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COMPARATIVE STUDY BETWEEN CONVENTIONAL THREE PORT LAPAROSCOPIC APPENDECTOMY VERSUS SINGLE INCISION LAPAROSCOPIC APPENDECTOMY USING TWO DIFFERENT SINGLE INCISION METHOD.

General Surgery

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ABSTRACT

BACKGROUND: The advent of Single incision laparoscopic appendectomy (SILA) has encouraged surgeons to compare its benefits over conventional laparoscopic appendectomy (CLA).but there are various technique for performing SILA surgery. We conducted a prospective study comparing two different techniques of SILA (SILA using SILS Port and SILA with Subfascial incision) with CLA, evaluating parameters like operative time and complications, post-operative pain, duration of stay and the cosmetic outcome. **METHODS:** A prospective, comparative study of 90 consecutive patients was conducted at our institution. The data regarding the various parameters were documented in all three groups of patients. **RESULTS:** Among the 90 patients, 30 underwent SILA using SILS PORT and 30 underwent SILA using subfascial incision and 30 underwent CLA. We found statistically significant outcomes for SILA over CLA in variables such as operative time ($p=0.0018$), duration of hospital stay ($p\leq0.0001$) and cosmetic outcome ($p\leq0.0001$). Almost all patients in the SILA category showed virtually no evidence of a scar after a three month follow up. **CONCLUSIONS:** SILA was found to have a better outcome than CLA with regard to operative time, hospital stay and cosmesis. We conclude that this technique of SILA can be a better alternative to CLA.

KEYWORDS

Appendectomy, Single Incision, Conventional Method, Subfascial Incision.

INTRODUCTION:

Appendectomy is one of the most commonly performed surgical procedure of the abdomen in the world. This surgical procedure has been performed for over 100 years, after first being described by McBurney[1].With rapidly developing, minimally invasive surgery, the laparoscopic appendectomy has become a selectable method for appendectomy. Laparoscopic surgery was first used about 35 years ago, and the concept of minimally invasive surgery has significantly affected the field of traditional surgery[2].The first laparoscopic appendectomy was performed by the **Gynaecologist Dr.Kurt Semm in 1983**.[3]McBurney's procedure represented the gold-standard for acute appendicitis until 1981, a real **"laparoscopic revolution"** took place only in 1985 with the first laparoscopic cholecystectomy performed by **Erich Muhe,** using Semm's technique and instruments[4].

Driven by a quest toward less abdominal trauma in surgery, improved cosmesis,the potential reduction in postoperative pain, and a shorter hospital stay, speciality cameras, ports, and instruments have been developed, and hence minimal access surgery has undergone an accelerated process of evolution [2].During the era of laparoscopic surgery common trend has been towards less invasive techniques and a natural extension of the trend is to perform operations without scars.

MATERIALAND METHODS:

This was a prospective, comparative study of patients who underwent elective appendectomy, in Indira Gandhi government Medical College and hospital , Nagpur, a tertiary care centre, the work has been approved by the ethical committees of the institution.All patients were included in this study after informed consent. Patient has been randomised by rotation method.

In the SILA group, a 2-cm vertical transumbilical incision is made under direct vision down to the peritoneum. The single-incision laparoscopic surgery Port is then inserted into the cavity, using curved artery forceps. The triple-entry port is used to create a pneumoperitoneum of 12-15 mmhg, two 5mm trocars and one 10mm trocar are inserted, one of them being for the telescope.

The patient is placed in the 30- degree Trendelenburg position and 20-degree left lateral decubitus for adequate intra peritoneal exposure of the right iliac fossa. Conventional laparoscopic instruments (rigid) were used to perform the appendectomy. The SILS port is removed and the wound was closed with an absorbable suture and inverted, aiming at a scar free surgery.

In patients of SILA with subfascial incision the incision is made over umbilicus with three ports inserted subfascially, rest of the procedure is same.

In the CLA group, the procedure was done according to the established standard 3 port technique for removal of the appendix. The three port sites were closed with sutures. All patients in both groups received the same regimen for post -op analgesia.

OBSERVATIONS AND RESULTS:

The study was conducted in Department of Surgery at our institute IGGMCH.

