

Comparing the Incidence of Wound Infection in Periumbilical Incision with Intraumbilical Incision Technique in Laparoscopic Appendectomy

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ABSTRACT

Objectives: To compare the infection rate in periumbilical incision and intraumbilical incision in laparoscopic appendectomy patients.

Study Design: Randomized control trial study.

Place and Duration of Study: This study was conducted at the Department of Surgery, NMC/NH, Multan from January 2016 to January 2017.

Materials and Methods: A total of three hundred and ninety six patients enrolled in our trial and the patients were randomized in two equal groups (Group P and Group I). Data collected was entered in computer program SPSS version 23 and analyzed. Mean \pm standard deviation were calculated for numerical values like infection score. Categorical variables were presented as frequencies and percentages. Effect modifier like age and gender were controlled by stratification of data. Post stratification chi square test was applied. A p value ≤ 0.05 was considered statistically significant.

Results: Group P treated with periumbilical incision and Group I treated with intraumbilical incision. It was seen that in group P, 3.5% (n=7) patients were having wound infection while 96.5% (n=191) were not, and in group I, only 1.5% (n=3) were having wound infection while 98.5% (390) were not.

Conclusion: The ratio of complication in intraumbilical incision is less than periumbilical incisions. So the incision on intraumbilical region is easy and safe to replace the surgery of incision on periumbilical region with best cosmetic results.

Key Words: Periumbilical, Intraumbilical incision, Laparoscopy, Appendectomy.

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INTRODUCTION

Appendix is a pouch like structure protruding through the cecum situated at its posteromedial region. It is located 2.5 cm down the ileocecal valve. It develops from the midgut between the 5th and 8th weeks of pregnancy¹. Afterward it becomes fixed in the right lower quadrant of the abdomen cavity. It is a useless structure in humans at adult age but in childhood it has some role in immune function. An inflamed appendix is an emergency and should be treated as early as possible. Surgical treatment of appendix called appendectomy, laparoscopic appendectomy is a latest and globally accepted treatment of appendectomy in field of general surgery².

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Infection Rate In Periumbilical and Intraumbilical Incisions

For this procedure laparoscopic port can be inserted from vagina and rectum but insertion from these ports is unethical. Insertion from umbilicus is a natural safe³. Sometime a laparoscopic appendectomy needs to be converting on open appendectomy due to intraoperative complications⁴ so it is very important to choose a better method of incision. Minor incision on the upper or lower border of umbilicus (peri umbilical incision) is a useful method for insertion of laparoscopic port into the abdominal cavity. It is a U-shaped incision at the skin through subcutaneous fat and facia below or above the umbilicus. Incision on intraumbilical region is a vertical cut extending to the length of the umbilicus, can also be used. Only fat and facia needs to be divide in the intraumbilical incision which is less time consuming and easy to perform. Intraumbilical incision technique leads to better cosmetic results in laparoscopic surgery.^{5,6}

Umbilicus is situated a little deeper than its surrounding areas leading to inhabitation of more bacteria compared to its surrounding. More than 1400 types of bacteria from 95 umbilical bacterial cultures were found in a recent study. Till now, there is no study on the comparison of complication rate of periumbilical and

intraumbilical incision. Some experts hypothesize that with proper sterilization there is no significant difference in the complication of intraumbilical and umbilical incision. Some studies are tying infection rates to the methods used for ligation of appendix at the end of laparoscopic surgery. A loop (using thread), absorbable clip, and an endoscopic stapler are commonly used methods for the purpose of ligation of appendix.

Endoscopic stapler is considered to lower the risk of intra-abdominal surgical-site infection by some surgeons⁷, its use and this concept varies from country to country and from surgeon to surgeon⁸. In a trial conducted by Jun SL et al⁹ find no difference in duration of hospital stay, analgesic demand and operation time of both groups of intraumbilical and periumbilical incision. Wound infection rate of 0.6% (one case) in intraumbilical and 2.5% (3 cases) in periumbilical group was found in that study. This study aims at comparing the infection rate in periumbilical incision and intraumbilical incision in laparoscopic appendectomy for the sake of adopting a better method of incision with less infection rates.

