Original Article

Contaminated Abdominal Wound

Comparative Study Between Primary Closure and Delayed Primary Closure in Potentially Contaminated Abdominal Wound in Paediatrics Age Group

Mohyuddin Kakar[1], Yaqoot Jahan[2] and Farhat Mirza[3]

ABSTRACT

Objective: The purpose of our comparative study is whether the delayed primary skin closure of contaminated and dirty abdominal incision reduces the rate of surgical site infection, and the rate of morbidity as compared with the primary skin closure.

Study Design: Experimental / Randomized study

Place and Duration of Study: This study was carried out at National Institute of Child Health Karachi from February 2007 to July 2007.

Materials and Methods: A total of 60 patients of pediatric age group were included .They have randomized to have their surgical incision (skin and subcutaneous tissue) either primarily closed or left opened with the pyodine soaked gauze packing and loose stitches applied for delayed primary closure which were tied on 4th post of day of wound closure. A wound was considered infected if pus discharged from the incision site .The main out come measured were the incidence of wound infection and the length of hospital stay.

Results: This study revealed that the incidence of wound infection was considerably high in those contaminated wound where primary closure was done in 46.67% 18 out of 60 patients, hence increased morbidity with prolonged hospital stay while in delayed primary closure wound infection was 33.33% 10 out of 60 patients.

Conclusion: This study revealed that method of delayed primary closure without skin stitches is better than the primary wound closure technique in contaminated abdominal wounds.

Key Words: Wound, Delayed primary closure, Primary closure, Laparotomies.

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INTRODUCTION

It precisely refers to a sharp damage which injuries the skin dermis.[1] All surgical wounds are contaminated by microbes, but in most cases, infection does not develop because innate host defenses are quite efficient in the elimination of contaminants. A complex interplay between host, microbial, and surgical factors ultimately determines the prevention or establishment of a wound infection) Each surgical wound is adulterated by microorganisms, but infection does not appeared in most cases because of effective innate host defenses in the contaminants abolition. A intricate interaction between host, microbial, and surgical factors eventually fixes the inhibition or formation of a wound infection.[2]

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Primary wound closure is defined as the when wound edges are brought together (sutured/glued) for approximation where as the secondary wound healing is defined as. "The wound is permissible to granulate, may packed with gauze or with a drainage system." In this type granulation results in a bigger scar and healing process can be slow due to presence of drainage from infection. In this type of healing wound care needed on daily basis to reassure wound debris removal and allow for granulation tissue formation.[3]

The potential for infection depends on a number of patient variables such as the state of hydration, nutrition and existing medical conditions as well as extrinsic factors, for example related to pre-, intra-, and post-operative care if the patient has undergone surgery. This often makes prediction difficult about wound which one will become infected.[4] The most current systematic review and meta-analysis compares the usefulness of DPC by comprising only randomised controlled trials (RCTs) found that DPC has no advantage over primary closure (PC) in complicated appendicitis.[5] Since then, more studies have been reported in which some establish benefits of DPC[6] while some studies did not.[7,8] We therefore updated a systematic review and meta-analysis of RCTs which

aimed at comparing surgical site infection between DPC and PC in complicated appendicitis underwent open appendectomy and other contaminated abdominal wound.

MATERIALS AND METHODS

This study was conducted in the department of pediatric surgery National Institute of Child Health Karachi from February 2007 to July 2007. Study design was Experimental / Randomized study. it was carried out in the patients of below 13 year of age, divided in two groups 30 each, on alternate basis (non-consecutive) .there were 19 males and 11 female in group A and 20 males and 10 females in group B. Exclusion criteria was patients with clean, elective surgery or with chronic disease e.g. diabetes mellitus, jaundice, uremia. The patients lost follow up or died during follow up are excluded. The antibiotics used were intravenous injections of augmentin, flagyl and ceftazidim, cefotaxime and cefotriaxone. The data was entered and analyzed into SPSS version 10.0 .frequency and percentages were computed for categorical variables like age group, sex, causes of laparotomy, and outcome (wound infection, wound dehiscene, incisional hernia and ugly scar) for groups A and B. The proforma was design to note down all the findings like personal information of patients, examination findings, per op, out come and follow ups. In group A, primary closure was done that is musculo peritoneal and facial layer was closed with vicryl and skin stitches with interrupted sutures. The wound was examined 48 hours post operatively followed by dressing. The stitches were removed at the 8th post operative day. Patient was kept in follow-up initially for 1 week after discharge then 1 month after discharge and after every 3 months of discharge. In group B after the closure of musculo peritoneal layer, fascia tied with loose stitches with the sterile saline soaked gauze piece. The wound was dressed daily for 4 to 5 days followed by tightening the sutures. The stitches removed after 12 post operative day. After tightening sutures on delayed primary closure if infection was again noticed, the sutures were removed on that day, pus sent for the culture and sensitivity and the antibiotics changed according to sensitivity. Hydrotherapy until the wound becomes clean and then secondary stitches were applied and were removed when heeled completely. Patients in this group also followed after 1 week one month and finally 3 months after discharge. Same antibiotic used in Group A Patients also given to this group of patients. Both groups have 30 patients each with 13(43.33%) cases of perforated appendix.6(20%) cases of abdominal trauma.5(16.66%) typhoid perforation and 6(20%) included intestinal obstruction, worms infection, gut atresia, Hirschprungs disease, ruptured liver abscess and primary peritonitis.

