SINGLE INCISION LAPAROSCOPIC SURGERY: USE OF CONVENTIONAL LAPAROSCOPIC INSTRUMENTS IN SINGLE INCISION LAPAROSCOPIC SURGERY: OUR EXPERIENCE

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ABSTRACT

BACKGROUND

Laparoscopic surgery has undergone several modifications since its advent. There has been a shift from a standard multiport approach to more minimalistic approaches. SILS is a major step in this evolutionary process. We present our experience with SILS using conventional laparoscopic instruments and without the need for a SILS port.

METHODS

211 patients in Fortis Hospitals, Bangalore, India, who underwent SILS for various abdominal conditions from May 2009 to May 2011 were included in the study. Variables such as operating time, conversion to multi-port laparoscopy or open surgery, complications, analgesia requirements and hospital stay were included.

RESULTS

211 patients underwent SILS using conventional laparoscopic instruments for Gallstones, Appendicitis, Morbid Obesity, Gynaecological conditions and Renal cysts. Average age group was 48.5 years; mean duration of hospital stay was 46.5 hours; 166 Laparoscopic cholecystectomies were done, out of which 47 were acute cholecystitis. There were no cases converted to open surgeries.

CONCLUSION

Single Incision Laparoscopic surgery is technically feasible and as effective as conventional laparoscopic surgery. It is a safe procedure and provides an advantage with regards to analgesia requirement, length of hospital stay and early return to work. Cosmetically, it is superior to multiport laparoscopy.

KEYWORDS

Single Incision, Conventional Instruments, Cosmesis, Cost Effective.

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INTRODUCTION

Since its advent, laparoscopy has rapidly become the standard of care for a wide variety of abdominal surgeries offering the advantages of decreased post-operative pain, early recovery, shorter duration of hospital stay, early return to work and improved cosmesis. The past few years have seen a further push towards more minimalistic approaches to abdominal surgery. Single incision laparoscopic surgery has been the logical next step in this minimalistic approach. It has been shown to be cosmetically superior to conventional laparoscopic surgery with the further advantages of decreased post-operative pain and requirement for analgesics leading to a quicker recovery as compared to conventional laparoscopic surgery.

OBJECTIVE

Our experience with SILS using conventional laparoscopic instruments and a brief discussion on review of literature.

DESIGN

Retrospective observational study.

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METHODS

211 patients at the Fortis Hospitals, Bangalore, India, underwent SILS by a single surgeon from May 2009 to May 2011. Variables such as operating time, conversion to multi-port laparoscopy or open surgery, complications, analgesia requirements and hospital stay were taken into account. Patients were followed up for a period of 3 months. Paediatric age groups were excluded.

Surgical Technique

All the patients were given General Anaesthesia. Patient was positioned on the table depending on the type of surgery. Intraperitoneal access was achieved by the open technique. A single 20 mm periumbilical curvilinear incision was made either above, below or to its left depending on the proposed operative procedure. Incision was deepened to linea alba. Fascial incision was made, peritoneal cavity was opened by blunt technique and a 10 mm blunt trocar was deployed. Pneumoperitoneum was created with carbon dioxide insufflation at a pressure of 14 mmHg. The secondary trocars were inserted above and lateral to the 10 mm trocar with an oblique path (Z technique).

RESULTS

All the patients underwent SILS using conventional laparoscopic instruments via a single periumbilical incision using conventional laparoscopic trocars and instruments.

Average age group was 48.5 years; mean operative time (For all cases done) was 112.5 (15 min-210 min), the operating time being the longest for Sleeve gastrectomy (210 min) and the mean duration of hospital stay was 46.5 hours, (21-72 hours). There were no intraoperative or immediate post-operative complications noted. There were nine cases of cholecystectomies that were converted to multiport [5.42%] due to large gallbladder [n=4], dense adhesions [n=3] and empyematous gallbladder [n=2]. The patients were followed up for 3 months, assessed clinically and no complications were noted in this period. There was no incidence of port site hernia and port site infections.

One patient had a combined ectopic pregnancy excision with tubal ligation, one patient had a combined cholecystectomy with appendectomy and two patients had a combined cholecystectomy with ovarian cystectomy; 47 patients out of 166 who underwent SILS cholecystectomy were diagnosed with acute cholecystitis; 9 cases out of 47 cases of acute cholecystitis were converted to multi-port laparoscopic surgery. There were no cases converted to open surgeries. Among patients who underwent sleeve gastrectomy, one had BMI of 44.9 and the other had BMI of 37.8.

"Table 1 shows the number of patients included in the study and also shows the total number of male patients and female patients in the study."

Total No. of Patients	Males	Females
211	78	133
Table 1		

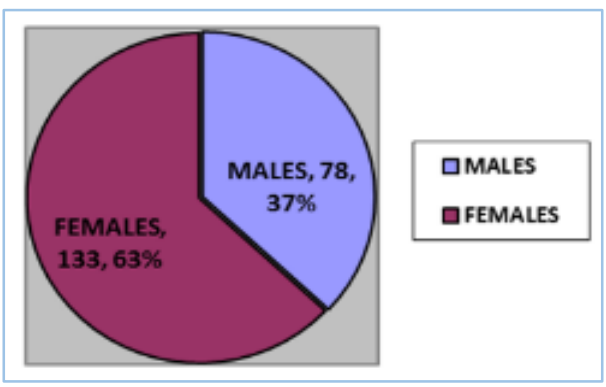

Fig. 1: Sex Distribution

"Table 2 shows the number of parameters that have been considered for the study and also shows the different results and interpretations of the individual parameters."

