ORIGINAL ARTICLE

Comparison of two Suturing Techniques: Interrupted Mass Closure and Continuous Mass Closure with Polypropylene in Laparotomy Wound

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ABSTRACT

Introduction: Wound dehiscence is an acute wound failure. It commonly presents about one week after surgery and may be preceded by a serosanguinuous discharge. Wound dehiscence is an important cause of postoperative morbidity and mortality.
Objective: To compare the early postoperative complications of closure of laparotomy wound by interrupted mass closure and continuous mass closure techniques.
Subjects and Methods: Sixty patients were included in this study and divided in two groups; group A and group B. Closure of laparotomy wound with monofilament polypropylene No.1 suture by interrupted mass closure technique for group A and continuous mass closure technique with same suture material in group B was done.
Results: In group A, 2 patients developed wound infection and 1 patient was found with wound dehiscence, while in group B, 3 patients suffered wound infection and 2 patients developed wound dehiscence.
Conclusion: The closure of laparotomy wound by interrupted mass closure technique with polypropylene No. 1 is better closure technique with low rate of wound infection and wound dehiscence as compared to continuous suturing technique with same suture material.
Key words: Interrupted technique, Continuous technique, Mass abdominal closure, Laparotomy

INTRODUCTION

Abdominal wound dehiscence remains a major cause of morbidity following any laparotomy whether elective or emergency[1]. Uncomplicated healing of surgical wounds is one of the most important factors which contribute to the success of operation. In particular dehiscence of laparotomy is an important complication associated with considerable morbidity and mortality[2]. Wound dehiscence occurs in 1-3 percent of abdominal surgical procedures. Systemic and local factors contribute to the development of this complication[3].

Burst abdomen is related to the technique of closure of abdomen and the suture used. Attention to the technique and material for closure is associated with low rates of wound complications. Material and technique for fascial closure are often determined by local custom and surgical tradition[4-5]. Despite the arguments for and against different suture materials[6], the site of incisions and the insistence on a meticulous surgical technique in the closure of wounds, the cases of burst abdomen still occur[7].

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MATERIAL AND METHODS

This study was conducted in Surgical Department of Services Hospital, Lahore from 13th September 2006 to 13th March 2007. A total of 60 patients were included in the study and were divided into two groups A (odd number) and B (even number), comprising 30 patients in each group. Mass abdominal closure was done in all cases. Monofilament polypropylene number 1 was used for interrupted mass closure in group A and same suture material for continuous mass closure technique in patients included in group B. Wound dehiscence was suspected when there was serosanguinous discharge and was confirmed when there was a visible gap between the wound edges or abdominal viscera were lying outside the abdominal cavity in the wound and a new closure was necessary.

RESULTS

A total of 60 patients undergoing laparotomy by vertical midline incision were included in the study and divided into two groups; group A and group B. In group A, 19 patients (63.3%) were male and 11 patients (36.6%) were females. In group B, 17 patients (56.7%) were males and 13 (43.3%) were females (Table 1).

The age of the patients varied from 15 years to 64 years. In group A, the mean age was 32.75±13.78 years and in group B, the mean age of the patients was 30.37±12.56 years. The two groups were well matched and there was no statistically significant difference (p=0.521) as far the age of the patients were concerned (Table 2).

In group A, 2 cases (6.67%) out of 30 cases developed wound infection and 1 patient (3.3%) was found with wound dehiscence. While in group B, 3 patients (10%) out of 30 patients suffered wound infection and 2 patients (6.6%) developed wound dehiscence. Statistically the difference was significant (p<0.05) [Table 3].

Table 1: Sex distribution of both groups

Sex	Group A (n=30)		Group B (n=30)	
	Frequency	%age	Frequency	%age
Male	19	63.3	17	56.7
Female	11	36.7	13	43.3
Male to female ratio	1:1.7		1:1.3	

Table 2: Age distribution in both groups

Age (years)	Group A (n=30)		Group B (n=30)	
	Frequency	%age	Frequency	%age
15 – 24	11	36.66	14	46.68
25 – 34	7	23.34	5	16.66
35 – 44	4	13.34	5	16.66
45 – 54	5	16.66	5	16.66
55 – 64	3	10.00	1	3.34
Mean±SD	32.75±13.78		30.37±12.56	p = 0.521

Table 3: Comparison of post-operative complications in both groups

Post-operative complications	Group A (n=30)		Group B (n=30)		P value
	No.	%	No.	%	
Wound infection	2	6.6	3	10.0	P<0.05
Wound dehiscence	1	3.3	2	6.7	P<0.05

DISCUSSION

As surgery evolved through generations of discovery, experience, and evolution to become a science, the healed and uncomplicated surgical wound came to be regarded as the only acceptable outcome of an operation.[8] Wound behaviour both surgical and traumatic is greatly influenced by the technique of the closure of the wound and suture material[2].

Wound infection is the commonest and most troublesome disorder responsible for impaired wound healing.[9] The association between infection, technique and suture material used in a wound has been an important consideration in the surgeon's mind.[10] In this study, the wound infection in group A, 2 patients (6.67%) and in group B, 3 patients (10%) were found (Table 2). So it was noted that wound infection in continuous suturing technique is greater than interrupted suturing technique and the results were statistically significant.