RESULTS

A total of 60 patients under going laprotomy included in this study patients were divided in two groups ,30 patients under went primary skin closure (group A) and 30 patients under went delayed primary closure (group B). The median age of the patients were 9 years (ranging from 2 days to 13 years), majority of the patients were between 6 to 13 years of age in both groups. Out of 60 patients 39 (65%) were males and 21 (35%) females with male to female ratio 1.9:1 proportion of difference of gender was not statistically significant (chi square =0.07, P value =0.78).About 13 patients under went appendectomy and about 8 appendectomy wounds get infected with greenish yellow pus, pain redness at the wound and fever, which was usually of high grade the hospital stay of the patient increased from about 2 days to 8 days as pus used to drained daily send for culture and sensitivity daily dressings then drugs started according to the sensitivity and the drugs which were not available in the hospital had to be purchased by the patient himself which was the huge load on patients attendants pocket because the patients were usually of underprivileged background. and only 4 cases got infected which closed by secondary intention.

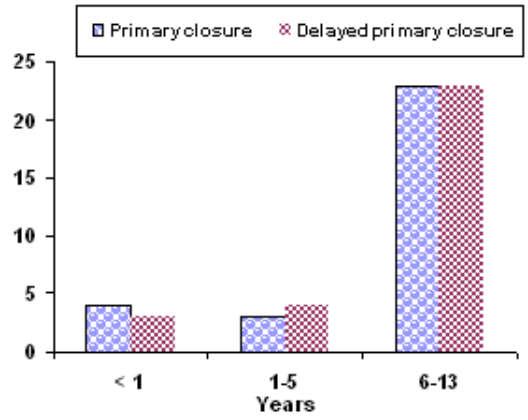

Fig.1: Age distribution of patients in both groups

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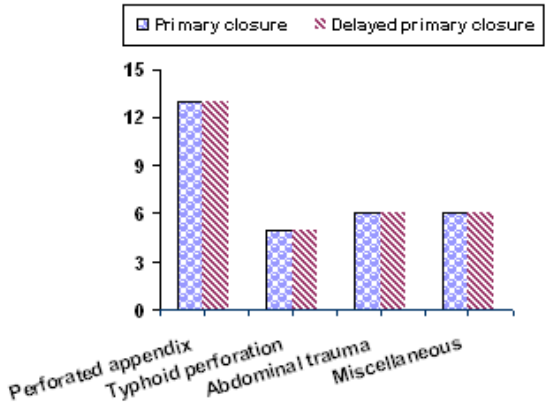

Figure No.2: Type of cases selected for both groups

The results regarding the typhoid perforation patients was that among 5 patients about 4 which close by primary intention developed infection, wound dehescience, incisional hernia, ugly scar where as these problems did not created in secondary wound closure technique. The total rate of wound infection in group A was 18 patients that is 60% where as total rate of infection in group B was 10 patients that is 33.33%. Four patients in group A develops wound dehiscence where as in group B no wound dehiscence occurred (Figs.1-3, Tables 1-3).

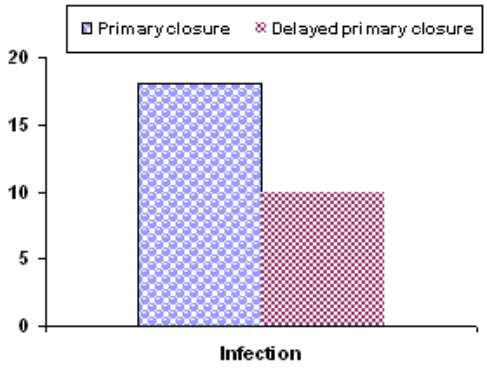

Figure No.3: Rate of infection in both groups

Table No.1: Outcome according to groups for perforated appendix

Outcome	Primary closure (n=13)	Delayed primary closure (n=13)
Wound infection	8	4
Wound dehiscence	0	0
Incisional hernia	0	0
Ugly scar	0	0

Table No.2: Outcome according to groups for typhoid perforation

Outcome	Primary closure (n=5)	Delayed primary closure (n=5)
Wound infection	4	1
Wound dehiscence	2	0
Incisional hernia	2	0
Ugly scar	2	0

Table No.3: Outcome according to groups for abdominal trauma

Outcome	Primary closure	Delayed primary closure
Wound infection	3	2
Wound dehiscence	0	0
Incisional hernia	0	0
Ugly scar	0	0

