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Pre-operative Assessment of Difficult Laparoscopic Cholecystectomy by Clinico-Radiological Diagnosis

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Abstract: ***Background*:** The gold standard in the treatment of symptomatic gallstones is laparoscopic cholecystectomy, which is one of the most regularly performed surgical operations globally. Ultrasonography is the most common noninvasive, safe, and highly accurate screening test for cholecystitis and cholelithiasis. It can also help surgeons to get an idea of potential difficulty to be faced during surgery in that particular patient. ***Objective*:** The objective of this study is to evaluate the role of USG of abdomen to detect the conditions of gall bladder in preoperative diagnosis and their per-operative comparison. ***Methods*:** A prospective cross-sectional study was conducted over a period of one and half year from January 2023 to June 2024. A total of 82 patients were included in this study. All Gall stones were diagnosed clinically and radiologically then compared with peroperative difficulties during laparoscopic cholecystectomy. Data were collected from these patients by a preformed questionnaire and finally the data were analyzed by SPSS 29. ***Results*:** Most of the patients were female 54 (65.85%). Among them 35(42.68%) cases were present in 41-50 years of age group. Clinically >3 times attack were 58(70.73%). USG of whole abdomen revealed ≥4 mm wall thickness of gall bladder 39(47.56%), contracted gall bladder 41(50%), multiple stones were 61(74.39%) and impacted stones were 11(13.41%). In difficult gall bladder dissection time were > 1 hour 50(60.98%) and conversion to open needed 9(10.98%). ***Conclusion*:** The preoperative identification of cases of difficult laparoscopic cholecystectomy is an important advantage not only for the surgeon who has to perform the surgery, but also for the organization of the operating room and technical resources.

Keywords: Pre-operative diagnosis, USG of Abdomen, Laparoscopic cholecystectomy.

Research Paper

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INTRODUCTION

In 1987, Laparoscopic cholecystectomy (LC) has evolved to become the gold standard for the management of symptomatic gallstones. It took the upper hand over open cholecystectomy due to its minimal postoperative pain, shorter hospital stay, less rate of incisional hernia and cosmetic outcome [1, 2]. Difficult LC predictors have been identified by analysis of routine clinical parameters from history, clinical examination and investigation findings. This surgery may need skillfully experienced surgeons due to the high rate of conversion to open one [3]. Ultrasonography is the most common noninvasive, safe, and highly accurate screening test for cholecystitis and cholelithiasis. It can also help surgeons to get an idea of potential difficulty to be faced during surgery in that particular patient [4]. Based on ultrasonographic findings, certain preoperative factors can reliably predict the chances of conversion to the open procedure and the danger of certain complications so that the surgeon and the patient are mentally prepared [5]. Preoperative ultrasonography can help to determine surgical problems or even the likelihood of a laparotomy conversion,4 despite that it is operator dependent. Actual rates of conversion from the

laparoscopic cholecystectomy to open cholecystectomy recorded in the literature are highly diverse, ranging from 0% to 35%, despite the increase in surgical expertise [6, 7]. Patients with a gall bladder wall thickness of more than 4 mm on ultrasonography are more likely to have a difficult operation or conversion to open, as well as a higher risk of bile duct injury or harm to the adjacent viscera [8]. while the accuracy of presence of pericholecystic fluid on ultrasonography, is another factor of difficult laparoscopic surgery [9]. The presence of multiple stones within the gall bladder on ultrasonography is another indicator of difficult laparoscopic surgery [10]. Although conversion of LC to open cholecystectomy is considered an important outcome of LC, however, currently, conversion rate is less common (2.6% - 5.2%) than other surrogate parameters of difficult LC such as operative time more than 60 min, adhesions in the Triangle of Calot, cystic artery injury, or spillage of stones [11]. This study was aimed to look for some predictive factors on ultrasonography of gallbladder that can give the clue to the surgeon about the potential difficulty and complications that may be encountered during the procedure of laparoscopic cholecystectomy.

