ORIGINAL ARTICLE

EXPERIENCE OF LAPAROSCOPIC CHOLECYSTECTOMY DURING A STEEP LEARNING CURVE AT A UNIVERSITY HOSPITAL

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Background: Cholelithiasis is the most common disease of alimentary tract affecting the adult population globally and our country in particular is no exception to it as a cause of hospitalization. Surgical removal of gall bladder is the main stay of symptomatic cholelithiasis ensuring a permanent cure. The minimally invasive technique of laparoscopic cholecystectomy has gained wide acceptance as a Gold Standard treatment ever since its introduction. The purpose of this prospective observational study was to document our experience of laparoscopic Cholecystectomy during a learning curve in a single unit of a university hospital and compare it with other available data in the literature. **Methods**: Total 94 patients underwent laparoscopic cholecystectomy during the learning curve from Jan 2009 to Dec 2010 in the Department of Surgery Liaquat University Hospital Jamshoro. **Results**: Mean age was 42 years with females (88.29%) preponderance. Majority of the cases were operated by consultants (85.10%) within 25–60 minutes. Postoperative hospital stay was 3 days with return to work in 7 days. Only 6 (6.38%) cases were converted to open technique. Intra-peritoneal drains and Foley's catheter were kept in selected cases only. Eleven patients (11.70%) had intra-operative complications including complete transaction of CBD in only one (1.06%) male patient. Five patients (5.31%) had postoperative complications with two patients having iatrogenic duodenal injury which was not identified during surgery and pseudo cyst pancreas. Four patients (4.25%) died due to multiple organ failure. **Conclusion:** We conclude that Laparoscopic Cholecystectomy is a gold standard procedure and should be learned on virtual simulated models before starting this procedure on human patients.

Keywords: Laparoscopic Cholecystectomy, Learning curve, experience.

INTRODUCTION

Conventional Open Cholecystectomy with or with out drain was a standard treatment for more than 100 years for cholelithiasis till 1983 when it was slowly replaced by Laparoscopic cholecystectomy in 1985–87.[1–4] In fact laparoscopic cholecystectomy is the most remarkable innovation of the last century and has been accepted as a gold standard procedure world wide for the treatment of cholelithiasis.[5–7] It needs lot of experience initially on simulated models and a steep learning curve still exists for the technique especially in developing countries like Pakistan.[8] We document and share our experience of Laparoscopic Cholecystectomy during steep learning curve in a university hospital.

MATERIAL AND METHODS

All patients of uncomplicated cholelithiasis who underwent laparoscopic cholecystectomy during the study period were included. Patients with co morbidity, altered LFT, CBD stones and acute cholecystitis were excluded from the study. The patients were operated by 8 consultants with an experience of more than 10 years standing in general surgery. All patients underwent 4 ports laparoscopic cholecystectomy under general anaesthesia. Harmonic scalpel was not used. Lega clips were used to ligate cystic duct and artery separately. Carbon dioxide gas was used for creating pneumoperitonium. Intra-peritoneal drain in sub hepatic area was placed in cases that had a difficult dissection. Nasogastric suction was also required in cases that had distended stomach during laparoscopic cholecystectomy. The abdominal cavity was deflated of the gas before closing the ports with vicryl. Patients Demographics, operating surgeons, operating time, conversion to open method, operative and postoperative complications, hospital stay, return to work and mortality were recorded prospectively on a designed Performa after obtaining informed written consent.

RESULTS

Out of 149 patients diagnosed as uncomplicated cholelithiasis, 94 (63.06%) patients underwent laparoscopic cholecystectomy during the study period. There were 83 (88.29%) females and 11 (11.70%) male patients, with a male to female ratio of 1.7:8.8 (Table-1). Their ages ranged from 15 to 70 years (Table-2).

Eighty (85.10%) patients were operated by trained laparoscopic surgeons, 7 (7.44%) were operated by trained laparoscopic and learning surgeons combine while 7 (7.44%) were operated by learning surgeons under strict supervision (Table-3).

