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THE OUTCOME OF SINGLE INCISION LAPAROSCOPIC (SILS) APPENDICECTOMY FOR MANAGEMENT OF ACUTE APPENDICITIS

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Abstract

Background: Acute appendicitis is most common emergency encountered round the globe. Open appendectomy is gold standard for treatment of acute appendicitis. However, with invent of laparoscopic surgery, effort is to minimize the tissue trauma. Single incision laparoscopic surgery (SILS) appendectomy is novel technique which is not universally practiced. This study evaluated outcome of SILS appendectomy.

Objective: The objective of this study is to determine the outcome of SILS appendectomy for treatment of acute appendicitis.

Methods: A Cross sectional comparative study was carried at surgical departments at sir Ganga ram Hospital Lahore for Six months from June 2006 to November 2006. Hundred patients with diagnosis of acute appendicitis were collected for this study. All the patients had SILS appendectomy. The patients were evaluated for the outcome parameters i.e. wound infection and hospital stay.

Results: The success was labeled as yes in 98 (98%) patients. The wound infection was seen in 2 (2%) patients, while 98 (98%) patients did not have wound infection. There were 95 (95%) patients in the study in whom two days of hospital stay was required, while in 5 (5%) patients, more than two days of hospital admission was needed. The mean duration of hospital stay was 2.16±0.29 days.

Conclusions: The success rate of SILS appendectomy is quite high with a very low rate of wound infection. The hospital stay is also acceptable (approximately 2 days). So, it appears to be a feasible technique.

Key Words: Acute Appendicitis, Single Incision Laparoscopic Surgery; Appendectomy; Wound Infection; Hospital Stay

BACKGROUND:

Acute appendicitis is one of the most common intra-abdominal infections seen in patients presenting with acute abdomen in the surgical departments (1). The reported lifetime prevalence is as high as one in seven (2). According to an estimate 6% of population will suffer from acute appendicitis during their lifetime (3). The peak age group is 12 to 30 years in both sexes but slightly more common in males (4). Acute appendicitis remains an up to date issue, being the most frequent cause of surgical acute abdomen round the globe (5). Appendectomy is one of the commonest procedures in surgery (6).

During the past two decades, general surgery has seen a major shift from open to minimally invasive surgery. This has been driven by the development of laparoscopic technology that enables surgeons to perform increasingly complex tasks through small incisions (7). Laparoscopic appendectomy (LA) was one of the first reported laparoscopic cases in general surgery by de Kok in 19771 (8). The increased adoption of LA is undoubtedly multifactorial and includes motivations of the surgeon, patient and medical device industry that go beyond the measurable outcome benefits. From the surgeons' perspective, laparoscopy offers greater flexibility for both diagnosis and intervention in the event of finding unexpected pathology when operating on suspected appendicitis (9, 10).

Single-incision laparoscopic surgery (SILS) is accomplished through a single 20 mm incision in the umbilicus, minimizing the scar and incisional pain associated with the multiple points of entry used during traditional laparoscopy (11). Single-incision laparoscopic surgery (SILS) developed with the aim of reducing the invasiveness of traditional laparoscopy, (12) and safe alternative to natural orifice transluminal endoscopic surgery, single incision laparoscopy is gaining popularity (13).

Currently many general surgical procedures have been successfully done through SILS, including appendectomy, cholecystectomy, sleeve gastrectomy, gastric banding, colectomy and adrenalectomy, ureterolithotomy, orchidectomy and orchidopexy, nephrectomy and live donor nephrectomy, have been performed, and it is not hard to image cystectomy and prostatectomy following same path (11, 14-17)

Advantages of laparoscopic surgery over open surgery are well established in terms of safety, reduced postoperative pain, shortened hospital stay, faster recuperation, and earlier return to normal function (11, 18, 19).