MATERIALS AND METHODS

This randomized control trial was conducted Department of Surgery, NMC/NH, Multan during period of January 2016 to January 2017. A total of three hundred and ninety six patients enrolled in the study and the patients were randomized into two equal groups (Group P and Group I). Group A was having data of those patients who were operated with periumbilical incision method and Group B was having data that were operated with intraumbilical incision method. Informed consent was taken for procedure and confidentiality. Contact numbers of patients and address of home were taken for proper follow up. Risks and benefits of treatment were discussed with patients/parents or their guardians. Study was conducted after approval from ethical committee of the institution. All patients were operated by single consultant surgeon with post fellowship experience of 4 years and with same technique. Follow up was done by an independent fellow who is kept blind about the study to minimize bias till 7 days. Wound Infection was considered present if collective score of following was 3 or more according to hospital data on post operative follow up till seven weeks. (1): Localize Erythema = score 1, (2): Edema= score 1, (3): Subjective pain = score 1, (4): Purulent Discharge = score 1. Patients with acute appendicitis (diagnosed on the basis of USG abdomen), both gender and patients > 16 years were included. Patients who were convert to open appendectomy due to intra operative complications, which was show clinical evidence of septicemia, respiratory failure, congestive heart failure and patient who were known diabetic who were taking steroid for some other

illnesses, or immune suppressor drugs were excluded. Data collected was entered in computer program SPSS version 23 and analyzed. Mean \pm standard deviation were calculated for numerical values like infection score. Categorical variables were presented as frequencies and percentages. Effect modifier like age and gender were controlled by stratification of data. Post stratification chi square test was applied. A p value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 396 patients were included in this study (both genders). Gender distribution of the patient sowed that there were more males i.e. 64.1% (n=254) while the females were 35.9% (n=142). The mean age of the patients was 32.89 ± 11.09 . The mean score of the patients was 0.14 and S.D 0.642. When patients were grouped into different age categories it was seen that almost half of the patients 50.5% (n=200) were of age 31-60 years and about half of the patients 49.5% (n=196) were of age 16 to 30 years of age.

These 396 (100%) patients were divided into two equal groups, 198 of each. Group P treated with periumbilical incision and Group I treated with intraumbilical incision. It was seen that in group P, 3.5% (n=7) patients were having wound infection while 96.5% (n=191) were not. And in group I, only 1.5% (n=3) were having wound infection while 98.5% (390) were not. So group I had better performance than group P. The mean age of the patients in group P was 23.53 ± 4.15 years and 42.25 ± 7.30 years in group I. while the mean score of the patients in group P was 0.12 ± 0.592 and 0.03 ± 0.301 in group I. Gender distribution of the patients in groups showed that in group P, there were more males i.e. 64.1% (n=127) while the females were 35.9% (n=71) and in group I, there were the same results as the group P i.e. 64.1% (n=127) were males and 35.9% (n=71) were females.

Table No.1: Demographic Variables

Characteristics	Group P	Group I
Age	23.53 ± 4.15	42.25 ± 7.30
Female	71 (35.9%)	71 (35.9%)
Male	127 (64.1%)	127 (64.1%)
Wound Infection		
Yes	7 (3.5%)	3 (1.5%)
No	191 (96.5%)	195 (98.5%)

Table No.2: Inferential variables

Gender	Wound infection		P Value
	No	Yes	
Female	142	0	0.017
Male	244	10	
Total	386	10	

When chi-square was applied to see the effect modification it was observed that gender was associated with wound infection and in our study, it was very

interesting to note that stratified age was not associated with wound infection.

