ORIGINAL ARTICLE

Outcome of Single Incision versus Conventional Laparoscopic Appendectomy: A Single Institute Based Analysis

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ABSTRACT

Objective: To compare the outcomes of single incision versus conventional laparoscopic appendectomy in term of post operative pain and surgical site infection.

Study Design: Randomized controlled trial

Place and Duration of Study: Department of Surgery, Allama Iqbal Medical College/ Jinnah Hospital Lahore from 1st July 2017 to 30th June 2018.

Materials and Methods: A total of 340 patients with the diagnosis of acute appendicitis were selected through Emergency Department of Jinnah Hospital Lahore. Standard and same pre and post operative care was given to all patients. Two equal groups were created. In Group A, the single incision laparoscopic appendectomy was performed while in Group B, conventional laparoscopic appendectomy was done. In single incision laparoscopic appendectomy, a single intra-umbilical incision was made and a multi-channel port was inserted. All the patients were assessed for postoperative pain at 24 hours by VAS and were discharged when tolerating oral soft diet and mobilized. The surgical outpatient follow ups were at 7, 15 and 30 days after surgery. The patients were assessed for SSIs.

Results: Patients mean age was 28.13±7.804 years. There was no difference between groups in term of distribution of age, gender and body mass index (p values 0.214, 0.586 and 0.773 respectively). The frequency of surgical site infection and mean pain scores were less in single incision laparoscopic appendectomy as compared to conventional laparoscopic appendectomy group (p values 0.014 and <0.0001 respectively).

Conclusion: Single incision laparoscopic appendectomy is better and safe procedure in term of postoperative pain and surgical site infection as compared to conventional laparoscopic appendectomy in patients undergoing LA for acute appendicitis.

Keywords: Postoperative, Surgical, Infections, Conventional, appendectomy,

INTRDOUCTION

Acute appendicitis is the most widely recognized stomach careful crisis. For a long time, the open appendectomy (OA) has been the pillar of treatment through an entry point at the McBurney's point. The open appendectomy has constrained chance to investigate particularly when the a ruptured appendix is muddled or some other pathology is found.[1] Since the first laparoscopic appendectomy (LA) in 1983, this strategy has developed and as of now in numerous nations it has become standard procedure for appendicectomy.[2]

The regular laparoscopic appendectomy (CLA) is finished with the assistance of three stomach ports. Umbilical trocar is for camcorder while hypogastric and left lower quadrant are for dismemberment and withdrawal of tissues.[3] The LA has numerous points of interest over the OA like improve restorative outcomes, diminished clinic remain, decreased postoperative agony, and early recuperation. The medical clinic costs are tantamount nonetheless; LA is related with increasingly usable occasions. During the time spent improving further postoperative results the single entry point LA (SILA) was presented in which a solitary port with three to four trocars is utilized. SILA is likewise a protected and achievable alternative for appendectomy however when contrasted with CLA, employable results like usable time, postoperative torment and careful site contaminations (SSIs) rates have been variable in the literature.[4]In 2013, Frutos et al[5] conducted a study in which the SILA had reduced postoperative pain scores measured by visual analogue scale (VAS) as compared to the CLA (2.76±1.64 and 3.78±1.76 for SILA and CLA respectively, p value < 0.001). Another study in following year showed that SILA is associated with more postoperative pain (4.0±1.3 and 3.3±0.5 for SILA and CLA respectively, p value 0.004).[6] Liang et al[7] showed that SILA has fewer incidences of SSIs than CLA but results were not statistically significant (3% versus 14% for SILA and CLA respectively, p value 0.07). The wound infection was 7.1% versus 15.7% for SILA and CLA respectively.[8] Locally there is scarce data to label one as a better procedure with good outcome in a developing country set up.[9,10] Our study would help local and young surgeons specially in emergency settings to choose the better procedure for good operative outcomes for LA and thus would reduce the morbidity, hospital costs and hospital stay.