This is combined with improved cosmetic result, leading in many cases to improved patients satisfaction (15-20). The laparoscopic technique has been proven advantageous over the conventional open technique in terms of shorter hospital stay, lower complication rate, and better cosmoses, and SILS appendectomy is suggested to be even more advantageous to patients by eliminating the scars and potentially diminishing postoperative pain (21) Therefore, the technology presents improved feasibility, accessibility, and some situation this method could be especially beneficial, such as patients with concomitant umbilical hernia through which single port could be inserted, or in those that require widening of the incision (22).

A study by Rajat G, et al, (23) 30 patients with acute appendicitis had surgery with SILS. The procedure was successful (i-e the procedure was accomplished without conversion to open appendectomy) in 93.3% patients. Mean operative time was 80.4 minutes (range 31 to 136minutes). There was no mortality or major postoperative complication. The median hospital stay was 1.9 days (range 1 to 5 days). The mean visual analogue scale at the time of discharge was 2.2 (range 1 to 4). In another study by chandler NM, et al, (24) the infection rate after SILS appendectomy was 13.9%. Although, the study by Rajat G, et al, (23) and Chandlar NM, et al, (24) have shown encouraging results from SILS appendectomy. This technique is still evolving and is not recommended as gold standard for the treatment of acute appendicitis. This technique needs highly sophisticated equipments and expert surgeons so this procedure is being carried out in limited units. In Pakistan, study by Shaikh HR, et al, (25) have also shown a success rate of 100%. But this study was also done in a limited number of patients. Previously, studies are available in this regard but these are mostly with limited sample like Rajat G, et al, with 30 patients and Shaikh HR, et al with 42 patients.

The authors have also stressed on continuing work up to explore different aspects of this technique. So, I want to conduct this study in order to determine the outcome of the technique to get more reliable results.

METHODOLOGY:

A Descriptive case series was carried out at surgical departments at Sir Ganga Ram Hospital Lahore for Six months from June 2006 to November 2006.
A Seventy patients with clinical suspicion of acute appendicitis were selected by Non probability purposive sampling.

INCLUSION CRITERIA:

A 20-45 years of age male and female patients with acute appendicitis are included in this study

Exclusion criteria:

Patients with history of previous abdominal surgery, Children and elderly, Perforation appendix with signs and symptoms of peritonitis, Contraindication to GA, or laparoscopic surgery, Patients with appendicular mass (proven on ultra sound), Patients who will refuse from laparoscopic surgery, Coagulation disorder, Patients in whom compromised liver (billirubin > 2 mg / dl) and compromised renal function (creatinine > 1 mg / dl) were excluded
On hundred cases fulfilling inclusion criteria were registered through Emergency Department of General Surgery, Jinnah Hospital, Lahore. Demographic history [including age (in years)] and sex (male or female) was taken. Informed consent was taken. All the patients in this study received SILS appendectomy. The surgery was done by a fellow surgeon who have at least 5 years experience in the field of surgery. After the intervention is done, all the patients will be observed for the outcome parameters i.e. hospital stay (in days) and wound infection (yes/ no) (as per operational definition). All the information were collected on a specially designed proforma (attached). The data was collected on a specially designed proforma.
All the collected data was entered into SPSS version 10 and analyzed. The qualitative data like outcome parameters i.e. sex (male or female), success (yes or no), and wound infection (yes/ no) was presented as frequency distribution. Quantitative data like age (in years) and hospital stay (in days) will be presented as means and standard deviations.
Stratification with respect to age and gender was done. Post stratification chi-square test was applied. $P< 0.05$ was taken as significant.

Results:

One hundred patients with suspicion of acute appendicitis who fulfilling the inclusion criteria were selected from emergency department of surgery, Sir Ganga Ram Hospital, Lahore.

Distribution of patients by Age:

The mean age of patients was 26.40 ± 9.95 years. There were 37 (37%) patients of age range of 20-25 years, 23 (23%) patients of age range of 26-30 years, 20 (20%) patients of age range of 31-35 years, 15 (15%) patients of age range of 36 – 40 years and 5 (5%) patients of age range of 41-45 years. (Table 1)

Distribution of patients by Sex:

In the distribution of sex, there were 62 (62%) male patients and 38 (38%) female patients. The female to male ratio was 1:1.63. (Table 2).

