

COMPARATIVE TRIAL OF PERIUMBILICAL INCISION VERSUS INTRAUMBILICAL INCISION IN EMERGENCY LAPAROSCOPIC APPENDECTOMY IN A HIGH VOLUME LAPAROSCOPIC SURGERY CENTRE

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Abstract

Background and Objective: An appendectomy is the surgical removal of the vermiform appendix. Laparoscopic Appendectomy is increasingly performed these days. Direct studies on comparison of complication rates of periumbilical and intraumbilical incision are lacking. The objective was to compare the frequency of infective complications of two different types of laparoscopic appendectomy incisions i.e. periumbilical incision versus intraumbilical.

Methods: This retrospective study was carried out at Department of Surgery, Our Lady of Lourdes Hospital, Drogheda, Ireland for 6 months (From 27.05.2015 to 26.11.2015). Medical records of 1044 patients who had Laparoscopic Appendectomy from 2010 to 2014 were analyzed. Their Preoperative, intraoperative, Postoperative and clinical notes were reviewed. This included patients who underwent laparoscopic appendectomy with periumbilical incision technique and those who were operated with intraumbilical incision technique. All the data were analyzed using computer software SPSS version 21.

Results: The mean age of the patients was 40.38±11.76 years. Ratio of Male to female was 1.6:1. The erythema was observed in 31.42% patients, edema was present in 242(23.2%), pain was present in 278(26.6%) and the purulent discharge was noted in 294(28.2%) patients. Overall wound infection was found in 16.86% patients. In intra umbilical group wound infection was found in 7.28% of patients while this rate was 26.44% in peri umbilical group. Statistically significant difference was found between the study groups i.e. p-value<0.001.

Conclusion: Intraumbilical incision is a safer and feasible substitute for the periumbilical incision, and it promises better outcomes.

KEYWORDS: Intraumbilical, Periumbilical, Incision, Laparoscopy, Infection, Appendectomy, Appendicitis, Open surgery.

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Appendix is an out pouching of the caecum, located at its posteromedial region. Embryologically appendix develops from midgut.¹ It has some contribution in immune function especially in young age. Sometimes appendix becomes inflamed and must be treated as early as possible. Appendectomy is an operative treatment of appendicitis. Now a days laparoscopic surgery is accepted as a treatment technique worldwide and got fame in field of general surgery.²

Initial trocar placement and creation of pneumoperitonium are two important steps of laparoscopic surgery. There are many ways of insertion of port into

the body such as through the stomach, vagina and rectum but these approaches are not commonly used. Umbilicus is a naturally suitable orifice for some laparoscopic procedures.³ Sometimes a laparoscopic procedure may need to be converted to an open one due to intraoperative complications.⁴

Considering all these factors choice of a better technique of incision is important. A peri umbilical incision that can be made just above or below umbilicus is a simple method for introduction of an optical port into the abdomen. On the other hand an intraumbilical incision is also a good method that is made by giving a vertical incision running through the length of umbilicus. Intraumbilical incision is quick and straightforward to perform. Intraumbilical incision technique also provides superior cosmetic results in laparoscopy.^{5,6}

Umbilicus has more bacteria than its surrounding areas because it is deeper and difficult to clean which can raise concern while giving intraumbilical incision. Some authors hypothesized that if umbilicus and its surrounding areas are properly prepared then there is no significant difference in both methods. Some studies found that at the end of laparoscopic appendectomy methods of appendix ligation also have infection concerns. The commonly used methods to ligate the appendix are a loop (using thread), absorbable clip, and an endoscopic stapler. While endoscopic stapler is considered to lower the risk of intra-abdominal surgical-site infection by some,⁷ it varies country to country.⁸

Jun SL et al.⁹ conducted a study on a comparison of the peri and the intra umbilical incision in laparoscopic appendectomy and concluded that there was no difference in operation time, hospital stay and analgesic requirement between the two groups.

Aim of this study was to compare the frequency of infection in these two techniques that can help in adopting a superior technique of making an incision with less infection rates. The objective was to compare the frequency of infection in periumbilical incision versus intraumbilical incision in laparoscopic appendectomy.

METHODS

This was a retrospective study conducted at the Department of surgery, Our Lady of Lourdes Hospital, Drogheda, Ireland from 27.05.2015 to 26.11.2015. This study comprised of male and female patients between 16 to 60 years of age included by Non probability consecutive sampling technique. This involved 1044 Patients (522 in each group) who had Laparoscopic Appendectomy. Patients who were converted to open appendectomy, who developed septicemia, respiratory failure or heart failure, who were diabetic, who were taking immunosuppressive drugs like steroids for some other illnesses were excluded from the study.

Hospital records of 1044 patients who underwent Laparoscopic Appendectomy from 2010 to 2014 were analyzed. Their Pre-operative, Intraoperative, Post-operative and follow up clinical notes were reviewed. All these Patients received standard pre-operative antibiotic prophylaxis according to the hospital guidelines i.e. second generation cephalosporin + metronidazole. These Patients were divided into two groups, those who were operated with periumbilical incision technique and those who were operated with intraumbilical incision technique. Data about wound infection was collected. Infection was regarded to be present if collective score of following was 3 or more according to follow up hospital data till seven weeks.

- I. Localize Erythema=score 1 (presence of redness on clinical examination)
- ii. Edema = score 1 (Presence of swelling on clinical examination)
- iii. Subjective pain= score 1 (complaint by the patient)
- iv. Purulent Discharge = score 1 (pus discharge from incisional site)

Computer software SPSS version 21 was used to enter and analyze all data. Mean and standard deviations were calculated for quantitative variables like age and hospital stay, BMI. Frequency and percentage were calculated for qualitative variables like gender and wound infection. Chi square test was applied to check the hypothesis. Effect modifier like age, gender and BMI was controlled by stratification of data. A p value of 0.05 was considered statistically significant.