From July 2015 to November 2017. A total of 30 patients were included in each group i.e. for conventional lap appendectomy and SILS appendectomy during specified period and evaluated prospectively.

The data collected was then incorporated into an Excel Data Sheet. This data was further analysed using the Statistical Package for the Social Sciences v20.0 software (SPSS). The comparative evaluation in both SILA and CLA groups were calculated by using't' test and chi square test.

Operative Time	Sila Group Using Sils Port	Percent %	Sila Group Subfascial Incision	Percent (%)	Cla Group	Percent (%)
20-30 Min	0	0	1	3.33%	11	36.33%
31-40 Min	9	30%	10	33.33%	13	43.33%
41-50 Min	14	46.66%	13	43.33%	2	6.66%
51-60 Min	5	16.66%	5	16.66%	1	3.33%
Above 60 Min	2	6.66%	1	3.33%	0	0%
Total	30	100%	30	100%	30	100 %
Mean Operatie Time	45.4 ± 9.27		44.86± 9.113		33.633 ± 7.97	
P-value	<0.0001 (S)	0.8208(NS)	<0.0001 (s)			

Intraoperative complications:

In our study the intraoperative complication occurs only in one patient (3.33%) which was operated by SILA (P). The patient undergone injury to terminal part of ileum by electro-cautery. Patient converted to standard three port conventional technique and injured portion was sutured by 2-0 vicryl. Patient went uneventful postoperatively and was discharged after starting on oral feeds on 3rd post-operative day.

Complications like massive bleeding which required laparotomy never occurred in our study.In patients operated by CLA no intraoperative complication occurred.

Conversion rate:
Out of 30 operated cases for SILA (P) one case were converted to open appendectomy, whereas two cases required a conversion to a conventional laparoscopic appendectomy. In SILA(S) one patient is converted to open due to dense adhesions whereas in CLA out of 30 cases, two cases converted to open appendectomy and no case required an additional port.

Reason for conversion: Out of the 30 operated patients, one case of SILA was converted to open appendectomy due to dense adhesions with ileal loops, it was difficult to separate those dense adhesions from ileal loops laparoscopically and hence decision was taken to directly go for open appendectomy. Similar case of dense adhesion occur in case of SILA (S) .one case OF SILA (P) was converted to CLA due to intraoperative injury to the terminal part of ileum while dissecting the appendix from mesoappendix and hence decision was taken to go with CLA and repaired the injured bowel laparoscopically.One case of SILA was converted to CLA due to crowding of instruments and hence it was difficulty for the surgeon and assistant to operate and hence decision was taken to go with CLA. This incidence occurs during initial phase of study when surgeons were unfamiliar with SILS instruments.Out 30 CLA cases two were converted to open appendectomy due to dense adhesions.

POST-OPERATIVE PAIN:
Among the 30 patients operated by SILA (P) the mean VAS score at the end of 24 hours was found to be 3.533 ± 1.04 and at end of 7 days was found to be 2.066± 0.73.Among the 30 patients operated to be 2.066± 0.73.Among the 30 patients operated by SILA (S) the mean VAS score at the end of 24 hours was found to be 3.66 ± 1.12 and at end of 7 days was found to be 2.16 ± 0.77.Among the 30 patients operated by CLA the mean VAS score at the end of 24 hours was found to be 3.63 ± 0.85 and at the end of 7 days was found to be 2.13 ± 0.62P value between SILA(P) and CLA on day 1 and day 7 was found to be 0.693 and 0.715 respectively, which is not significant.P value between SILA(S) and CLA on day 1 and day 7 was found to be 0.907 and 0.868 respectively, which is not significant.P value between SILA(S) and SILA(P) on day 1 and day 7 was found to be 0.650 and 0.629 respectively, which is not significant.

Nil per oral status:
The mean nil per oral time for patients operated by SILA was 22.8 ± 3.88 which had a range from 16-36 hours.The mean nil per oral time for patients operated by CLA was 22.1 ± 4.88 with a range of 16-33 hours.The mean nil per oral time for patients operated by SILA(S) was 23.7 ± 5.36 which had a range from 16-39 hours.P value of SILA(P) and CLA was found to be 0.5271 which was not significant.P value of SILA(S) and CLA was found to be < 0.001 which is significant.P value of SILA(S) and SILA (P) was found to be < 0.001 which is also significant.Patients who had longer operative time and needed conversion were the ones in whom the bowel sounds appeared late as compared to those who had shorter operative time .