Parameters	Statistics
Age Group	21-76 (mean 48.5 years)
BMI	17.1-55 (mean 36.05)
Mean Operating Time	15 to 210 min (mean 112.5)
Duration of Stay	21 to 72 hours (mean 46.5)
Post-Op Analgesia [Diclofenac/Aceclofenac and/or Paracetamol]	3 Days
Visual Analogue Scale for Pain	1-4 (mean 2.5)
Return to Normal Activity	3-5 Days (mean 4 days)
Conversion (Multi-port/Laparotomy)	9 (Multiport) cases of Acute cholecystitis (Large gallbladder [n=4], dense adhesions [n=3] and empyematous gallbladder [n=2])
Complications	0
Table 2	

"Table 3 shows the different types of surgeries performed by Single Incision Laparoscopic Surgery (SILS) using conventional laparoscopic instruments and the number of surgeries performed."

Types of Surgeries	Number of Cases
Cholecystectomy	166
Appendectomy	26
Tubal Ligation	4
Ovarian Cystectomy	4
Ectopic Pregnancy	3
Sleeve Gastrectomy	4
Renal Cyst Excision	2
Hysterectomy	1
Lymph Node Biopsy	4
Splenic Cyst Excision	1
Table 3	

"Table 4 shows the comparison of our study with the studies done by other authors considering the number of cases, conversion to standard laparoscopy, complications and the duration of the surgery."

Authors	Publication Year	n	Conversion to Standard Laparoscopy (%)	Complication (%)	Average Operating Time (min)
Palanivelu et al[1]	2008	10	4 (40)	1 (10)	148
Navarra et al[2]	2008	30	0	0	123
Cugura et al[3]	2008	1	0	0	NR
Bucher et al[4]	2009	11	0	0	52
Ersin et al[5]	2009	20	1 (5)	0	94
Nguyen et al[6]	2009	1	0	0	70
Langwieler et al[7]	2009	14	0	0	53-115
Podolsky et al[8]	2009	5	0	0	121
Zhu et al[9]	2009	26	0	0	62
Guo et al[10]	2008	1	0	0	158
Gumbs et al[11]	2009	2	0	0	< 60
Hong et al[12]	2009	15	0	0	79
Kuon Lee et al[13]	2009	37	5 (13.5)	2 (5.4)	83.6
Our cases	2010-11	211	9 (5.42)	0	15-210
Table 4					

DISCUSSION

Philip Mouret performed the first laparoscopic cholecystectomy in 1987, which was later established in 1990 by Dubois and Perissat.[14] Since then, it has been accepted worldwide and is now considered as a Gold standard procedure in the surgical treatment of gall bladder diseases.[15] Standard laparoscopic cholecystectomy is performed using the conventional four port technique. The fourth lateral port is created in order to expose the Calot's triangle by holding and retracting the fundus of the gall bladder. However, with growing laparoscopic experience, additional ports may not be necessary and the surgery can be safely performed with a single incision.[16] SILS was described as early as 1992 by Pelosi et al, who performed a single-puncture laparoscopic appendectomy.[17] Further, in the era of laparoscopic surgery, less post-operative pain and early recovery are major goals to achieve better patient care and cost effectiveness. Several studies have demonstrated that less postoperative pain is associated with a reduction in either size or number of ports.[18]

Single incision laparoscopic surgery is performed through one incision usually at the umbilicus. This approach limits the port incisions to one site. Positioning the single access within the umbilicus results in better cosmesis and avoids penetration through the muscle. Reducing the abdominal wall trauma results in less postoperative pain, faster recovery, fewer wound complications and improved cosmetic outcomes. Risk of epigastric vessel injury can be eliminated by avoiding the lateral placement of ports. Access through the umbilicus reduces the torching effect of trocars facilitating the mobility of the instruments/trocars in different directions. There are ports, disposable hand instruments and flexible endoscopes that have been suggested to do this surgery, but they are expensive and would increase the cost of the operation.[19] Single incision laparoscopic surgery is gaining popularity as a complement to standard laparoscopic surgery with regards to cosmesis, less pain, shorter duration of hospital stays and early recovery.[20]

With our experience, these additional instruments are not required as equal efficacy and success rate can be achieved with conventional laparoscopic instruments, ports and telescopes. We have performed SILS using conventional laparoscopic instruments in over 200 patients by triangular port insertion. Safety was defined as performance of the procedure without any major complications like bleeding and injury to the bile duct, major vessels or any viscera. Benefits were measured in terms of operative time, days of hospital stay, postoperative recovery time after discharge, days taken to return to work, quantitative requirement of analgesia after surgery, assessment of postoperative pain score using a 10-cm unscaled Visual Analogue Score (VAS) and cosmesis with a 3-month follow-up period.

As per Table 4, our study was compared with studies of different authors. Our study showed a conversion percentage of 5.42 as compared to the studies done by Palanivelu et al[1] (40%), Ersin et al[5] (5%) and by Kuon Lee et al[13] (13.5%).

Our study had no complications as compared to the studies done by Palanivelu et al[1] (10%) and by Kuon Lee et al[13] (5.4%). Average operating time in our study is comparable to other studies as shown in Table 4.

CONCLUSION

In our experience, SILS using conventional laparoscopic instruments is equally safe and effective as compared to the conventional laparoscopic surgeries or SILS with custom made instruments. SILS with conventional laparoscopic instruments is superior in terms of cost effectiveness. With increasing experience and expertise, SILS can be offered to a majority of patients mandating laparoscopic solutions of benign abdominal pathologies. SILS can also be applied to the treatment of acute cholecystitis and difficult gallbladders as safely as conventional multiport laparoscopy.

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