METHODS

This study was a prospective and cross-sectional study and conducted on 82 consecutive patients admitted in the Surgery department in the BSMMU, Dhaka, Bangladesh in between January 2023 to June 2024. All patients with gallstones diseases diagnosed by clinical assessment and USG of whole abdomen and performed laparoscopic cholecystectomy at the age of 20 to 70 years of range were included in this study. Patients with common bile duct stones, cholangitis, known case of gall bladder mass, acute pancreatitis were excluded in this study. There were no ethical problems as before study procedure conducted, verbal consent of every patient was taken. Disagreed cases were not included in this study. Relevant information (according to questionnaire) were taken from patients and physical examination were done in detail. In all cases evaluation of patients by clinically and USG of whole abdomen then performed laparoscopic cholecystectomy. Compare the radiological findings with per operative findings during dissection of difficult gall bladder. If a case was unclear or frozen calots then converted to open method in the benefit of the patients. All the data were analyzed manually in view of the objective of this study. Frequency, distribution and proportions were calculated for the values. Results were published in tabulated form.

RESULTS

The total number of cases were 82. Most of the patients were female 54 (65.85%). Among them 35(42.68%) cases were present in 41-50 years of age group. Clinically >3 times attack were 58(70.73%). USG of whole abdomen revealed ≥4 mm wall thickness of gall bladder 39(47.56%), contracted gall bladder 41(50%), multiple stones were 61(74.39%) and impacted stones were 11(13.41%). In difficult gall bladder dissection time were > 1 hour 50(60.98%) and conversion to open needed 9(10.98%).

Table 1: Demographic profile of the patients (n=82)

	Number	Percentage
Gender		
Male	28	34.15%
Female	54	65.85%
Age range (Years)		
20-30	07	8.54%
31-40	20	24.39%
41-50	35	42.68%
51-60	11	13.41%
61-70	09	10.98%
Frequency of attack		
< 3 times	24	29.27%
>3 times	58	70.73%

Table 2: Pre-operative findings of USG of abdomen (n=82)

USG findings of gall bladder	Number	Percentage
Pericholecystic fluid	9	10.98%
Thickness of gall bladder wall		
<4mm	43	52.44%
≥4mm	39	47.56%
Contracted gall bladder	41	50%
Number of stones		

Single	21	25.61%
Multiple	61	74.39%
Impacted stones	11	13.41%

Table 3: Operative events during procedure (n=82)

	Number	Percentage
Operative time		
<1 Hour	32	39.02%
>1 Hour	50	60.98%
Conversion to open		
Present	9	10.98%
Absent	73	89.02%

Table 4: Relation of pre-operative findings of USG of whole abdomen with difficulty during Laparoscopic Cholecystectomy (n=82)

USG parameters	USG findings	Laparoscopic Cholecystectomy			
		Difficult	Percentage	Not Difficult	Percentage
Gall bladder wall thickness	<4mm	10	12.20%	33	40.24%
	≥4mm	31	37.80%	8	9.76%
Number of stones	Single	02	2.44%	19	23.17%
	Multiple	50	60.98%	11	13.41%
Contracted gall bladder	Yes	39	47.56%	02	2.44%
	No	00	00	41	50%
Impacted stones	Yes	11	13.42%	00	00
	No	10	12.19%	61	74.39%
Pericholecystic fluid	Yes	08	9.76%	01	1.21%
	No	07	8.54%	66	80.49%