Table No.3: Inferential variables

Age Groups	Wound infection		P Value
	No	Yes	
16-30 Years	189	7	
31-60 years	197	3	
Total	386	10	0.189

DISCUSSION

Peoples are working continuously for betterment in cure and cosmetic outcomes to meet the everlasting craving of society for beauty when appendectomy with the help of laparoscopy has been started in the early 1980. A method of SILS done through an incision in intraumbilical region was reported by Chow et al.¹⁰ without any scar on the skin at the end of surgery. Vidal et al.¹¹ also reported a kind of SILS performed with a Suprapubic approach which resulted in remarkable cosmetic results because of the incision in pubic region. The periumbilical incision is still widely used in spite of these options.

In our study, I group (intraumbilical) and the P group (periumbilical) shows no makeable difference in the wound complication rate but to our surprise I group have a reduced rate of wound infection compared to P group. In support of our hypothesis that inner portion of umbilicus is also germ free like outer portion preparation for surgery. Cultural swab have been taken from the inner side and outer side of the umbilical ring from 10 patients, after sterilization of both areas. It is found that after the seven day period cultural growth was not found on samples of both areas. In addition to infection of the wound in infraumbilical group one patient and in periumbilical group five patients were having minimum wound problems, at eight days after discharge, the patient in I group visited the outpatient clinic with minimum granuloma at the site of intraumbilical incision. This type of wound with minimum granuloma was healed with dressing only. In periumbilical group three out of five patients were having small amount of discharge from wound, only one having bulla and one patient presented with wound dehiscence treated with sutures under regional/local anesthesia. These patients were healed within two weeks.

A study done at Lee et al.¹² conducted a study on comparison of SILA with incision in intraumbilical region with appendectomy with open wound and found that instead of more complicated cases in laparoscopic surgery group infection incidence was less in group of single incision than open surgery. Main reason of these results is that in incision on intraumbilical region does not breach subcutaneous, this provide a very small prone space for sarcoma or hematoma development and

reducing the chances of wound infection as hematoma and sarcoma acts as an excellent growth medium for bacterial growth.

Appendectomy with laparoscopy is an easy procedure to perform so every general surgeon should be trained for this technique before other kind of surgery¹³. For patients satisfaction it is necessary to perform this procedure by a well trained surgeon to make the operation less event full and results should be better and satisfactory. Now in these days 30-40% of people consider their umbilicus is an important for better image of their body.^{14, 15}. In this survey it is also reported that 45% of male have this belief that appearance of umbilicus is a major concern for their partner attraction. These results show the importance of the cosmetic value of the umbilicus. In major surgeries like surgery of cancer cells and laparotomy it is not necessary to consider these cosmetic problems but in minor operations like appendectomy patients cosmetic appearance must be primary concern of surgeon. Surgeries with incision on periumbilical region must leave a scar around the umbilicus but in intraumbilical surgeries whole incision done within umbilicus so no visible scar seen on the outer side. Umbilicus also has many creases and folds so incision made within any fold never be visible. In addition surgery with incision on intraumbilical region is easy and takes a very small time. Only one suture on full layer is sufficient for closure of the wound. A single full layer suture is sufficient for closure in most patients. In comparison, the periumbilical incision is more cumbersome. Closure has to be done on all layers like subcutaneous tissues and fascias were closed separately. Periumbilical incision is difficult to perform in obese while intraumbilical incision offer no such difficulty^{16, 17}.

Although the study was somewhat limited as it was retrospective and other factors causing wound infection were not considered but the issue of choice of point for access of laparoscope is not only a problem for appendectomy¹⁸. Almost every intra abdominal laparoscopic surgery may benefit from intraumbilical incision. Laparoscopic surgery is an easy and safe alternative of open surgery not only for minor but also for major surgeries now in these days.^{19, 20}.

CONCLUSION

The ratio of complication in intraumbilical incision is less than periumbilical incisions. So the incision on intraumbilical region is easy and safe to replace the surgery of incision on periumbilical region with best cosmetic results.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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