RETROSPECTIVE STUDY OF LAPAROSCOPIC SURGERIES IN A TERTIARY CARE CENTER

Trupti Tonape[1], Amit Girme[2], Sunil V Panchabhai[3], Vivekananth Subramaniam[4], Shivangi Shahi[5]

[1]Professor,[2] Associate Professor,[3]Professor, 4,[5]Post Graduate, Department of General Surgery Dr. D. Y. Patil Medical College Hospital & Research Centre, Pune – 411018.

Corresponding author:

[4]Dr Vivekananth Subramaniam, Post Graduate, Dr. D Y Patil Medical College & Research Centre, Pune, Maharashtra- 411018, INDIA.

ABSTRACT

Background: This study aimed to demonstrate the demographic characteristics for laparoscopic surgeries performed in all units of the Department of general surgery, Dr. D Y Patil Medical College Hospital in last one year. Purpose of study is to know clinical indications of rate of conversion of laparoscopic to open surgeries and compare with established scientific literature. **Methods:** Present clinical Study is a Retrospective study conducted over a period of 1 year from January 2021 to December 2021. Data analysis is done from OT records to find out the rate of conversion. Inclusion criteria – All patients under went laparoscopic surgery in the Department of General Surgery in a year 2021 with exclusion of urological and gynecological surgeries in Dr. D Y Patil Medical College Hospital and Research center, Pune, Maharashtra. **Results:** Total number of 270 laparoscopic surgeries were attempted, out of which 12 cases were converted from laparoscopy to open surgery. Total conversion rate in present study is 4.44%. Most of conversions occurred in laparoscopic cholecystectomy 3.73%, laparoscopic appendectomy 1.49 % and laparoscopic hernia repair with 6.66%.**Conclusion:** Over all conversion rates of laparoscopic procedure into open surgery is low when compared to other international studies. Most common causes of conversion in present study altered anatomy, adhesions and intra operative bleed. Conversion of laparoscopic surgery into open surgery resulted in decreased morbidity, complications and increase in duration of hospital stay.

Keywords: Laparoscopic Surgery, Open Surgery, Conversion rates.

Introduction:

Surgical audit forms an indispensable part of surgical practice today. Laparoscopic surgeries form the major part of general surgeries performed now a days. Audit provide a measure of current performance, reduced clinical risk to the patient and personnel. Ultimately aim to improve patient care. The audit process also evaluates the institutional practices by extension of national standards of health care delivery. Study chosen for clinical audit to compile the data of laparoscopic surgeries performed in Dr. D Y Patil Medical College Hospital and

Research Centre, Pune in Year 2021. The rate of conversion of open surgeries comparing it with international standards. To identify reason for conversion this audit will help in improving the technical quality and patient outcomes.

Patients and methods:

The protocol is approved by institution ethics committee as a part of clinical audit. Present clinical Study is a Retrospective study conducted over period of 1 year from January2021 to December 2021 in the Department of General Surgery, Dr. D Y Patil Medical College Hospital and Research center, Pune, Maharashtra.

Inclusion Criteria: All unit patients who underwent Laparoscopic Surgeries (n=270) in a year 2021.

Exclusion Criteria: Surgeries excluding Urological and gynaecological surgeries.

Observation & results:

A total of 270 Laparoscopic surgeries were attempted in a year 2021 out of which12 were converted to open the conversion rate on our study was 4.4% (Table-1). Most of our patients (60) were in the <40yr group with conversion rate of 3.33%.The>41yrgroups (210) conversion rate was 4.76% higher than our overall conversion rate which is of 4.44%. 165 (61.11%) out of 270weremales,ofthemLaparoscopicprocedurewassuccessfully completed in 157 (58.14%), but 8(2.96%)requiredconversion.105(38.88%)outof270werefemalesandlaparoscopicprocedure wassuccessfullycompletedin101(37.40%)patients,but4(1.48%)females required conversion. Laparoscopic cholecystectomy was done on 107 out of 270 total laparoscopic procedures,4 case required conversion with conversion rate 3.73%. Laparoscopic appendectomy was performed over 67 patients among 270 total laparoscopic procedures,1case required conversion with conversion rate of 1.49%. Laparoscopic hernia repair was performed in 32patients out of 270 total laparoscopic procedures 2 case required conversion with6.66%conversionrate. Laparoscopic umbilical hernia repair was done on 41 out of 270 total procedures 1 case required conversion with conversion rate of 2.43%. Laparoscopic abdomino perineal resection was done 6 cases out of 270, total procedure 1 case requires conversion with rate of 16.6. Laparoscopic gastrectomy was done 5 cases out of 270 total procedures, 1 case required conversion with rate of 20%. Laparoscopic hydatid cyst resection was done 5 cases out of 270 total procedures, 1 case was required conversion with rate of 20%, and Laparoscopic splenectomy was done 7 cases out of 270 total procedure 1 case required conversion with rate of 14%.Conversion from Laparoscopy to Open was categorized as elective and emergency conversion. Elective conversion is defined as the decision by the surgeon, at any stage of the operation, to convert from the laparoscopic approach and to open before being forced to do so because of suspected or anticipated injuries, 8 (66.6%) out of 12 converted cases reported in this category is more than emergency conversion 4 cases reported with rate of (33.33%).

