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ORIGINAL RESEARCH

A comparative analysis of absorbable versus non- absorbable sutures in closure of laparotomy incisions

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Abstract

Background: Wound dehiscence occurs because of the distracting forces in a wound which exceed the holding forces.The present study compared absorbable with non- absorbable sutures in closure of laparotomy incisions.

Materials & Methods: 76 patients undergoing laparotomy of both genderswere divided into 2 groups of 38 each. In group I patients, Prolenewas used and in group IIVicryl was used. Parameters such as diagnosis, wound dehiscence and type of procedure was recorded.

Results: Group I comprised of 18 males and 10 females and group II had 16 males and 12 females. Diagnosis was intestinal perforation seen in 12 in group I and 8 in group II, intestinal obstruction 10 in group I and 11 in group II, gut gangrene 3 in group I and 4 in group II, mass abdomen 1 in group I and 2 in group II, hemoperitoneum 1 in group I and 1 in group II, blunt trauma abdomen 1 in group I and 2 in group II. Procedure was elective 18 in group I and 15 in group II and emergency 10 in group I and 13 in group II. Wound dehiscence was seen in 5 in group I and 9 in group II. The difference was significant ($P< 0.05$).

Conclusion: Prolenesuture had less wound dehiscence and has better outcome as compared to absorbable Vicryl suture.

Key words: Prolene, Vicryl, Wound dehiscence

Introduction

Wound dehiscence is a multifactorial problem, conditioned by local and systemic, as well as pre-, per-, and postoperative factors.[1] Wound dehiscence occurs because of the distracting forces in a wound which exceed the holding forces.[2] It is also important to acknowledge that the failures after abdominal wound closure are due to poor closure technique, deep wound infection, postoperative vomiting, persistent postoperative cough, postoperative abdominal distension, and poor general condition of the patient which includes obesity, jaundice, malignant disease, hypoproteinemia, and anemia. [3,4]

Skin closure methods reported in medical literature include continuous stitch closure, interrupted stitch closure, full thickness closure, sub-cuticular closure, primary closure, secondary closure, vacuum assisted closure, glue assisted closure, skin clips or staples closure, simple suture *vs* mattress sutures, steri-strips closure, absorbable or non-absorbable suture (NAS) closure and other innovative methods.[5]

Prolene is a non- absorbable clear blue coloured suture made up of isotectic crystalline steroids Omer used for soft tissue closure or ligation. It seems to little less desirable for surgeons because of extra time on its removal and revisiting problems for patient.[6,7] The

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present study comparedabsorbable with non- absorbable sutures in closure of laparotomy incisions.

Materials & Methods

The present study was conducted on 76 patients undergoing laparotomy of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 38 each. In group I patients, Prolenewas used and in group IIVicryl was used. Parameters such as diagnosis, wound dehiscence and type of procedure was recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I Distribution of patients

Groups	Group I	Group II
Method	Prolene suture	Vicryl suture
M:F	18:10	16:12

Table I shows that group I comprised of 18 males and 10 females and group II had 16 males and 12 females.

Table II Comparison of parameters

Parameters	Variables	Group I	Group II	P value
Diagnosis	Intestinal perforation	12	8	0.05
	Intestinal obstruction	10	11	
	Gut gangrene	3	4	
	Mass abdomen	1	2	
	Hemoperitoneum	1	1	
	Blunt trauma abdomen	1	2	
Procedure	Elective	18	15	0.91
	Emergency	10	13	
Wound dehiscence		5	9	0.05

Table II, graph I shows that diagnosis was intestinal perforation seen in 12 in group I and 8 in group II, intestinal obstruction10 in group I and 11 in group II, gut gangrene3 in group I and 4 in group II, mass abdomen1 in group I and 2 in group II, hemoperitoneum1 in group I and 1 in group II, blunt trauma abdomen 1 in group I and 2 in group II.Procedure was elective 18 in group I and 15 in group II and emergency 10 in group I and 13 in group II. Wound dehiscence was seen in 5 in group I and 9 in group II. The difference was significant (P< 0.05).