DISCUSSION

Among the hospital acquired infection Surgical site infection (SSI) is one of the most common type, caused by wound contamination by exogenous or endogenous bacterial introduction during surgical procedures. Once it occurred, would cause a patient pain, cost of treatments, prolonged hospital stay, and loss of function.[7] There are different studies been carried out to decide whether which type of wound closure will be beneficial for closure of contaminated wound. A study carried out at Ayub teaching hospital in 2012 shows that Delayed primary closure is the optimal management strategy in case of perforated appendicitis as it decreases the incidence of wound infection this study has been carried out in adults.[6] There are number of studies been carried out regarding that topic most of them deal with only perforated appendix and address to adult age group but none of them consider the paediatric age group patients and other different abdominal cases. It is still a matter of debate whether delayed primary closure (DPC) of contaminated abdominal incisions reduces surgical site infections compared with a primary closure.[8] So that we can say that this study is distinctive in sense that this covers only the paediatrics age group and different kinds of operations been considered here as compared to other studies which discussed appendicitis mostly. There is another study conducted in India in 2009 which also showed delayed primary closure is a sound incision management technique in 81 patients with dirty abdominal incisions. It significantly lowers the rate of superficial SSI as well as fascial dehiscence and reduces the mean CIH time and hospitalization. This study includes the adults mostly.[9] Another study carried out in Pakistan 2011 in the adult patients also displayed that. There frequency of Surgical Site Infection was significantly lower after delayed primary closure of contaminated wounds as compared to primary closure.[10] Study carried out in India during 2013 in about 60 patients in whom a different procedure of linear sub dermal wound closure was carried out its proved to be a better choice as compared to the primary wound closure.[11-13]

CONCLUSION

Delayed primary closure for contaminated abdominal wound result in decreased wound infection .There is increased incidence of wound infection in primary closure for contaminated wound the local signs that were noted after development of wound infection, presence of pus usually yellowish green in colour along with fever, anorexia, vomiting, pain. There is less chance of wound dehiscence and bad scar formation of contaminated wounds which closed by delayed primary closure, there is less morbidity, short hospital stay of about a week as compared to15 to 20 days in the contaminated wound that closed by primary intention hence resulting in less financial burden to the parents as patients came in the hospital are usually belong to poor socioeconomic groups earning on daily wedges.

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

REFERENCES

1. Wound(n.d) retrieved February 01-2015, from en.wikipedia.org/wiki/wound.
2. Wound infection (n.d) retrieved February 05-2015 from emedicine.medscape.com/article/188988-overview.
3. Wound healing (n.d) retrieved February 8-2015, from http://en.wikipedia.org/wiki/Wound_healing.
4. Henry MCW, Moss RL. Primary versus delayed wound closure in complicated appendicitis: An international systematic review and meta-analysis. Pediatr Surg Int 2005;21:625–30.
5. Chiang RA, Chen SL, Tsai YC. Delayed primary closure versus primary closure for wound management in perforated appendicitis: A prospective randomized controlled trial. J Chin Med Assoc 2012;75:156–9.
6. Lahat G, Tulchinsky H, Goldman G, Klauzner JM, Rabau M. Wound infection after ileostomy closure: a prospective randomized study comparing primary vs. delayed primary closure techniques. Tech Coloproctol 2005;9:206–8.
7. Khan KI, Mahmood S, Akmal M, Waqas A. Comparison of rate of surgical wound infection, length of hospital stay and patient convenience in complicated appendicitis between primary closure and delayed primary closure. J Pak Med Assoc 2012;62:596-8.
8. Cohn SM, Giannotti G, Ong AW, Varela JE, Shatz DV, McKenney MG, et al. Prospective randomized trial of two wound management strategies for dirty abdominal wounds. Ann Surg 2001;233(3):409-13.
9. Ahmad M, Ali K, Latif H, Said K. Comparison of primary wound closure with delayed primary closure in perforated appendicitis. J Ayub Med Coll Abbottabad 2014;26(2):153-7.
10. Siribumrungwong B, Noorit P, Wilasrusmee C, Thakkinstian A. A systematic review and meta-analysis of randomized controlled trials of delayed primary wound closure in contaminated abdominal wounds 2014, World J Emerg Surg 2014; 9: 49.
11. Cheng Y, Zhou S, Zhou R, Lu J, Wu S, Xiong X, et al. Abdominal drainage to prevent intra-peritoneal abscess after open appendectomy for complicated appendicitis. Cochrane Database Syst Rev 2015;2:CD010168.
12. Duttaroy DD, Jitendra J, Duttaroy B, Bansal U, Dhameja P, Patel G, Modi N. Management strategy for dirty abdominal incisions: primary or delayed primary closure? A randomized trial. Surg Infect (Larchmt) 2009;10(2):129-36.
13. Jorge JM, Wexner SD, Morgado PJ Jr, James K, Nogueras JJ, Jagelman DG. Optimization of sphincter function after the ileoanal reservoir procedure. A prospective, randomized trial. Dis Colon Rectum 1994;37(5):419-23.