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RESEARCH PAPER

Laparoscopic cholecystectomy in rural setup

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***Background and aims**: Cholelithiasis or gall stone disease is a significant healthcare problem among the adult population. Laparoscopic cholecystectomy is widely accepted as the gold standard in symptomatic gall stone diseases. However, common bile duct injury is more frequent in laparoscopic cholecystectomy than open cholecystectomy. The present study audits 184 laparoscopic cholecystectomy patients in Tezpur Medical College from August 2014 to September 2019. This study aims to determine the advantages, intra-operative and postoperative complications in laparoscopic cholecystectomy and assess the reasons for conversion to open cholecystectomy. **Methods**: The retrospective study consists of 184 patients with symptomatic cholelithiasis/ chronic cholecystitis and treated by standard four-port laparoscopic cholecystectomy from Aug'2014 to Sept'2019 at Tezpur Medical College. The results and complications of laparoscopic cholecystectomy were documented for each case and were analysed. **Results**: Out of the 184 cases, 139 were females. The age of the patients ranged from 14 to 65 years. The average duration of operating time was 65 minutes. Conversion to open cholecystectomy was 3.2%. There were no postoperative abdominal abscesses, port site hernia, or mortality cases. There were two bile duct injuries. One patient with lateral damage to the common bile duct was managed by open repair, and the other subject reported later was referred to a higher centre. **Conclusion**: Laparoscopic cholecystectomy in our set-up proves to be a safe procedure and effective treatment of Gallstone diseases.*

***Keywords**: Gallstone diseases, Open Cholecystectomy, Laparoscopic Cholecystectomy, Rural setup.*

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INTRODUCTION

Cholelithiasis or gall stone disease is a significant healthcare problem affecting 10% to 15% of the adult population in developed societies.[1] Although gall stones are common, most of the cases are asymptomatic.[2] In symptomatic gall stone diseases, laparoscopic cholecystectomy is widely used as the procedure is less invasive and has a lower surgical risk than conventional open surgery. However, common bile duct injury is more frequent in laparoscopic cholecystectomy than open cholecystectomy.

In 1882, Carl Langenbuch performed the first cholecystectomy enunciating a principle "The gall bladder needs to be removed not because it contains stones but because it forms them".[3] Open cholecystectomy has long been considered the gold standard in the treatment of gallstones. The first laparoscopic cholecystectomy was performed on September 12, 1985, by Prof Dr Med Erich Mühe of Böblingen, Germany.[4] First documented laparoscopic cholecystectomy using a keyhole approach was by Philip Mouret of Lyon, France, in 1987.[4] Since then, laparoscopic cholecystectomy has become the preferred treatment for gallstones. Preferences and desire for laparoscopic cholecystectomy are logical in today's environment because it causes less pain, requires less medicine, requires a shorter hospital stay, allows for an

early return to regular work and activities, and offers good cosmetic outcomes. Also, this technique provides a minimally invasive surgical alternative to open cholecystectomy. However, as documented in various studies, laparoscopic cholecystectomy necessitates the surgeon's use of two-dimensional vision and tactile tissue perception, resulting in 0.4% to 0.6% bile duct injuries. While in open cholecystectomy, common bile duct injuries encounter up to 0.3% cases.[5]

Tezpur Medical College is a new set-up. It lacks some facilities such as Endoscopic Retrograde Cholangiopancreatography (ERCP), Intraoperative Cholangiogram, Magnetic Resonance Cholengio Pancreatography (MRCP), etc. Also, it is situated 18 Kilometres away from the town. The patients attending the hospital are usually from the surrounding villages and far remote areas. Most of them are unaware of modern medical procedures and often needs to be counselled. In the present study, we have tried to assess the applicability and safety of laparoscopic cholecystectomy in this rural medical setup.

The objective in the present study is to assess the applicability and safety of the laparoscopic cholecystectomy in a rural hospital set up in terms of duration of surgery, analgesic requirements, postoperative complications, conversion to open cholecystectomy, postoperative hospital stay and time taken for return to normal work.

MATERIAL AND METHOD

This study consisted of 184 patients diagnosed with cholelithiasis/chronic cholecystitis with at least one attack of abdominal pain, i.e. symptomatic gall stones and underwent laparoscopic cholecystectomy at Tezpur Medical College from August 2014 to September 2019.

Inclusion Criteria: Patients with cholelithiasis proven by Ultrasound scanning with at least one attack of upper abdominal pain and considered fit for elective cholecystectomy were included.

Exclusion criteria: The patients who had a history or images suggesting common bile duct stones, perforated gall bladder or testing positive for hepatitis B or C are excluded from the study. Also, patients over 70 years of age were not included in the study.

All patients have been admitted after preoperative workup including blood counts, sugar, renal function test, thyroid-stimulating hormone, viral profile (Hepatitis B and C, HIV), ultrasound abdomen to confirm Gall stones and to assess the common bile duct diameter, chest X-ray and ECG were done then with all reports pre-anaesthetic check-up was performed. Patients who opted for laparoscopic cholecystectomy were explained the possibility of conversion to open cholecystectomy. All the cases were elective. A 3rd generation cephalosporin IV dose was given preoperatively after the skin test. Injectable Gentamycin or Amikacin and Analgesics were given 2 to 3 days postoperatively, then orally for three days. Patients were started oral feeding between 24-48 hours postoperatively. Patients were discharged on the 3rd to 5th postoperative day. Sutures were removed on 7 to 8th postoperative day. Patients were reviewed on the 7th and 21st days after discharge. Follow up was done for 3-6 months whenever possible. Standard 4 port techniques were used. The pneumoperitoneum was created by open method using blunt trocar (Hason's procedure).