Hospital stay:
The mean hospital stay for patients operated by SILS (P) is found to be 2.0±0.922 with range of 2-6 days The mean hospital stay for patients operated by SILS (S) is found to be 2.77±0.84 with range of 2-6 days The mean hospital stay for patients for patients operated by CLA is found to be 2.76±0.72.The p value of SILA (P) and CLA was found to be 0.514 which was found to be not significant.The p value of SILA (S) and CLA was found to be 0.914 which was found to be not significant.The p value of SILA (S) and SILA (P) was found to be 0.0013 which was found to be significant.

COSMETIC SCORE:
The mean cosmetic score for the patients operated by SILA is found to be 8.16±1.14 with range of 5-10.The mean cosmetic score for the patients operated by CLA is found to be 7.36±1.15 with range of 5-9 and operated by SILA (S) is 7.86 ± 1.75 with range 5-10.The patients who had the complication like wound gape and wound infection has the low cosmetic score as compare to the other patients. Patients operated by SILA have more cosmetic score as compared to the patients operated by CLA mainly because of the single scar which was mainly burry in the umbilicus few days after surgery. Patients with operated by SILA (P) has maximum cosmetic score.

P value of SILA (P) and CLA for cosmetic score is found to be 0.0089 which is statistically significant, also p value for SILA(S) and CLA is found to be 0.196 which is no significant. And p value of SILA(S) and SILA (P) is found to be 0.43 which is not significant. This shows that SILA (P) has good cosmetic results as compared to CLA as well as SILA (S).

POST-OPERATIVE COMPLICATIONS:
Out of 30 patient operated by SILA 1 (3.33%) patient had wound infection and 1 patient had wound gape Out of 30 operated by CLA 2 patient (3.33%) has wound infection and no patient had wound gape.The complication rate is same in both the groups and hence the p value is 1 which is not significant.

OPERATIVE TIME:
No intraoperative complications occurs in our study in CLA group, In the present study, mean operative time in the 30 cases operated by SILA (P) 45.4 ± 9.27minutes. Operative range was 30 to 75 minutes. And mean operative time for SILA(S) is found to be 44.86 ± 9.113.

The mean operative time for the 30 cases operated by CLA is 33.633 ± 7.97 with range of 23 to 60 minuets. There is statistically significant difference in term of operative time between SILA (P) and SILA (S) and CLA. P value is <0.0001, that is SILA cases are taking more time that CLA cases.

This could be explained by "**learning curve**" effect associated with any new technique, which was also shown in studies by **dr.MFazdali Ibrahim (2010)**[5].The operative time decreases significantly once the surgeon gets accustomed with this new technique. **Duron et al. (2011)**[6] reported a series of 55 cases performed in a single institution in which a 'learning curve' effect was present with respect to shorter operating times and the inclusion of more technically difficult patients as the surgeons gained experience with the procedure .

CONCLUSION:
Both SILA and CLA appear to be feasible and effective techniques for the removal of an appendix due to acute appendicitis, with similar outcomes of interest.On the one hand ,appendectomy via SILA may be considered as an alternative to CLA, with expected good impact on cosmetic results.On the other hand, the results of this study could also be interpreted as indicating that there are no real observed benefits of SILA over those of CLA.SILA can be performed by both technique using sils port and by taking sub fascial incisions but results are good if use SILS port if surgeon is experienced in SILS.As the SILA has appeared as a new instrument in toolbox of general surgeon, further studies including high-quality multicentre prospective randomized trials and subsequent clustered Meta –analysis are required to better assess all aspects of the SILA procedure, including cosmetic results.

ABBREVIATIONS:
SILS [P]- single incision laparoscopic surgery by using SILS port.
SILS[S]- single incision laparoscopic surgery using subfascial incision.
CLA-conventional three port laparoscopic appendectomy.

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