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Research Article

Analysis of predictors of a difficult laparoscopic cholecystectomy

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ABSTRACT

Background: Laparoscopic cholecystectomy is the gold standard for gall stone disease at present. However, conversion to open surgery is necessitated in specific circumstances. The aim was to analyze the factors which are likely to predict a difficult cholecystectomy necessitating conversion to open surgery.
Methods: Retrospective analysis was done from January 2013 to December 2013 of patients who underwent laparoscopic cholecystectomy and analysis of various factors like patient's age, sex, presence of co-morbidities like diabetes mellitus, laboratory values (including bilirubin, total count and alkaline phosphatase) and ultrasound finding like pericholecystic fluid, gall bladder thickness and the presence of a CBD stone between two groups of patients classified as difficult and easy cholecystectomies.
Results: Presence of pericholecystic fluid on ultrasound, mean total count and the presence of diabetes were found to be significant in predicting difficult cholecystectomies.
Conclusions: Factors like ultrasonic features of pericholecystic fluid, increased mean total count and the presence of diabetes are strong predictors of a difficult laparoscopic cholecystectomy. These factors should be used pre operatively as a predictive tool and will help the surgeon and patient prepare well in advance.

Keywords: Difficult, Cholecystectomy, Predictor

INTRODUCTION

Laparoscopic cholecystectomy is the preferred therapeutic operative procedure for symptomatic gall stone disease at present. Since the introduction of laparoscopic cholecystectomy by Mouret et al, minimal access surgery has developed greatly and has now replaced open cholecystectomy as the standard treatment.[1] The advantages of laparoscopic surgery over the traditional surgery include minimal postoperative pain, shorter hospital stay, a cosmetically better outcome, and earlier recovery.[2-4] Despite having these attractive advantages, many times there exists difficulty during surgery that may require conversion of laparoscopic surgery to an open procedure. Hence, preoperative screening and early detection of these signs are important to allow the surgeon to prepare the patient both physically and psychologically.

The aim of this study was to identify all possible factors that could help in the detection of a difficult laparoscopic cholecystectomy.

METHODS

The data were collected retrospectively from January 2013 to December 2013 of the patients who underwent laparoscopic cholecystectomy. After excluding patients who underwent combined procedures or those that belonged to the pediatric age group, the following variables were analysed: patient's age, sex, presence of co

morbidities like diabetes mellitus, laboratory values (including bilirubin, total count and alkaline phosphatase) and ultrasound finding like pericholecystic fluid, gall bladder thickness and the presence of a CBD stone. Intraoperative findings were also analysed including findings such as adhesions, frozen calot's triangle, use of drain, need for conversion to open surgery, operative time, wound infection, hospital stay period with antibiotic use and need for post-operative ERCP. A correlation between these data was looked for and analyzed.

RESULTS

The study contains all patients who underwent laparoscopic cholecystectomy at a single tertiary care hospital from January 2013 to December 2013. After exclusion of cases that had combined procedures and those that belonged to the paediatric age group, a total of 212 cases were included in this study. Of these, 110 cases were considered to be difficult cholecystectomies. According to this study, the definition of a difficult cholecystectomy is one which meets one of the following criteria: length of surgery exceeding 90 minutes, presence of adhesions, conversion to open surgery, frozen calot's triangle, and the presence of any complications including bile duct injury or bowel injury.

The factors analysed included patient's age, sex, and presence of co-morbidities like diabetes mellitus, laboratory values, and ultrasound findings. Of the 110 patients that presented with a difficult cholecystectomy intra operatively 41 (37.3%) were male and 69 (62.7%) were female. In this study, the mean age of the patients was 49.6 years. 41 (37.3%) cases had diabetes, and 8 (7.3%) presented with pericholecystic fluid on ultrasound abdomen. On analysis of the laboratory values, the mean total count was 10,860 the mean serum bilirubin was 1.23 and mean alkaline phosphatase 115.

In comparison, the group consisting of normal cholecystectomies had a mean age of 45, with a gender distribution of 65 (63.7%) female and 37 (36.3%) male. 26 (25.5%) patients had diabetes, and 0 patients had finding of pericholecystic fluid on USG. The mean total count was 8770, mean bilirubin 1.78 and mean alkaline phosphatase 112.

A comparative analysis was done among these two arms of patients to see which pre-operative factors could predict a difficult cholecystectomy at surgery. The factors analyzed included age, gender, history of diabetes, presence of pericholecystic fluid on ultrasound and laboratory investigations like alkaline phosphatase, total count and bilirubin. Among these factors, there was a significant difference in those patients who were diabetic (p-value of 0.045) and those whose ultrasound abdomen revealed the presence of pericholycystic fluid (p-value 0.05). Also, an analysis of the mean total count there was a significant difference among the two arms (p-value of 0.0). The other factors did not have a significant difference among the two groups and thus not useful in the detection of a difficult cholecystectomy.

Table 1: Comparison of easy versus difficult cholecystectomies.