MATERIALS AND METHODS

This randomized controlled trial was carried out at Department of Surgery, Allama Iqbal Medical College/Jinnah Hospital Lahore, Pakistan from 1st July 2017 to 30th June 2018. A total of 340 cases (170 in each group) were enrolled. Patients undergoing elective LA for acute appendicitis, age range from 15 to 60 years, both male and female patients were included in the study. Patients with chronic illness like diabetes mellitus, hypertension, ischemic heart disease, chronic kidney or liver disease, immunocompromised patients, previous

history of any chemotherapy or radiotherapy, any history of repeated infection, chronic pain >3 months, preoperative use of analgesics for > 3 days per week for >3 months, tumor of appendix and complicated appendicectomy in which LA is converted to OA were excluded. The diagnosis was confirmed by detailed history, clinical examination and relevant investigations. Hospital registration numbers and informed consent were taken from all patients. Pre-anesthesia workup was completed. Same intravenous antibiotics (Inj. Ceftriaxone 1 gram and inj. Metronidazole 500 mg) prophylaxis was given to all patients half hour to one hour before surgery and another dose were given 6 hours after surgery. We divided the patients randomly into two groups, A and B via lottery method. All surgical procedures were done under standard general anesthesia. In Group A, the SILA were performed while in Group B, CLA were done. All cases were operated by surgeons having minimum experience of 50 LAs. In SILA, A single intra-umbilical incision was made and a multi-channel port was inserted. A 5 mm, 30 2 degree telescope were used to visualize the operative field. Conventional laparoscopic instruments were used for the procedure. The musculo-aponeurotic layers of the port site were closed with absorbable sutures before closing the skin incision. In CLA, 10 mm intra-umbilical port was passed after initial pneumoperitoneum. A further 10 mm port was used in the left iliac fossa and a 5 mm port was used in the hypogastrium. The musculo-aponeurotic layers of port site of 10 mm were closed with absorbable sutures before closing the skin. The dissection of the mesoappendix from the appendix was done with diathermy and division of the appendix base was done between two endoloops. After the procedure extra gas in the peritoneal cavity was thoroughly evacuated from the port sites. All patients were given 3 doses of inj. Ketorolac 30mg IV (analgesic) and inj. Ranitidine 50 mg IV (antacid) 8 hourly. Same standard postoperative care was given to all the patients. All the patients were assessed for postoperative pain at 24 hours by VAS. The patients were discharged when tolerating oral soft diet and mobilized. The surgical outpatient follow up were at 7, 15 and 30 days after surgery. The patients were assessed for SSIs. Statistical analysis was performed with SPSS version 26. VAS scores were compared between SILA and CLA groups by independent sample t test and proportions of SSIs were compared by Chi square test. P value≤ 0.05 was considered as significant.

RESULTS

There were 94 males and 76 females in SILA group while in CLA group, 89 males and 81 females (Table 1). Eleven patients have SSI and 159 patients have no SSI in SILA group while 25 patients have SSI and 145 patients have no SSI in CLA group (Table 2). Collectively, mean BMI and pain scores were 24.11±2.621 kg/m2 and 3.59±1.511. Out of 340 patients, 36 (10.6%) developed SSI. The results showed that there was no difference between groups in term of distribution of age, gender and BMI (p values 0.214, 0.586 and 0.773 respectively). The frequency of SSI and mean pain scores were less in SILA as compared to CLA group (p values 0.014 and <0.0001 respectively) [Table 3].

The data was stratified according to age, gender and BMI. The results showed that there was no impact of age, gender and BMI on mean pain scores (p value remained same i.e. <0.0001) [Table 4]. For SSI, the results were significant only for age <30, female gender and BMI <0.25 (p values 0.005, <0.0001 and 0.010 respectively) [Table 5].

Table 1: Gender distribution among groups

Gender	SILA	CLA	P value
Male	94	89	0.586
Female	76	81	

Table 2: SSI among groups

SSI	SILA	CLA	P value
Yes	11	25	0.014
No	159	145	

Table 3: Mean of age, BMI and pain scores among groups

Parameter	SILA	CLA	P value
Age (years)	28.65±7.703	27.60±7.891	0.214
BMI (kg/m2)	24.15±2.679	24.06±2.568	0.773
Pain scores (VAS)	3.09±1.477	4.08±1.382	<0.0001

Table 4: Stratification of pain scores according age, gender and BMI in both groups

Parameter	SILA	CLA	P value
Age (years)			
<30	3.07±1.481 (n=97)	4.06±1.488 (n=102)	<0.0001
>30	3.12±1.481 (n=73)	4.12±1.216 (n=88)	<0.0001
Gender			
Male	3.16±1.439 (n=94)	4.18±1.353 (n=89)	<0.0001
Female	3.01±1.527 (n=81)	3.98±1.414 (n=81)	<0.0001
BMI			
<25	3.15±1.504 (n=103)	3.97 ± 1.417 (n=111)	<0.0001
>25	3.01±1.441 (n=67)	4.29±1.301 (n=59)	<0.0001

