This study was targeted at identifying the possible predictors of difficulty in LC. At the end of this study the following conclusions may be drawn:

- Elderly patients are more likely to have a difficult LC.
- Females undergo this surgery more frequently but males tend to have a higher number of difficult cases.
- Recurrent cholecystitis is a predictor.
- Obese patients and those with recurrent cholecystitis tend to have more difficulties during surgery.
- Previous surgery predisposes towards difficulties in cholecystectomy.
- Patients who needed preoperative ERCP had more chances of having a difficult cholecystectomy.
- Abnormal serum hepatic and pancreatic enzyme profiles were associated with difficulty in surgery.
- Pre-operative USG can predict difficulties during LG.
- Features like distended or contracted gallbladder, intra-peritoneal adhesions, structural anomalies or distortions and the presence of a cirrhotic liver are signs that are associated with subsequent difficulties during the surgery.

Bibliography

1. Nachnani J and Supe A. "Pre-operative prediction of difficult laparoscopic cholecystectomy using clinical and ultrasonographic parameters". *Indian Journal of Gastroenterology* 24 (2005): 16-18.
2. Ishizaki Y, *et al.* "Conversion of elective laparoscopic to open cholecystectomy between 1993 and 2004". *British Journal of Surgery* 93 (2006): 987-991.
3. Alponat A, *et al.* "Predictive factors for conversion of laparoscopic cholecystectomy". *World Journal of Surgery* 21 (1997): 629-633.

4. Kama NA, *et al.* "A risk score for conversion from laparoscopic to open cholecystectomy". *The American Journal of Surgery* 181 (2001): 520-525.
5. Palanivelu C, *et al.* "Laparoscopic cholecystectomy in cirrhotic patients: The role of subtotal cholecystectomy and its variants". *The Journal of the American College of Surgeons* 203 (2006): 145-151.
6. Jongsiri N. "How to secure cystic duct ligation for laparoscopic cholecystectomy-back to simple basic". *The Thai Journal of Surgery* 30 (2009): 29-33.
7. Singh K and Ohri A. "Difficult laparoscopic cholecystectomy: A large series from north India". *The Indian Journal of Surgery* 68 (2006): 205-208.
8. Gabriel R, *et al.* "Evaluation of predictive factors for conversion of laparoscopic cholecystectomy". *Kathmandu University Medical Journal (KUMJ)* 7 (2009): 26-30.
9. Yol S, *et al.* "Sex as a factor in conversion from laparoscopic cholecystectomy to open surgery". *Journal of the Society of Laparoendoscopic Surgeons* 10 (2006): 359-363.
10. Russell JC, *et al.* "Symptomatic cholelithiasis: A Different disease in men?" *Annals of Surgery* 227 (1998): 195-200.

Assets from publication with us

- Prompt Acknowledgement after receiving the article
- Thorough Double blinded peer review
- Rapid Publication
- Issue of Publication Certificate
- High visibility of your Published work

Website: www.actascientific.com/

Submit Article: www.actascientific.com/submission.php

Email us: editor@actascientific.com

Contact us: +91 9182824667