A STUDY OF CONVERSIONS OF LAPAROSOCOPIC SURGERIES INTO OPEN SURGERIES: A ANALYTICAL STUDY

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ABSTRACT

INTRODUCTION: The aim of present study is to know the Conversions in Laparoscopic surgery to Open surgery in The patients of all the surgical units in the Department of General Surgery, Government General Hospital, Rangaraya Medical College, Kakinada over a period of 2 years from July 2013 to July 2015. The Objectives of present study is to compare the Conversion Rates of Laparoscopic Surgery to Open Surgery and the factors causing Conversion to Open Surgery in our institution.

PATIENTS AND METHODS
The protocol is approved by institution ethics committee and written informed consent was taken from each patient. Present clinical Study is an Analytical study conducted over period of 2 years from July 2013 to July 2015 in the Department of General Surgery, Government General Hospital, Rangaraya Medical College, Kakinada, Andhra Pradesh.

RESULTS
Total number of 536 laparoscopic surgeries were attempted in elective operation theatres with 21 cases out of 536 cases were converted from laparoscopy to open surgery. Total conversion rate in present study is 4%. Most of conversions occurred in laparoscopic chelecystectomy 5.73% cases in comparison to laparoscopic appendectomy 2.26% and laparoscopic hernia repair with 0%.

CONCLUSIONS
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 is 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, Factors causing conversions, Laparoscopic Cholecystectomy, Laparoscopic Appendectomy, Laparoscopic Inguinal inguinal hernia repair.

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INTRODUCTION: Laparoscopic procedures are most popular in present era because of its advantages like less scaring, short hospital stay and earlier return to activities. Despite of increased experience and technical innovations there are many occasions that require conversion of laparoscopic procedures into open surgical procedures. Here we have done a study in our institution to know the rates of conversion and factors causing conversion to open surgeries.

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PATIENTS AND METHODS: The protocol is approved by institution ethics committee and written informed consent was taken from each patient. Present clinical Study is an Analytical study conducted over period of 2 years from July 2013 to July 2015 in the Department of General Surgery, Government General Hospital, Rangaraya Medical College, Kakinada, Andhra Pradesh.

Inclusion Criteria: All patients who underwent Laparoscopic Surgeries in our Elective operation theatre (n=536) who underwent only laparoscopic cholecystectomy, laparoscopic appendectomy and laparoscopic hernia repair in above mentioned study period were included. All patients who were converted (n=21) from laparoscopic surgery to open surgery were enrolled as cases.

Exclusion Criteria: In our institution apart from the above mentioned 3 types of Laparoscopic surgeries, the other Laparoscopic surgeries performed were Laparoscopic Thyroidectomy, Laparoscopic Varicocelectomy, Laparoscopic Nissens fundoplication, Laparoscopic Splenectomy, and Laparoscopic Incisional Hernia repair, etc. were less frequently performed and hence these were Excluded from the present study.

OBSERVATION & RESULTS: A total of 536 Laparoscopic surgeries were attempted in the study period, out of which 21 were converted to open; thus the conversion rate in our study was 4 % (Table-1). Most of our patients (340) were in the <40yr group with conversion rate of 2.64%, which is less than our overall conversion rate. The >41 yr groups (196) conversion rate was 6.12% higher than our overall conversion rate which is of 4%. 227 (42.36%) out of 536 were Males, of them Laparoscopic procedure was successfully Completed in 214 (94.27%), but 13(5.72%) required conversion. 309 (57.64%) out of 536 were Females and laparoscopic procedure was successfully Completed in 301 (97.41%) patients, but 8 (2.58%) Females required conversion. Most of the patients requiring conversion 15 (71%) among 21 converted cases were elective admissions in OPD. Only 6 (29%) among 21 converted cases presented to the casualty and had an emergency admission and operated later in our Elective operation theatre.

Laparoscopic cholecystectomy was done on 279 out of 531 total laparoscopic procedures, 16 cases required conversion with conversion rate 5.73%. Laparoscopic appendectomy was performed over 221 patients among 531 total laparoscopic procedures, 5 cases required conversion with conversion rate of 2.26%. Laparoscopic hernia repair was performed in 36 patients out of 531 patients with 0% conversion rate. Chief Operating Surgeons is Assistant Professors in 12 (57.14%) cases, Associate Professors headed 4 (19.04%) of cases & Professors were the operating surgeons in 5 (23.8%) cases.