Discussion

The possibility of conversion of laparoscopy to open surgery is inherent. It should not be regarded as a failure of the technique. It may be entirely appropriate. In this audit we are collecting data of one year of laparoscopic surgery and trying to find out the conversion rate to open surgeries. It will help us to understand reasons for conversion, comparison with the established standards and improvements if needed. Our study conducted in Department of General Surgery, at Dr D Y Patil Medical College Hospital, Pune reported a conversion of 4.44% of patients undergoing Laparoscopic surgeries in a duration of a year 2021. Out of all laparoscopic surgeries conducted most conversions occurred in laparoscopic cholecystectomy cases (3.73%). When compared with other laparoscopic surgeries in the study. This may be explained by variability in patient presentation with adhesion, varied anatomy, suspicious growth, conversion of 1 case of laparoscopic cholecystectomy induced Bile Duct Injury had Mirizzi syndrome Type I. Conversion rate in case of Appendectomy from Laparoscopy to open method rate is low (1.49%). The reasons being, the patient selection is better. The present study is compared with other studies according to corresponding procedures in various international studies. Benjie Tang etal[1] states the range of conversion rate of laparoscopic cholecystectomy to the open approach is commonly reported as 1.5% – 10%, actual reported rates in different series can vary depending on the target patient populations and the associated risk factors for conversion. The conversion rate in the present study (3.73%) slightly lower than other international studies (Table - 3). Our observation of occurrence of conversion in elderly is comparable with other studies[3]. In the present study men had slightly more than conversion rate when compared to the female. Almost every study either corroborated this or further cemented this observation. Yol Setal[9]conducted a trail in which tissue hydroxyproline and collagen were measured in sample taken from the gallbladder wall and peri-cholecystic tissue of both genders. They observed that inflammatory cells were more numerous in the tissue samples taken from men. The difference in tissue hydroxyproline values between male and female patients was found to be statistically significant, being higher in men. Dense collagen accumulation was seen in the sub mucosal region of the gallbladder wall in males[9].Kartal A et al state that estrogen inhibits connective tissue deposition in peritoneal inflammation (adhesion formation) by suppressing macrophage activation. This fibro suppressive effect of estrogen may explain the decreased incidence of adhesion formation in women [7].

Despite the fact that Ballal Met al state a higher conversion rate to open if the patient had an emergency admission[4].Traumatic diaphragmatic herniation with shattered spleen in thoracic cavity was the reason for conversion of 1case of laparoscopic splenectomy to open, nearly all patient [1 out of 12 (8.3%)] converted in this study were admitted electively. Most of our conversions were executed electively. The reasons behind elective conversion in decreasing order of incidence are inability to define anatomy due to adhesions, altered anatomy, suspicious growth. Most of our enforced (emergency)

conversions were due to iatrogenic injury. Though in literature trocar related complication like Subcutaneous emphysema due to extra peritoneal insufflations,11 enteric injury or perforation7,11 and port site bleeding7 have been described. None of the cases in the present series had a trocar related complication. Our institution protocol to achieve abdomen access by an open technique and surgeons experience counts inn. The open technique of trocar insertion according to Malik AM et al [10]seems to have reduced access-related major vessel injury and mortality rate (Table – 6).

After reviewing the literature the observation of this author that, adhesions around gallbladder which would have made the dissection of the calot's triangle both unsafe and difficult laparoscopically is the most common reason for converting the procedure to open has become established [1]. Iatrogenic organ injury, though not the second most common cause of conversion in some studies [5,6] was the overall second most common, and the most common cause for an enforced (emergency conversion) in the present study. Ibrahim Set al [3] and Tang B et al [1] share the same observation, strengthening over evidence for the same. We have reported a Bile Duct Injury with type I Mirizzi with rate of 4.76% (n=1) which is on the higher side compared to Tayeb M et al [5] Misawa T et al [9]Simopoulos C etal[5] and Ibrahim Set al [2] who report an incidence of 2.73%, 0.64%, 2.13% and 1.9% respectively. It has been observed that as the usage of Laparoscopic cholecystectomy has increased, so has the incidence of Bile Duct Injury also. It has been speculated that two-dimension image, limited visual field, absence of tactile sensation may explain reason [10].CBD is usually injured due to anatomical misidentification if CBD instead of cystic duct [7,10]. Reason behind conversion of Laparoscopic inguinal hernia surgery is known to have a steep learning curve and tendency toward more complications when compared to open surgery. An effective training program that keeps surgeons motivated requires relevant curriculum content, personnel, and resources for optimal flexible training strategies.