Distribution of patients by Success:

The success was labeled as yes in 98 (98%) patients, while as no in 2 (2%) patients. (Figure 1)

Distribution of patients by Wound infection:
The wound infection was seen in 2 (2%) patients, while 98 (98%) patients did not have wound infection. (Figure 2)

Distribution of patients by hospital stay:
There were 95 (95%) patients in the study in whom two days of hospital stay was required, while in 5 (5%) patients, more than two days of hospital admission was needed. The mean duration of hospital stay was 2.16±0.29 days. (Table 3)

Age (Years)	No.	Percentage
20 -25	37	37
26 – 30	23	23
31 – 35	20	20
36 – 40	15	15
41 – 45	5	5
Mean±SD	26.40 ± 9.95	

Table 1: Distribution of patients by age (n=100)

Sex	No.	Percentage
Male	62	62
Female	38	38
Total	100	100

Table 2: Distribution of patients by sex (n=70)

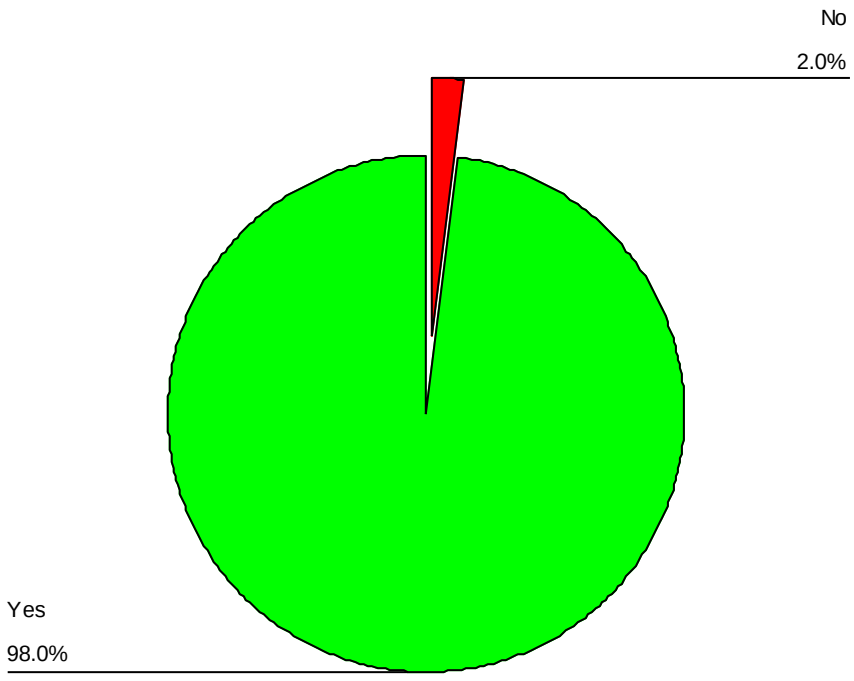

Figure 1: Distribution of patients by Success (n=70)