DISCUSSION

The research of predictive preoperative factors for difficult LC is essential to estimate the probability of conversion, to identify high-risk procedures, to optimize the surgical plan and efficiency of the operating room and to change, when needed, the surgical technique or the surgeon. Moreover, the use of predictive factors can allow us to select patients eligible for non-surgical treatment [12, 13]. Total 82 patients were included in this study. The gall stone diseases were more common in female 54(65.85%). The commonest age group of 41-50 years and it was 35(42.68%). Sharma R, Sachan SG, Sharma SR showed most of the patients (80.7%) in their study were females. The effect of estrogen and progesterone on biliary cholesterol levels and gallbladder motility has been linked to a higher prevalence of gallstones in women [14]. In this study, the findings of different patients of gall stone diseases in USG of whole abdomen report were pericholecystic fluid 9(10.98%), thickness of gall bladder ≥4mm 39(47.56%), multiple stones 61(74.39%) and contracted gall bladder 41(50%). So, findings of ultrasonography have been used as predictors for difficult laparoscopic cholecystectomy. Gall bladder has been identified in studies as a predictor of difficult surgery [15]. Gall bladder wall thickness is one of the most researched parameters, and it can be assessed with high precision using ultrasonography [16]. Gall bladder detachment from its bed is more difficult when the thickness of wall of the gall bladder is increased; thicker gall bladder walls make grasping and manipulating the gall bladder more difficult, as well as making dissection at Calot's triangle and the gall bladder bed more difficult. The presence of pericholecystic fluid on ultrasonography was found to be predictor for the difficult laparoscopic cholecystectomy; this was present in 27(18%) patients and in 26 cases laparoscopic cholecystectomy was found difficult. These results were described by Chindarkar H et al and Nidoni *et al.*, in their studies [17, 18]. Another important indicator that has a good predictive value is a stone impacted at the neck. Because of the distension of the gall bladder and the thick gall bladder wall, an impacted stone at the neck of the gall bladder causes some technical issues in the laparoscopic cholecystectomy. We found stone impacted in 11 (13.42%) patients and all were difficult on surgery. The impacted stone caused mucocele, which made it difficult to grasp the gallbladder's infundibulum for retraction during dissection, resulting in difficult operation. This result is in consistent with other studies and it was found 20(13.3%) [19]. This study revealed that operative time more than 1 hour was 50(60.98%) and conversion to open in 9(10.98%). Males had a considerably higher conversion rate than females, according to Nidoni *et al.*, (p = 0.034, 95 percent confidence interval) [18]. The conversion rate from laparoscopic to open cholecystectomy varies between 7% and 35% globally [20]. This finding is in consistent

with Bourgouin *et al.*, (4.3%) [21]. This low conversion rate may be attributed to the expertise of the operating surgeon. The study showed difficult laparoscopic cholecystectomy more in contracted gall bladder 39(47.56%), impacted stones11(13.42%), when pericholecystic fluid present 08(9.76%) and the thickness of gall bladder wall more than 4mm 31(37.80%) in USG report of whole abdomen. Prashant S Dhanke, Subodh P Ugane, in their study came to the conclusion that prior hospitalization, BMI > 27.5, palpable gallbladder, thick gallbladder wall on USG, impacted stone at the neck and pericholecystic collection are strong predictors of difficult laparoscopic cholecystectomy. Furthermore, the scoring system was applied as a whole the proposed scoring system had a positive prediction value for easy prediction of 94.05% and for difficult prediction of 100% [22].

CONCLUSION

Preoperative ultrasonography findings are an excellent predictor of difficulty in laparoscopic cholecystectomy and should be used as a screening procedure. This can help the surgeon anticipate any potential problems during surgery, allowing for ideas about pre-operative planning and patient counseling to conversion or post-operative complications and lowering overall morbidity.