RESULTS

The total number of patients admitted for laparoscopic cholecystectomy was 184, out of which 24.4% were males. The mean age of the patients was 39 years. The average duration of operation time was 65 minutes. More time was required due to intraoperative CO_2 leak, calots triangle dissection, spillage of stones, slippage of clips and delivery of gall bladder through the port site. Most patients (92.9%) stayed in the hospital for less than five days (**Table 1**).

Table 1 Patient profile

Variable	Category	Observations
Gender	Male	45 (24.4%)
	Female	139 (75.6%)
Age-group	0-20	15 (8.1%)
	21-30	66 (35.9%)
	31-40	59 (32.1%)
	41-50	26 (14.1%)
	51-60	15 (8.1%)
	61-70	3 (1.6%)
Operative time duration	Range: 40-90 minutes	Average: 65 minutes
Hospital stay (in days)	Less than or equal to 5	171 (92.9%)
	5-10	9 (4.9%)
	More than 10	4 (2.2%)

2 (Two) patients had bile duct injuries. One patient had lateral bile duct injury due to clip advancement and having biliary stricture, which was managed with stent placement outside and later exploration and end to end anastomosis. Another patient reported after four weeks, referred to a higher centre as per the wish of the party where he was operated on. (**Table 2**).

Table 2 Intra and postoperative complications

Complications	Number	Percentage
Bile duct injury	2	1.08%
Perforation of GB with stone spillage	7	3.8%
Haemorrhage	6	3.3%
Bile leak	5	2.7%
Wound infection	7	3.8%
Chest infection	3	1.6%

As seen from **Table 3**, Six (3.2%) patients had to convert from laparoscopic to open cholecystectomy in the initial period. Five patients were converted due to dense adhesion in the fudus body and calots area, probably due to post-acute cholecystitis and empyema of the gallbladder. One patient had inadvertent hook cautery injury to the cystic artery with profuse bleeding.

Table 3 Conversion rate from laparoscopic to open cholecystectomy

Series	Conversion rate (%)
Saeed et al.[6]	3.2
Wherry et al.[7]	8.08
Simpoulous et al.[8]	5.2
Shiazaki et al.[9]	6.4
Elder et al.[10]	12.5
Cheema et al.[11]	2.0
Mir I S et al.[12]	1.8
This Study	3.2

DISCUSSION

Laparoscopic cholecystectomy is one of the most commonly performed laparoscopic procedures. It requires only 0.5 to 1 cm incisions that cause relatively less pain, early ambulation, shorter hospital stay, early return to work, early return of intestinal motility and lower incidence of incisional hernia. Surgeons and patients now prefer laparoscopic cholecystectomy to open cholecystectomy as the procedure is cost-effective and produces less morbidity. Access to laparoscopic cholecystectomy is equally vital for rural communities of the developing world.

The present study revealed the need for conversion from laparoscopy to open cholecystectomy in 3.2% of patients, comparable to a study from Pakistan.[6] Wherry DC et al.[7] evaluated complications of laparoscopic cholecystectomy performed in medical treatment facilities of the Department of Defence and reported conversion to open cholecystectomy in 8.08% patients with bile duct injury in 0.57%. In the present study, bile duct injury was observed in 1.1% of patients. Simpoulous C et al.[8] reported conversions to open cholecystectomy in 5.2% of patients, while Elder S et al.[10] reported a 28% conversion rate in their study. Mir IS et al.[12] reported a conversion rate of 1.8% in a prospective analysis conducted in a non-teaching hospital in the rural area of Kashmir.

Laparoscopic cholecystectomy is an invasive procedure associated with a range of minor and major complications. The present study found gallbladder perforation with stone spillage, bile duct injury, haemorrhage, bile leak, and wound infection as the most frequent complications of laparoscopic cholecystectomy. Damage to the main bile duct is more frequent with laparoscopic cholecystectomy.[13] In this study, one patient with lateral bile duct injury due to clip advancement and having billiary stricture was managed with stent placement outside and later exploration and end to end anastomosis. One should be cautious because most bile duct injuries are not visible intra-operative and present in the postoperative period. Successful performance of laparoscopic cholecystectomy requires proper training, discipline, skill and technology and ongoing maintenance of competency.[12]

Duca S et al.[14] reported the most frequent complications of laparoscopic cholecystectomy as bile leakage, haemorrhage, subhepatic abscess and retained bile duct stones. Ghnnam W et al.[15] reported postoperative transient pyrexia, wound infection, fluid collection and bile duct injury as the common complications in their study. Deziel DJ et al.[16] conducted a national survey of 4292 hospitals and 77604 cases of laparoscopic cholecystectomy and reported that bile duct injuries were recognised postoperatively in half of the cases and most frequently required anastomotic repair, while bowel and vascular injuries which occurred in 0.14% and 0.25% cases respectively were the most lethal complications and postoperative bile leak in 0.3% of patients most commonly originating from the cystic duct.

Despite the advantages of laparoscopic cholecystectomy, possible injuries and postoperative complications are still of concern. The effective administration of the procedure depends upon the proper training and expertise of the surgeon and the quality of the types of equipment used. The present retrospective study revealed a low incidence of bile duct injury and a high success rate among the patients who have undergone laparoscopic cholecystectomy at our institute.

CONCLUSION

With a high success rate of 97%, laparoscopic cholecystectomy may be considered a safe and effective treatment for symptomatic cholelithiasis/chronic cholecystitis at our set-up. The findings of the study are comparable to similar other studies. However, the procedure may result in bile duct injuries and other postoperative complications.

Hence, preventive and safety measures and proper training of the performing surgeon are necessary prerequisites for effectively utilising the procedure.

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