RESULTS

The mean age of the intraumbilical patients was 39.83 ± 10.99 years whereas it was 40.93 ± 12.47 years for the periumbilical patients. In intraumbilical group, there were 323 males and 199 females while in periumbilical group, there were 327 males and 195 females. The intraumbilical group had mean height of 1.69 ± 0.11 meters and in periumbilical group it was 1.70 ± 0.11 meters. The mean weight in intraumbilical group was 66.43 ± 10.56 kg and in periumbilical was 67.70 ± 11.54 kg. The mean BMI in intraumbilical group was 23.11 ± 3.28 kg/m² and in periumbilical group was 23.38 ± 3.38 kg/m². Table-I

In intraumbilical group, erythema was observed in 37 patients while in periumbilical group, erythema was observed in 291 patients. Edema was observed in 34 cases of intraumbilical group and 208 cases of periumbilical group. Pain was noted in 34 cases of intra-

Table 1: Baseline characteristics of patients

	Incision	
	Intra umbilical	Peri umbilical
n	522	522
Age	39.83 ± 10.99	40.93 ± 12.47
Sex (m/f)	323/199	327/195
Height (m)	1.69 ± 0.11	1.70 ± 0.11
Weight (Kg)	66.43 ± 10.56	67.70 ± 11.54
BMI (Kg/m²)	23.14 ± 3.28	23.38 ± 3.38

umbilical group and 244 cases of periumbilical. Purulent discharge was observed in 35 cases of intraumbilical group and 259 cases from periumbilical group. The difference was significant and intraumbilical group showed less complications as compared to periumbilical ($p < 0.05$). The mean total score of intraumbilical group was 0.26 ± 0.83 and in periumbilical group it was 1.91 ± 1.16 . Independent t-test was used as test of significance. In intraumbilical group, wound infection was noted in 38 patients while in periumbilical, wound infection was observed in 138 patients. The mean hospital stay in intraumbilical group was 2.62 ± 0.69 days and in periumbilical group it was 4.20 ± 1.03 days. The difference was significant ($p < 0.05$) for all complications and periumbilical Patients had significantly prolonged hospital stay ($p < 0.05$). Table-II

Table 2: Postoperative complications.

	Incision		p-value
	Intra umbilical	Peri umbilical	
N	522	522	
Erythema	37	291	0.000
Edema	34	208	0.000
Pain	34	244	0.000
Purulent discharge	35	259	0.000
Total score	0.26 ± 0.83	1.91 ± 1.16	0.000
Wound infection	38	138	0.000
Hospital stay (days)	2.62 ± 0.69	4.20 ± 1.03	0.000

DISCUSSION

Minimally invasive surgery is gaining more and more popularity every day. Laparoscopy is becoming a standard for a variety of procedures from simple like appendectomy to more complex ones like cancer surgeries. In laparoscopic appendectomy efforts have been made for better cosmetic results.^{2,10-15} although a variety of single incision laparoscopic surgical (SILS) techniques are now available, conventional multiport techniques are still most commonly used. Among these the periumbilical incision is used quiet frequently because of the concerns of increased wound infection by using intraumbilical incision. Our study addresses these concerns and provides evidence about the better incision technique.

In our study the erythema was observed in 31.42% patients, edema was present in 242(23.2%), pain was present in 278(26.6%) and the purulent discharge was noted in 294(28.2%) patients. Wound infection was found in 176 (16.86%) patients in which 38 were from intraumbilical and 138 were from periumbilical. The wound infection was not found in 868 cases in which 484 were from intraumbilical and 384 were from periumbilical. Statistically highly significant difference was found between the study groups and wound infection of the patients. i.e. p-value=0.000. We have talked about few studies in support and against the results of our study.

One study by Ibrahim Akkoyun¹⁶ evaluated the results of single incision laparoscopic surgery (SILS) by Un-conventional periumbilical incision in place of conventional umbilical incision. Authors did not

find any complications like wound infection, hernia, adhesive intestinal obstruction, or abscess in unconventional periumbilical incision. Good cosmetic results were achieved after the periumbilical incision technique. On contrary one study by JS Lee et al⁹ did not find any difference in operation time, analgesic requirements, and postoperative hospital stay between the two groups. In this study 0.6% patients in intraumbilical group and 2.5% patients in the periumbilical group had wound infections. There is no difference of wound complication rates between intraumbilical and periumbilical incisions.

A study by WEI Yang-hui et al¹⁷ concluded in their study that the wound complication rate of intraumbilical and peri-umbilical incisions are not significantly different. The difference was statistically significant between two groups on wound satisfaction score (P<0.05). One case in the intraumbilical group (1%) and 3 cases in the periumbilical group (3%) developed wound infections, but without wound hernia or hematoma formation. In some studies there were few reports of umbilical granuloma in patients who underwent intraumbilical approach.^{18,19}

Ates et al.²⁰ in 2007, described SILS technique for appendectomy. There is increased use of intraumbilical incision technique, with the increasing cases of single incision laparoscopic surgery. This technique is proven to be a possible substitute for conventional laparoscopic surgery with superior cosmetic results.^{5,6,21-25}

Some studies claim that Laparoscopy is safe and feasible substitute for open surgery in advanced surgical cases like cancer surgery. Benefits of intraumbilical incision can be expanded to such advanced and complex surgeries.²⁶⁻³⁰

CONCLUSION

Intraumbilical incision is a safer and feasible alternative for the periumbilical incision, and it is simpler to perform, with better results.

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