REFERENCES

1. T Buanes, Mjåland O. Complications in Laparoscopic and Open Cholecystectomy: A Prospective Comparative Trial. SurgLaparoscEn dosc 1996; 6(4): 266-272.
2. Hollington P, Toogood GJ, Padbury RT. A prospective random ized trial of day-stay only versus overnight-stay laparoscopic cholecys tectomy. Aust N Z J Surg 1999; 69: 841-843.
3. Stanisic V, Milicevic M, Kocev N, Stojanovic M, Vlaovic D, *et al.*, Prediction of difficulties in laparoscopic cholecystectomy on the base of routinely available parameters in a smaller regional hospital. Eur Rev Med Pharmacol Sci 2014;18: 1204-1211.
4. Lal P, Agarwal PN, Malik VK, Chakravarti AL. A difficult laparoscopic cholecystectomy that requires conversion to open procedure can be predicted by preoperative ultrasonography. JSLS. 2002;6:59–63.[PMC free article] [PubMed]
5. Gadacz TR. Update on laparoscopic cholecystectomy, including a clinical pathway. Surg Clin North Am. 2000;80:1127–49. [PubMed]
6. Alan S, Yew Hu R, Menon R. Risk factors for conversion of laparoscopic cholecystectomy to open surgery - A systematic literature review of 30 studies. Am J Surg 2017; 214 (5): 920-930. Doi: 10.1016/j.amjsurg.2017.07.029.
7. Amin A, Haider M, Aamir IS, Khan MS, Choudry UK, Amir M, Sadiq A. Preoperative and Operative Risk Factors for Conversion of Laparoscopic Cholecystectomy to Open Cholecystectomy in Pakistan. Cureus 2019; 11(8): e5446. doi:10.7759/cureus.5446.
8. Gupta a N, Gyan R, Binita G, Poras C. Validation of a scoring system to predict difficult laparoscopic cholecystectomy. Int J Surg 2013; 11(9):1002-1006. Doi: 10.1016/j.ijsu.2013.05.037.
9. Qureshi TJ, Khan AU, Ashfaq A, Abid KJ. To determine the diagnostic accuracy of gallbladder wall thickness and presence of pericholecystic fluid in predicting the need for conversion of laparoscopic cholecystectomy to open cholecystectomy in patients with cholelithiasis. Pak J Med Health Sci. 2016; 10:1031-4.
10. Kreimer F, Cunha DJ, Ferreira CC, Rodrigues TM, Fulco LG, Godoy ES *et al.*, Comparative analysis of preoperative ultrasonography reports with intraoperative surgical findings in cholelithiasis. Arq Bras Cir Dig. 2016; 29(1): 26–29. doi: 10.1590/0102-6720201600010007
11. Lo CM, Liu CL, Fan ST, Lai EC, Wong J. Prospective randomized study of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. Ann Surg. 1998;227:461–7. [PMC free article] [PubMed].
12. Bourgouin S. *et al.*, How to predict difficult laparoscopic cholecystectomy? Proposal for a simple preoperative scoring system. Am. J. Surg. 212(5), 873–881. https://doi.org/10.1016/j.amjsurg.2016.04.003 (2016).
13. Alponat A, Kum CK, Koh BC, Rajnakova A, Goh PM. Predictive factors for conversion of laparoscopic cholecystectomy. World J. Surg. 1997; 21(6), 629–633. https://doi.org/10.1007/pl00012288 (1997).
14. Sharma R, Sachan SG, Sharma SR. Preponderance of gallstone in female. World Journal of Pharmacy and Pharmaceutical Sciences. 2013, 2(6): 5871-5877.
15. Zaineb T, Hassaan A, Hajirah K, Hassan M, Syeda Ameera N, Javed M et al . Preoperative Factors Associated with Difficult Laparoscopic Cholecystectomy. Biomed J Sci & Tech Res 2021; 33(1)-25531 25536. DOI: 10.26717/BJSTR.2021.33.005349
16. Sharma B, Bhati T, Gupta V. Predictive Role of Preoperative Ultrasonography in Laparoscopic Cholecystectomy. J Mahatma Gandhi Univ Med Sci Tech 2017; 2(2):78-80. doi: 10.5005/jp journals-10057-0040
17. Chindarkar H, Dumbre R, Fernandes A, Phalgune D. Study of correlation between pre-operative ultrasonographic findings and difficult laparoscopic

cholecystectomy. Int Surg J 2018; 5(7):2605 2611. DOI: http://dx.doi.org/10.18203/2349-2902.isj20182782

18. Nidoni R, Udachan TV, Sasnur P, Baloorkar R, Sindgikar V, Narasangi B. Predicting difficult laparoscopic cholecystectomy based on clinicoradiological assessment. J Clin Diagn Res 2015; 12: 9:PC09. Doi: 10.7860/JCDR/2015/15593.6929.
19. Shaban H, Alsehily A, Elhadary MK, Elkerkary MA. Evaluation the Effectiveness of Pre-Operative Prediction Scoring System for Difficult Laparoscopic Cholecystectomy. J Surg 2020; 5: 1297. DOI: 10.29011/2575-9760.001297.
20. Thyagarajan M, Singh B, Thangasamy A, Rajasekar S. Risk factors influencing conversion of laparoscopic cholecystectomy to open cholecystectomy. Int Surg J 2017; 4(10): 3354-3357. DOI: http://dx.doi.org/10.18203/2349-2902.isj20174495
21. Bourgouin S, Mancini J, Monchal T, Calvary R, Bordes J, Balandraud P. How to predict difficult laparoscopic cholecystectomy? Proposal for a simple preoperative scoring system. Am J Surg 2016; 212(5): 873 881.doi: 10.1016/j.amjsurg.2016.04.003
22. Prashant S, Dhanke PS, Ugane SP. Factors predicting difficult laparoscopic cholecystectomy: A single-institution experience Int J Stud Res 2014;4:3-7