	Easy cholecystectomy	Difficult cholecystectomy	p-value
Mean age	45.2	49.6	0.065
Male sex	37	41	0.497
PC fluid	0	8	0.005
No. of diabetics	26	41	0.045
Mean bilirubin	1.77	1.22	0.182
Mean TC	8769	10680	0.001
Mean alkaline phosphatase	112	115	0.749

DISCUSSION

Laparoscopic cholecystectomy is the gold standard for treatment for several gall bladder disorders. The presence of gall stone disease in the general population is around 3-20%; thus making laparoscopic cholecystectomy one of the most commonly performed procedures worldwide.[5] Laparoscopy allows for several advantages including less operative time, better surgical scar, and early discharge from the hospital. However, about 2-15% of laparoscopic surgeries require conversion to open surgery.[6,7]

The conversion of laparoscopic to open surgery is necessitated when laparoscopy cannot be completed successfully, and to avoid extra morbidity and mortality.[8] Hence, identification of factors that will help predict a difficult cholecystectomy will also help in preventing laparoscopy associated complications by converting to open when needed.

The main objective of this study was to analyse the factors that could possibly help to detect a difficult cholecystectomy in the pre-operative period so as to improve theatre scheduling, patient knowledge, time taken to convert to an open procedure and adequate pre-operative counseling. Also, the prediction of a difficult laparoscopic cholecystectomy would help to avail a senior consultant in the setting of a teaching hospital

where residents generally perform the surgeries to improve patient safety.

In this study, diabetes and the presence of pericholecystic fluid on ultrasound were the two significant indicators of a difficult cholecystectomy. Various studies suggest male gender as a risk factor of difficult cholecystectomy.[9] However, in this study, there was no difference between the male and female gender.

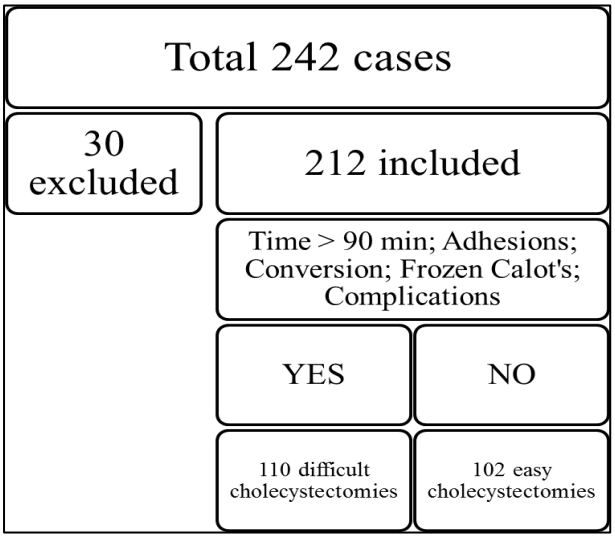

Figure 1: Number of cases in the study.

Certain studies also reported that advanced age was associated with the need to convert from a laparoscopic to open procedure.[10] However, there was no significant difference between age groups in this study. As reported by other studies, this study also found that diabetes is a statistically significant predictor ($p < 0.05$) of difficult laparoscopic cholecystectomy. Diabetic patients, when compared to non-diabetics, generally have several attacks of subacute inflammation, causing more scarring and making cholecystectomy more difficult.[11,12] The comparison of the mean total counts in difficult versus easy cholecystectomies was also significant.

CONCLUSION

Factors like ultrasonic features of pericholecystic fluid, mean total count and the presence of diabetes are strong predictors of a difficult laparoscopic cholecystectomy. These factors should be used pre operatively as a predictive tool, and will help the surgeon and patient prepare well in advance.

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REFERENCES

1. Engel JM, Deitch SA, Sikkema W. Gallbladder wall thickness: sonographic accuracy and relation to disease. Am J Roentgenol. 1980;134:907-9.
2. Buanes T, Mjaland O. Complications in laparoscopic and open cholecystectomy: a prospective comparative trial. Surg Laparosc Endosc. 1996;6:266-72.
3. Hollington P, Toogood GJ, Padbury RT. A prospective randomized trial of day-stay only versus overnight-stay laparoscopic cholecystectomy. Aust NZ J Surg. 1999;69:841-3.
4. Trondsen E, Reiertsen O, Andersen OK, Kjaersgaard P. Laparoscopic and open cholecystectomy. a prospective, randomized study. Eur J Surg. 1993;159:217-21.
5. Ali RSA, Ali SA, Akhtar S, Faridi S, Ahmed M. Forecast of difficult laparoscopic cholecystectomy by sonography: an added advantage. Biomedical Research. 2012;23(3):425-29.
6. Alponat A, Kum CK, Koh BC, Rajnakova A, Goh PM. Predictive factors for conversion of laparoscopic cholecystectomy. World J Surg. 1997;21:629-33.
7. Sanabria JR, Gallinger S, Croxford R, Strasberg SM. Risk factors in elective laparoscopic cholecystectomy for conversion to open cholecystectomy. J Am Coll Surg. 1994;179:696-704.
8. Partha B, Prasad RR, Kumar HS, Kumar BP. Pre-operative prediction of difficult laparoscopic cholecystectomy. Indian Medical Gazette. 2013;147(4):128-33.
9. Zisman A, Gold DR, Zisman E, Negri M, Halpern Z, et al. Is male gender a risk factor for conversion of laparoscopic into open cholecystectomy? Surg Endosc. 1996;10:892.
10. Fried GM, Barkun JS, Sigman HH. Factors determining conversion to laparotomy in patients undergoing laparoscopic cholecystectomy. Am J Surg. 1994;167:35-41.
11. Shpitz B, Sigal A, Kaufman Z, Dinbar A. Acute cholecystitis in diabetic patients. Am Surg. 1995;61:964-67.
12. Lau H, Lo C, Patil N, Yuen W. Early versus delayed-interval laparoscopic cholecystectomy for acute cholecystitis: a meta-analysis. Surg Endosc. 2006;20:82-7.

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