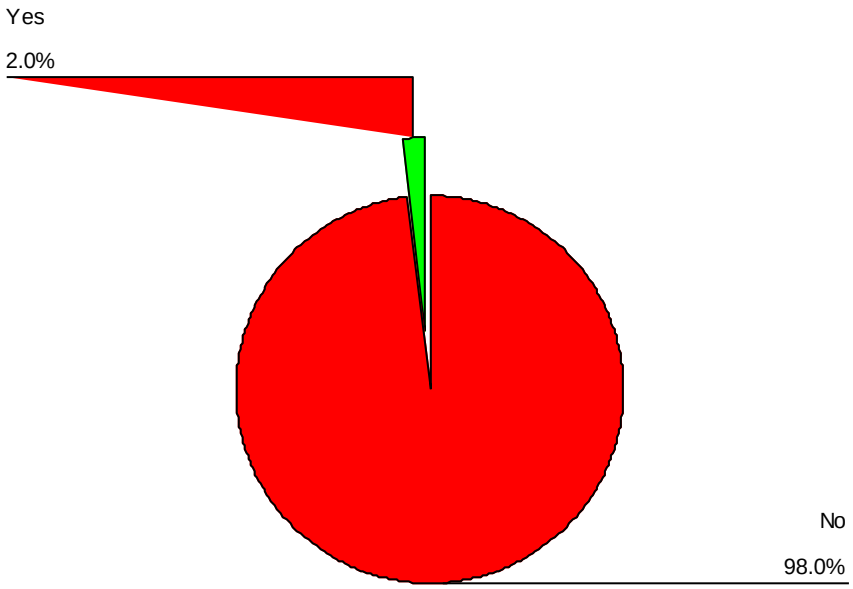

Figure 2: Distribution of patients by Wound infection (n=70)

Hospital stay	**No.**	**Percentage**
Two days	95	95
More than Two days	5	5
Mean ± SD	2.16±0.29	

Table 3: Distribution of patients by Hospital Stay (n=100)

DISCUSSION:

Appendectomy for suspected acute appendicitis is a common procedure. However, with the invent of minimal surgery procedure, there had been efforts of perform it with single incision laparoscopic surgery. This study was done to determine the outcome of single incision laparoscopic surgery. This study was done in a tertiary care unit of Pakistan, on a lager sample size of 100 patients. The results of this study favored the SILS appendectomy with a success rate of 98% and wound infection in only 2% patients.

In our study the mean age of the patients was 26.40 ± 9.95 years which is comparable to the study of Jehangir et al (26) in which mean age of patients was 20 years. In the study of Khan et al (27) the mean age of the patients was 24 years which is also comparable with our study.

In our study 62% of patients were male and 38% were females. As compared with the study of Stefanutti et al, (28) there were 55% males and 45% females which were comparable with our results.

In our study, the success rate was 98%. The success was defined as yes if the surgery was not converted to open. In other study by Vidal O, et al, (29) the success was described in 100% cases. They described that operation was completed successfully in all patients, and conversion to either multiport or open surgery was not required. However, they studied in 20 patients with acute appendicitis. Feinberg EJ, et al (28) performed a study among 25 patients with acute appendicitis. All the patients received surgery through single incision laparoscopy. The procedure was successfully completed in all cases so their success rate was also 100%. Shaikh HR, et al (25) in a local study described 100% success rate. They performed surgery in 25 cases and the procedure was successfully completed in all patients without needing to convert it into open or 3 port surgeries. As compared to the other studies, our success rate was little lower. The two conversions were done in the first 10 cases. This might be due to the reason that we were in learning phase and we could not complete the

dissection of the mesoappendix. Moreover, we did the study on a bigger population size. So, this rate is quite acceptable.

In our study, the frequency of wound infection was 2%. In study by Vidal O, et al, (29) no wound infection was observed over a period of 7 days. Similarly, Feinberg EJ, et al (28) and Shaikh HR, et al (25) did not describe any case of wound infection. However, they did study on a smaller sample size of 20 and 25 cases. In our study, only the two patients got wound infection. Both of them had suferficial infection which was settled with simple opening of skin stiches. The frequency of wound infection is quite acceptable in our study.

The mean duration of hospital study in our study was 2.16±0.29 days and 95% patients could be discharged within the next two days. In study by Kossi J, et al, (30) the mean postoperative stay was 2 days (range 1–5). In study by Vidal O, et al, (29) the mean length of hospital stay was 2 ± 0.5 days. So, the mean duration of the hospital stay was in the range of 2 days including our study. So, this mean duration is quite acceptable in patients with SILS appendectomy.

The study had certain limitations. This was a single center study, where all the surgeries were performed by two surgeons. The reproducibility of the techniques in hand of new and inexperienced surgeon is still questionable.

CONCLUSION:

The success rate of SILS appendectomy is quite high with a very low rate of wound infection. The hospital stay is also acceptable (approximately 2 days). So, it appears to be a feasible technique, however, the higher cost of the procedure as well as the learning curve associated with it may prove to be a hindrance in its widespread use. Further randomized trials, conducted on a large number of patients, are, therefore needed to ascertain the added benefits of this novel technique.

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