Conversion from Laparoscopy to Open was categorized as Elective conversion or Emergency (enforced) conversion. Elective conversion is defined as the decision by the surgeon, at any stage of the operation, to desist from the laparoscopic approach and to resort to laparotomy before being forced to do so because of suspected or anticipated injuries, 15 (71.42%) out of 21 converted cases reported in this category. Emergency conversion is an intra-operative emergency when the surgeon has to resort to laparotomy to control or deal with the complication and 6 (28.57%) out of 21 converted cases were reported in this category (Table 2). Iatrogenic organ injury was the reason in 1 case in which Dense adhesions at Calots triangle, in a type 1 mirrizi's syndrome, while dissecting the cystic duct the CBD got injured, CBD injury was Stewart way class1. The average post operative hospital stay was 9 days.

DISCUSSION: On account of our study subjects being converted cases of Laparoscopy, which are usually few and uncommonly pass, we adopted a very careful approach to facilitate utmost efficiency. The frequency of conversions in laparoscopic surgery, just like any other contrary outcome of the surgical procedure, is varied. Our study conducted in Department of General Surgery at Government General Hospital, Kakinada, reported a conversion of 4% of patients undergoing Laparoscopic surgeries.

Out of all laparoscopic surgeries conducted in our institution, most conversions occurred in lap cholecystectomy cases (5.73%). When compared with other laparoscopic surgeries in the study. This may be explained by complexity and more variability in the anatomy of Extra hepatobiliary apparatus, aberrant ducts and might have chronically inflamed with lot of adhesions and fibrosis by the time of admission which make laparoscopy difficult compared to others in the study. Conversion rate in case of Laparoscopic appendectomy from Laparoscopy to open method is low (2.26%). The reasons being, In Laparoscopic appendectomy the patient selection is better and as the patient, generally presents during 1st or 2nd attack adhesions are less expected, as well in this study the number of cases of Laparoscopic appendectomy were less as most of the cases were planned for Lap appendectomy in Emergency Operation theatre which were not included in this Study.

The present study is compared with other studies according to corresponding procedures in various international studies here. Benjie Tang et al[1] states that although 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 (5.73%) slightly Lower than other international studies (Table - 3). Gabriel R et al[2] conducted their study at Kasturba Medical College, Manipal, India and reported a much higher conversion rate (26.1%) than present study.

Our observation of occurrence of conversion in elderly is comparable with other studies.[3,4,5,6,7] Some author's advocated that the increased conversion in elderly patients was explained by recurrent attacks and longer duration of symptomology.[5,6] But in our study the duration of symptomology was not longer but comparable to their younger counter parts.

In the present study also Men had slightly more than conversion rate when compared to the female sex. Male sex has been universally affiliated with high incidence of conversion. Almost every study either corroborated this or further cemented this observation.[1,8,3,4,5,7,9]

It was initially proposed that this higher conversion rate might be due the heedless attitude of the male gender which influences them to ignore their health, but this wasn't a doubtless scientific explanation[9]. Yol S et al[9] conducted a trail in which tissue hydroxyproline and collagen were measured in sample taken from the gallbladder wall and pericholecystic tissue of both genders. They observed that inflammatory cells were more numerous in the tissue samples taken from Men. Also 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 submucosal 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 fibrosuppressive effect of estrogen may explain the decresed incidence of adhesion formation in women.[8]

Despite the fact that Ballal M et al[4] state a higher conversion rate to open if the patient had an emergency admission, nearly all patient [15 out of 21 (71%)] converted in this study were admitted electively. Most of our conversions were executed electively. The reasons of elective conversion in decreasing order of incidence are; inability to define anatomy due to adhesions, equipment failure, and altered anatomy. Most of our enforced (emergency) conversions were due to intraperitoneal bleeding. Even though Post graduate surgical trainees also perform laparoscopic cholecystectomy under monitoring of a consultant, all of the converted cases were being operated upon by the Consultants themselves, ruling out the sparsely experience factor as a significant conversion risk. This observation is corroborated by Misawa T et al[10] who state in their study that experienced laparoscopic surgeons were in the driving seat in all of their converted cases due to CBD injuries and Contrary to what is stated by Ibrahim S et al[4] allege a significant higher conversion rates when junior surgeons are operating compared to their senior counter parts.