Conclusion:

After analysis of the data from the present study that obtained from literature we come to following conclusions. In our institution total conversions from laparoscopy to Open surgery are 4.44% out of which more in Laparoscopic cholecystectomy compared to other laparoscopic surgeries in our present study, out of 107 laparoscopic cholecystectomy 4 cases converted to open (3.73%) which is slightly higher than the expected standard but acceptable mostly the Intra-operative factors which influenced conversion are Adhesions, Altered anatomy and Intra peritoneal bleeding. Out of 67 laparoscopic appendicectomy only 1 was converted to open which 0.93%, which is significantly less than internationally accepted standards due to proper selection of cases, and for laparoscopic inguinal hernia repair out of 32, 2 cases were converted to open its because of slow learning curve and lack of expertise. According to this audit all conversion rates are acceptable and for inguinal hernia we propose training sessions for inguinal hernia surgeries for the faculties followed by reaudit in upcoming years.

Type of Surgery	Total attempted	Conversions	Percentage
Lap Cholecystectomy	107	4	3.73%
Lap Appendectomy	67	1	1.49%
Lap Inguinal hernia repair	32	2	6.66%
Lap Umbilical hernia repair	41	1	2.43%
Lap Abdominal-perineal resection	6	1	16.6%
Lap Gastrectomy	5	1	20%
Lap Hydatid cyst resection	5	1	20%
Lap splenectomy	7	1	14%
Total	**270**	**12**	4.44%

Table 1: Comparison of Various Lap Conversions in Our Study (N=270)

	REASONS	No. Cases	%
ELECTIVE	Inability to define anatomy due to adhesions	7	58.33
	Suspicious Growth	1	8.33
	Equipment failure	0	0.00
	Total	**8**	**66.66**
EMERGENCY	Bleeding	3	25
	Trocar injuries	0	0.00
	Injury to other viscera	0	0.00
	CBD Injury	1	8.33
	Total	**4**	**33.33**

Table 2: **Comparison of Reasons for Conversion (N=12)**

Author	Dinkel HP (May2000) [12]	Tayeb M (2005) [6]	Simopoulos C (Jul2005) [5]	Ibrahim S (Sep2006) [3]
Conversion (%)	6.7	7.5	5.2	10.3

Author	Gabriel R et al (2009)[2]	Ballal M (Oct2009)[4]	Sakpal S V (Oct2010)[15]	Present Study
Conversion (%)	26.1	5.2	4.9	3.73%

Table 3: Conversion rate of Lap. Cholecystectomy - Comparison with Other Studies

Conversion to open appendectomy in our study was found to be 0.96% which was much Low when compared to conversion rates of 6% to 15% from different international centres (Table - 4).

Author	S. C. Patel etal16	Martin etal [16]	Hellberg et al[18]	Sakpal SV et al[14]	Present Study
Conversion %	15.1%	8%	6.2%	6.2%	1.49 %

Table 4: Comparison of Lap Appendectomy Conversions

According to this audit all conversion rates are acceptable except for inguinal hernia which was 2 out of 32 cases with conversion rate of 40% (Table - 5).

Author	C. H. U. Brugmann Study (2008)	Ahmed Mahajna et.al (2009)[17]	Present Study
Conversion %	1.1%	1.2%	6.66%

Table 5: Comparison of Lap Inguinal Hernia Conversions

Author		Tayeb M (2005) [6]	Simopoulos C (Jul 2005) [5]	Ibrahim S (Sept. 2006)[3]	Present Study
REASONS (%)	Adhesions	56.2	74.47	67.9	58.33
	Equipment failure	-	9.57	-	0.00
	Suspicious Growth	-	1.06	-	8.33
	Bleeding	-	3.19	27.2	25

Iatrogenic injury toCBD	2.73	2.13	1.9	8.33
Others	12.2	9.57	2.9	0.00

Table 6: Reasons for Conversion - Comparison with Other Studies

Conflicts of interest: All authors declare no COI.