Intra-peritoneal drain (55.31%) and nasogastric tube (26.95%) were kept in selected patients. Eleven (11.70%) patients had intra-operative complications including perforation of gall bladder (1.06%), spillage of gall stones (1.06%), bleeding from gall bladder bed

(3.19%), difficult retrieval of gall bladder (3.19%), unnoticed iatrogenic pancreatic and duodenal injury and the most dreaded complication encountered was transacted common bile duct (1.06%) which was immediately rectified by reparative hepatico-jejunostomy (Table-4). Six (6.38%) patients were converted to open technique due to various other reasons. Postoperative hospital stay in most of the cases was 3 days and return back to work was 7 days (Table-5).

Postoperative complications included bile leakage through drain tube (2.12%), peritonitis due to duodenal injury (1.06%), and moderate size pseudo cyst of pancreas (1.06%), diathermy burn and dehiscence of epigastric port site in same patient (1.06%). Total 4 patients (4.25%) died due to septicaemia leading to multiple organ failure. Only two patients were explored twice, one initially due to unnoticed iatrogenic duodenal injury and later with in short period for adhesions which were not settled on conservative management and the other patient with transacted CBD was explored after initial reparative hepaticojejunostomy (Table-6).

Table-1: Gender distribution of the patients (n=94)

Gender	No.	%
Male	11	11.7
Female	83	88.3
Total	94	100.0

Table-2: Age distribution of the patients

Age (Year)	No.	%
15–30	10	10.63
31–45	63	67.02
46–60	20	21.27
61–70	1	1.06

Table-3: Operating surgeon

Operating Surgeon	No.	%
Trained surgeon	80	85.10
Trained surgeon + Learner (Combined)	7	7.44
Learner alone (under supervision)	7	7.44

Table-4: Intra-operative complications

Complications	No.	%
Intra-peritoneal drainage	52	55.31
Nasogastric Suctions	25	26.95
Gall bladder perforation	1	1.06
Spillage of gall stone	1	1.06
Bleeding from gall bladder bed	3	3.19
Difficult retrieval of gall bladder	3	3.19
Complete transection of CBD	1	1.06
Unidentified injury to duodenum and pancreas	2	2.12

Table-5: Operative/Postoperative evaluation

Variable	Value
Operative Time	25–60 min
Conversion to open method	6 (6.38%)
Postoperative hospital stay/Return to work	3/7 Days

Table-6: Postoperative complications (n=5)

Complication	No.	%
Temporary bile leakage from drain site	2	2.12
Peritonitis due to duodenal injury	1	1.06
Moderate size pseudo cyst pancreas	1	1.06
Diathermy burn/epigastric port access dehiscence	1	1.06
Re-exploration (Twice)	2	2.12
Septicaemia and multiple organ failure	4	4.25

DISCUSSION

In this study 94 patients underwent Laparoscopic Cholecystectomy with a mean age of 42 years which was a little higher than what had been reported.[1,9–11] In present study initially for first six months mean operating time in an uneventful procedure was approximately 90 minutes which was gradually reduced to 25–40 minutes by trained surgeons and 65 minutes by learners. This was much less than reported in earlier studies.[12–14]

In our series intra-operative complications were observed in 11 (11.70%) cases. Sanjay KB[1] reported 30% cases with perforated gall bladder and spillage of bile, and with 10% cases of spilled stones respectively. Postoperative hospital stay in our series on an average was 3 days. However Sanjay KB[1] reported postoperative stay of 3.02 days, McGinn[15] reported 2 days, whereas Supe and Bapat reported 3.3 and 2.7 days respectively in their series[13]. In the present study time for return to work was 7 days which is less comparable to other studies.[1,11–13]

In the present study only 6 (6.38%) cases were converted to open technique which is comparable to other studies who reported a varied conversion rate from 4 to 11.5%.[1,5,9,11,14,15] The reasons for conversion were transacted CBD, adhesions and obscure anatomy at porta hepatis and intra-operative bleeding in our series. We kept intra-peritoneal drain regularly initially in all cases as advocated by Hawasli *et al*[16] but later on we placed drain in selected cases only. We did not use Foley's catheter preoperatively and used it in a few cases postoperatively as advocated by Liu *et al*.[17]

For laparoscopic cholecystectomy, we believe that learning curve persists for about 200 cases, with gradual reduction in operating time as suggested by Andrus JV *et al*.[2] Although a few years back major use of laparoscopic technique was rather restricted to cholecystectomy, diagnostic approaches and gynaecological procedures but with passage of time more and more procedures like hernia repair, fundoplication, appendectomy, varicocele legation, splenectomy, adrenalectomy, nephrectomy and colectomy are being perform laparoscopically. On one hand where laparoscopy has revolutionised surgical care by reduction of patient trauma, morbidity, hospital stay, and improved cosmoses, increased incidence of different complications is reported. But this is mainly attributed to learning curve. We believe with our experience during a learning curve that minimal invasive techniques demand extensive surgical training especially hand, eye and foot coordination and depth perception. Initially all training should be undertaken on simulators and animal models in virtual labs followed by a structured training programme involving stepwise progressive learning with close supervision by experts.