Though in literature trocar related complication like Subcutaneous emphysema due to extra peritoneal insufflations,[11] enteric injury or perforation[7,11] and port site bleeding[7] have been described. None of the cases in the present series had a trocar related complication. This could be explained by the incredibly larger amount of time that is dedicated to the initial access port at our institution. Also in more than half of the cases in our institution abdomen access was achieved by an open technique. The open technique of trocar insertion according to Malik AM et al[11] 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.[1,8,3,5,6] Bleeding, 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 S et al[3] and Tang B et al[7] share the same observation, strengthening over evidence for the same. We have reported a Bile Duct Injury rate of 4.76% (n=1) which is on the higher side compared to Tayeb M et al,[5] Misawa T et al,[10] Simopoulos C et al[4] and Ibrahim S et al[2] who report an incidence of 2.73%, 0.64%, 2.13% and 1.9% respectively. Our case of Bile Duct Injury had Mirizzi syndrome Type I which has a documented conversion rate of 74%.[7] It has been observed that as the usage of LC has increased so has the incidence of Bile Duct Injury. It has been speculated that the two dimensional image, limited visual field, absence of tactile sensation may be responsible for this trend.[10] Also CBD is usually injured due to anatomical misidentification because of perceptual illusion identifying incorrectly the CBD for the cystic duct was based on an anatomical illusion.[7,10] Archer SB et al suggested the quick learning and early independent initiation of the procedure, without the benefit of proctoring as the reason for the higher incidence of Bile Duct Injury.[12] The average Post operative hospital stay for our patients were 9 days, slightly higher than the 7.53 days reported by Ibrahim S et al.[3]

CONCLUSION: After analysis of the data from the present study and that obtained from literature we come to following conclusions. In our institution total conversions from laparoscopy to Open surgery are 4% out of which more in Laparoscopic cholecystectomy compared to other laparoscopic surgeries (Lap appendectomy and Lap inguinal hernia repair) in our present study. 5.73% of Laparoscopic cholecystectomy conversions compared to 2.26% Lap appendectomy conversions and no Lap inguinal hernia repair conversions. Factors that are important in influencing conversion of laparoscopic surgery to open surgery in our hospital, as per the present study are: Advancing age and male gender are on the higher side, where as type of admission, surgeons experience could not be established as powerful enough factors influencing conversion. Mostly the Intra-operative factors which influenced conversion are Adhesions, Altered anatomy and Intra peritoneal bleeding. Laparoscopic to open surgery Conversions are associated with the increase in hospital stay and decrease in morbidity and complications.

Type of Surgery	Total attempted	Conversions	Percentage
Lap cholecystectomy	279	16	5.73%
Lap Appendectomy	221	5	2.26%
Lap hernia repair	36	0	0.00
Total	**536**	**21**	

Table 1: Comparison of Various Lap Conversions in Our Study (N=536)

	REASONS		No. Cases	%
ELECTIVE	Inability to define anatomy due to ADHESIONS		14	66.66
	Suspicious Growth		1	4.76
	Equipment failure	Camera problem	0	0.00
	Altered anatomy	Anticipating injuries	0	0.00
	Total		**15**	**71.42**
EMERGENCY	Bleeding		5	23.8
	Trocar injuries		0	0.00
	Injury to other viscera		0	0.00
	CBD Injury		1	4.76
	Total		**6**	**28.57**

Table 2: Comparison of Reasons for Conversion (N=21)

Author	Dinkel HP (May2000)[13]	Duca S (2003)[14]	Tayeb M (2005)[6]	Simopoulos C (Jul2005)[5]	Ibrahim S (Sep2006)[3]
Conve. (%)	6.7	1.9	7.5	5.2	10.3
Author	Gabriel R et al (2009)[2]	Priego P (Jan2009)[7]	Ballal M (Oct2009)[4]	Sakpal S V (Oct2010)[15]	Present Study
Conve. (%)	26.1	8.3	5.2	4.9	5.73

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

Conversion to open appendicectomy in our study was found to be 2.26% which was much Low when compared to conversion rates of 6% to 15% from different international centres (Table - 4).

Author	S. C. Patel etal[16]	Martin etal[17]	Hellberg et al[18]	Sakpal SV et al[16]	Present Study
Conversion %	15.1%	8%	6.2%	6.2%	2.26%

Table 4: Comparison of Lap Appendectomy Conversions

In our study there were No Laparoscopic inguinal hernia Repair conversions as the number of cases done are very few compared to other studies, here in our hospital total 36 Laparoscopic Inguinal hernia repair done all were successful Lap without conversions (Table - 5).

Author	C. H. U. Brugmann Study (2008)	Ahmed Mahajna et. al(2009)[19]	Present Study
Conversion %	1.1%	1.2%	0%

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	66.66
	Equipment failure	-	9.57	-	0.00
	Altered anatomy	19.2	-	-	0.00
	Suspicious Growth	-	1.06	-	4.76
	Bleeding	-	3.19	27.2	23.8
	Iatrogenic injury to CBD	2.73	2.13	1.9	4.76
	Others	12.2	9.57	2.9	0.00
	Not documented	-	-	-	-

Table 6: Reasons for Conversion - Comparison with Other Studies

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