Ethics: There is no ethical violation as it is a clinical audit study.

Funding: No external funding**.**

REFERENCES:

1. Tang B, Cuschieri A. Conversions during laparoscopic cholecystectomy: risk factors and effects on patient outcome J Gastrointestinal Surg.2006 Jul-Aug;10(7):1081-91.

2. Gabriel R, kumar S, Shrestha A. Evaluation of predictive factors for conversion of laparoscopic cholecystectomy. Kathmandu University Med J (KUMJ). 2009 Jan-Mar:7(25):26-30.

3. Ibrahim S, Hean TK, Ho LS, Ravintharan T, Chye TN, Chee CH. Risk factors for conversion to open surgery in patients undergoing laparoscopic cholecystectomy. World J Surg. 2006 Sep; 30(9): 1698-704.

4. Ballal M, David G, Willmott S, Corless DJ, Deakin M, Slavin JP. Conversion after laparoscopic cholecystectomy in England. SurgEndosc. 2009 Oct; 23(10): 2338-44.

5. Simopoulos C, Botaitis S, Polychronidis A, Tripsianis G, Karayiannakis AJ. Risk factors for conversion of laparoscopic cholecystectomy to open cholecystectomy. SurgEndosc. 2005 Jul; 19(7): 905-9.

6. Tayeb M, Raza SA, Khan MR, Azami R. Conversion from laparoscopic to open cholecystectomy: Multivariate analysis of preoperative risk factors. J Postgrad Med. 2005; 51(1): 17-20.

7. Kartal A, Aksoy F, Vatansev C, Sahin M, Yilmaz O, Belviranli M, Karahan O. Does estrogen cause low conversion rates in laparoscopic cholecystectomies for acute and chronic cholecystitis in women? JSLS. 2001 Oct-Dec;5(4):309-12

8. Yol S, Kartal A, Vatansev C, Aksoy F, Toy H. Sex as a factor in conversion from laparoscopic cholecystectomy to open surgery. JSLS. 2006 JulSep; 10(3): 359-63.

9. Misawa T, Saito R, Shiba H, Son K, Futagawa Y, Nojiri T et al. Analysis of bile duct injuries (StewartWay classification) during laparoscopic cholecystectomy. J Hepatobiliary Pancreatic Surg. 2006;13(5):427-34.

10. Malik AM, Laghari AA, Mallah Q, Hashmi F, Sheikh U, Talpur KA. Extra-biliary complications during laparoscopic cholecystectomy: How serious is the problem? J Minimal Access Surg. 2008 Jan;4(1):5-8.

11. Archer SB, Brown Dw, Smith CD, Branum GD, Hunter JG.Bile duct injury during laparoscopic cholecystectomy: results of a national survey. Ann Surg.2001 Oct:234 (4):549-58.

12. Dinkel HP, Kraus S, Heimbucher J, Moll R, Knüpffer J, Gassel HJ et al. Sonography for selecting candidates for laparoscopic cholecystectomy: a prospective study. AJR Am J Roentgenol. 2000 May;174(5):1433-9.

13. Duca S, Bãlã O, Al-Hajjar N, Lancu C, Puia I, Munteanu D et al. Laparoscopic cholecystectomy: incidents and complications. A retrospective analysis of 9542 consecutive laparoscopic operations. HPB (Oxford). 2003;5(3):152-8.

14. Sakpal SV, Bindra SS, chamberlain RS. Laparoscopic cholecystectomy conversion rates two decades later: Journal of the society of laparoendoscopic surgeons, 2010 Oct-Dec; 14(4):476-483.

15. S.C patel GF jumba, S Akmal.Laparoscopic appendicectomy at the aga khan hospital, Nairobi. East African Medical journal Vol.80 No.9 September 2003.

16. Martin, L.C Puente I. Sosa JL et 01. Open Versus laparoscopic appendectomy: prospective randomized comparison. Ann surg. 1995; 222:256-262. 18. Hellberg A, Rudberg C., Kullman E et al. Prospective randomized multicentre study of laparoscopic versus open appendicectomy Brit. J. Surg. 1999: 86:48-53.

17. Jean-Louis Duluc q, Pascal wintringer and ahmedmahajna. Laparoscopic totally extra peritoneal inguinal hernia repair:Lessons learned from 3100 hernia repairs over 15 years. Surgical endoscopy vol.23, number 3, 4825-486. March 2009

18. Hellberg A, Rudberg C., Kullman E et al. Prospective randomized multi centric study of laparoscopic versus open appendicectomy Brit. J. Surg. 1999: 86:48-53.