Smith[11] has mentioned that infection after clean abdominal procedures is uncommon and usually reflects either poor technique or cross infection. Therefore the avoidance of wound sepsis is equal in importance to the correct choice of wound closure technique and suture material. Complete asepsis is probably impossible to achieve, but the consequences of bacterial contamination can be reduced to a minimum if the local environment is made unfavourable[7].

Despite the arguments for and against different suture materials,[12] the site of incisions[10] and the insistence on a meticulous surgical technique in the closure of wounds, better preoperative and postoperative care, control of infection with antibiotics, the cases of wound disruption still occur. Many clinical studies have attested to a continuing steady incidence of wound disruption to be 1-3%[9,13] regardless of the type of suture used. In this study, in group A, the wound dehiscence was 3.33% which is comparable with the above mentioned studies (Table 3). Wound disruption is associated with a mortality rate of 10-20%[14] despite the most sophisticated intensive care these patients receive today.

Efron[15] closed 118 consecutive laparotomies with through and through interrupted non-absorbable sutures, using either monofilament or polypropylene and found only one disruption, an incidence of 0.8 percent while in this study in group A, interrupted mass abdominal closure technique it was 3.33% (Table 3). Ellis and Heddle[16] found the incidence of burst abdomen to be 3 percent with continuous mass closure using monofilament nylon and he did not include the peritoneum in closure. While in this study, it was 6.67% with continuous suturing technique in group B (Table 3).

We suggest that although the fascial dehiscence may not be eliminated its incidence can certainly be reduced to very low levels with proper attention to mechanics of fascial closure.

REFERENCES

1. Anurag S, Swapandeep R, Sahay KB, Vuthaluru S, Arvind K, Sunil C, et al. Prevention of burst abdominal wound by a new technique: A randomized trial comparing continuous versus interrupted X-suture. Indian J Surg 2004; 66: 19-27.
2. Marwah S, Marwah N, Singh M, Kapoor A, Karwasra RK. Addition of rectus sheath relaxation incisions to emergency midline

laparotomy for peritonitis to prevent fascial dehiscence. World J Surg 2005; 29:235-9.
3. Khan MNS, Naqvi AH, Irshad K, Chaudhary AR. Frequency and risk factor of abdominal wound dehiscence. J Coll Physicians Surg Pak 2004; 14:355-7.
4. Weiland DE, Bay RC, DelSordi S. Choosing the best abdominal closure by meta-analysis. Am J Surg 1998; 176: 666-70.
5. Ceydeli A, Rucinski J, Wise L. Finding the best abdominal closure: An evidence-based review of the literature. Current Surg 2006; 62: 220-5.
6. Orr JW Jr, Montz FJ, Barter J, Schaitzberg SD, Delmore JE, Dodson MK, et al. Continuous abdominal fascial closure: a randomized controlled trial of poly(L-lactide/glycolide). Gynecol Oncol 2003; 90: 342-7.
7. Rucinski J, Margolis M, Panagopoulos G, Wise L. Closure of the abdominal midline fascia: meta-analysis delineates the optimal technique. Am Surg 2001; 67: 421-6.
8. Ceydeli A, Rucinski J, Wise L. Finding the best abdominal closure: an evidence-based review of the literature. Curr Surg 2005; 62: 220-5.
9. Bohanes T, Neoral C, Klein J, Havlik R, Aujesky R, Kral V. Role of modern absorbable suture materials in decreasing the occurrence of early complications after laparotomy. Rozhl Chir 2002; 81: S24-6.
10. Coulthard P, Worthington H, Esposito M, Elst M, Waes OJ. Tissue adhesives for closure of surgical incisions. Cochrane Database Sys Rev 2004; 2: CD004287.
11. Smith JAR. "Wound infection" In: Kyle S, Smith D, Johnston P, editors. Pye's surgical handicraft. 22nd ed. Philadelphia: Butterworth Heinemann, 1992; 111.
12. Knaebel HP, Koch M, Sauerland S, Diener MK, Buchler MW, Seiler CM. Interrupted or continuous slowly absorbable sutures - design of a multi-centre randomised trial to evaluate abdominal closure techniques INSECT-trial [ISRECTN24023541]. BMC Surg 2005; 5: 3.
13. Waqar SH, Malik ZI, Razzaq A, Abdullah MT, Shaima A, Zahid MA. Frequency and risk factors for wound dehiscence/burst abdomen in midline laparotomies. J Ayub Med Coll Abbottabad 2005; 17: 70-3.
14. DuBay DA, Wang X, Adamson B, Kuzon WM Jr, Dennis RG, Franz MG. Progressive fascial wound failure impairs subsequent abdominal wall repairs: a new animal model of incisional hernia formation. Surgery 2005; 137: 463-71.
15. Efron G. Abdominal wound disruption. Lancet 1965; 1287-90.
16. Ellis E. Maingots abdominal operation. 9th ed. Philadelphia: Prentice Hall, 1990; 1230-90.