Table 5: Stratification of SSI according to age, gender and BMI in both groups

Parameter	SILA	CLA	P value
Age (years)			
<30	08/89	12/90	0.409
>30	03/70	13/55	0.005
Gender			
Male	11/83	11/78	0.891
Female	0/76	14/67	<0.0001
BMI			
<25	06/97	19/92	0.010
>25	05/62	06/53	0.591

DISCUSSION

Acute appendicitis is one the most common surgical emergencies all over the world. The diagnosis is mainly clinical but the advanced radiological investigations have helped a lot to diagnose this condition.[7] Minimally invasive surgery has revolutionized over the time and now days the trend towards this technique in almost every aspect of surgery. The laparoscopic approach is becoming more popular due to less postoperative pain, short hospital stay and early recovery.[2] The open appendectomy is the main operation for majority of cases of acutely inflamed appendix. But now the laparoscopic approach is more

feasible.[7] The multiport to single port conversion of LA is becoming more popular due favorable outcomes.[4] The outcomes are still debatable and long term results are still awaited for SILA. The operative cost is always more in SILA due to price of multiport and increased operative time.[4,6] Moreover technically SILA is difficult and learning curves is longer.[8] To get the maximum advantage of SILA, the selection of patients is very important, as the complications and difficulties are strongly correlated with the obesity and peritonitis.[11,12]

A meta-analysis by Cai et al[13] showed that SILA is better than the CLA in terms of early recovery. The longer operative time and increased conversion rate goes against this technique. Another meta-analysis in the same year found that SILA is technically difficult so that is the main reason for more hospital costs and hospitalization.[14] As compared to both open and multiport appendectomy, the SILA is associated with decreased wound infection. Rests of the parameters are almost same in both SILA and CLA.[3] In the present study the wound infection was also significantly less in SILA (p value 0.014).

Frutos et al[5] showed in randomized controlled trial that SILA had less postoperative pain scores as compared to the CLA (2.76±1.64 and 3.78±1.76 for SILA and CLA respectively, p<0.001). In our study the pain score was significantly different among groups. The SILA was associated with reduced pain (3.09±1.477 versus 4.08±1.382 for SILA versus CLA groups respectively, p value <0.0001). A comparative study by Kye et al[15] showed in results that BMI in both SILA and CLA groups was not different (p value 0.930) and pain score on the VAS on first postoperative was significantly lower in the SILA group than in the CLA (3.22±1.22 versus 3.90±1.46, p value 012). In patients with perforated appendicitis, the SILA took approximately 10 minutes less than the three-port procedure (44.11±7.75 versus 54.14 ± 32.21 minutes, p value 0.449). They showed that SILA has reduced operative time in perforations. Many studies concluded that in acutely inflamed appendectomy, the SILA is good but it must be assessed or larger scale in critical situations like perforation, peritonitis etc.[16-18] Another study found that SILA had same operative time and complication rates.19 While many studies found that the operative time was always longer with the SILA.[8,14,20,21] Some studies even found that SILA is even more painful as compared to CLA.[20,22] Miyauchi et al[23] found that in children SILA is alternative to CLA as the complications rates are similar and postoperative pain scores are also same. But a meta-analysis by Zhang et al[24] showed that SILA is not good option for the pediatric cased of LA.

Hua et al[25] concluded in a meta-analysis that SILA is feasible and safe with no obvious advantages over CLA. Therefore, it may be considered as an alternative to CLA. The cosmetic appearance may be reason to choose the SILA as rest of the outcomes are similar.[26,27] A recent study concluded that There was no difference in operative time, early complications, postoperative pain, analgesia requirement between SILA and CLA, but after SILA procedure discharge was quicker and long-term cosmetic satisfaction was superior.[28]

The data in our study was stratified according to age, gender and BMI. The results showed that there was no impact of age, gender and BMI on mean pain scores (p value remained same i.e. <0.0001). For SSI, the results were significant only for age <30, female gender and BMI <0.25 (p values 0.005, <0.0001 and 0.010 respectively)

CONCLUSION

Single incision laparoscopic appendectomy causes less frequency of postoperative pain and incidence of surgical site infections as compared to conventional laparoscopic appendectomy in patients undergoing LA for acute appendicitis. Multicenter larger scale studies followed with meta-analysis would help to validate the results.

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