A built-in system of audit can effectively train junior surgeons in laparoscopic cholecystectomy without exposing patients to undue risks.[9] In Pakistan although laparoscopic surgery is being adopted quickly but training programs are still limited. We believe that there should be mandatory workshops for all postgraduate students which will enhance there laparoscopic skills and there is need of rotation of all postgraduate fellowship trainees to laparoscopic unit to develop their basic laparoscopic skills. In this way in which we can develop good laparoscopic surgeons in future.

CONCLUSION

Laparoscopic Cholecystectomy can be considered as safe and the gold standard. Careful dissection of gall bladder from its bed is recommended to avoid perforation of gall bladder and venous sinuses in liver bed. One should not hesitate to open technique if any difficulty or doubt regarding anatomy arises.

REFERENCES

1. Sanjay KB, Langer JG. Laparoscopic Cholecystectomy: An experience of 200 cases. JK Science 2004;6(2):73–6.
2. Shea JA, Berlin JA. Indications and outcome of cholecystectomy: A comparison of pre and post-laparoscopic era. Ann Surg 1998;227(3):343–50.
3. Thomas RG. US experience with laparoscopic cholecystectomy. Am J Surg 1993;165:450–3.
4. Goco IR, Luciola G, Chamber RN. Mini-cholecystectomy and operative cholangiography: A means of cost containment. Am Surg 1983;49:143–5.
5. Andrus JV, Smiley GST, Sumi I. The tail of the learning curve for Laparoscopic Cholecystectomy. Am J Surg 2001;182(3):250–3.
6. Mouret P. From the first laparoscopic cholecystectomy to the frontier of laparoscopic surgery; the future prospective. Dig Surg 1991;8:124–5.
7. Mühe E. Laparoscopic cholecystectomy--late results [German]. Langenbecks Arch Chir Suppl Kongressbd 1991:416–23.
8. Bruce DS, Stephen BE. Laparoscopic cholecystectomy: Treatment of choice for symptomatic cholelithiasis. Ann Surg 1991;213(16):665–77.
9. Lim SH, Salleh I, Poh BK, Tay KH. Laparoscopic Cholecystectomy. An audit of our learning programme. ANZ J Surg 2005;75(4):231–3.
10. Royston CMS, Lansdown MRJ, Brough WA: Teaching laparoscopic surgery: The need for guidelines. Br Med J 1994;308:1023–5.
11. McDermott EWM, McGregor JR, O'Dwyer PJ, Mur-phy JJ, O'Higgins NJ. Patient outcome following laparoscopic and minilaparotomy cholecystectomy. Br J Surg 1991;78:1502. (Abstract)
12. Barkun JS, Barkun AN. Randomised controlled trial of laparoscopic versus mini-cholecystectomy. Lancet 1992;340:1116–9.
13. Supe AN, Bapat VN. Laparoscopic vs mini-lap cholecystectomy for gallstone disease. Ind J Gastroenterol 1996;15(3):94–6.
14. McMahon AJ, Baxter JN, Anderson JR, Ramsay G, O'Dwyer PJ, Russell IT, *et al*. Laparoscopic versus mini-cholecystectomy, a randomized trial. Lancet 1994;343:135–8.
15. McGinn FP. Randomized trial of laparoscopic cholecystectomy and mini-cholecystectomy. Br J Surg 1995;82(10):1374–77.
16. Hawasli A. To drain or not to drain in laparoscopic cholecystectomy: rational and technique. Surg Lap Endosc 1992;2(2):128–30.
17. Liu SK, Rassai H. Urinary catheter in laparoscopic cholecystectomy: Is it necessary? Surg Laparosc Endosc Percutan Tech 1999;9(3):184–8.

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