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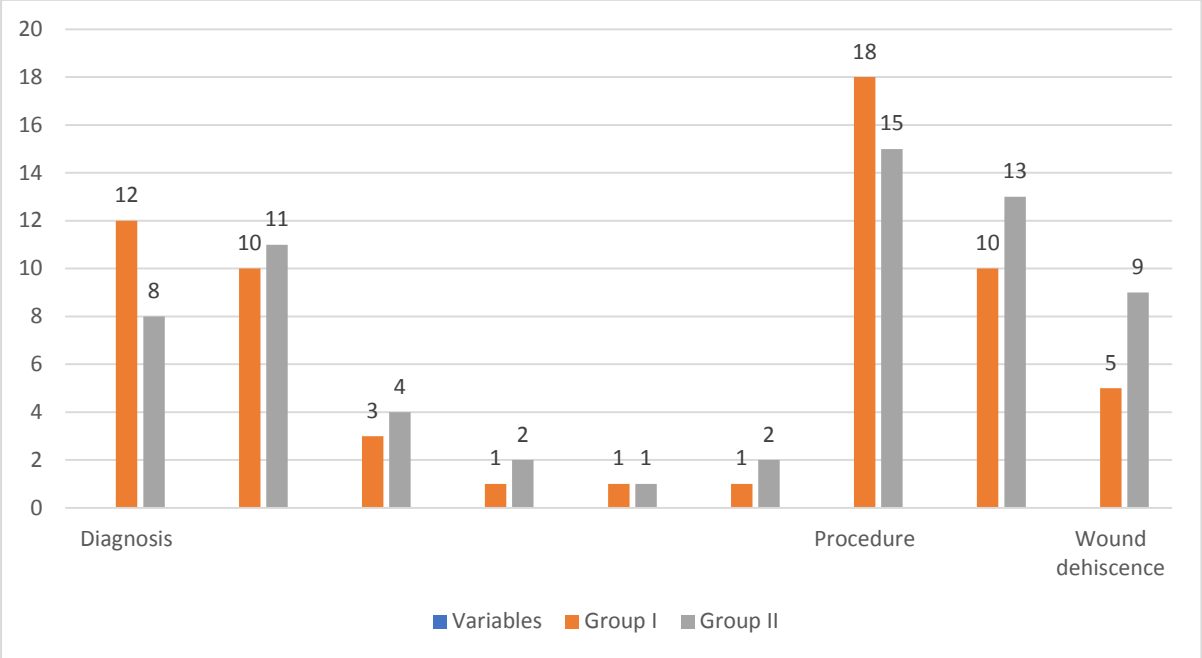
Graph I Comparison of parameters



Discussion

Development of incisional hernia following laparotomy is multifactorial. These factors may be classified into patient related, biological factors and surgical technique related.[8] Patient related factors include age, higher body mass index, synchronous presence of abdominal aortic aneurysm and multiple co-morbidities.[9] Biological factors include the capacity for normal collagen synthesis and organization to affect sound biological repair. Abnormal biological healing of fascial sheath results in the development of incisional hernia.[10]Several systematic reviews have examined the type ofsuture used for abdominal fascial closure but none have successfully recommended an agreed suture technique and suture type.[11,12]The present study compared absorbable with non- absorbable sutures in closure of laparotomy incisions.

We found that group I comprised of 18 males and 10 females and group II had 16 males and 12 females. Sajid et al[13]analysed the effectiveness of delayed-absorbable versus non-absorbable for abdominal fascial closure in patients undergoing laparotomy. Eight randomised trials encompassing 4261 patients undergoing laparotomy closure with either PDS or Prolene/Nylon were retrieved. There was no statistically significant heterogeneity among trials. In the fixed effect model PDS was comparable to Prolene/Nylon in terms of risk of incisional hernia, wound dehiscence, peri-operative complications, suture sinus formation and surgical site infection. Subgroup analysis separately comparing Prolene and Nylon with PDS supported same outcome.

We observed that diagnosis was intestinal perforation seen in 12 in group I and 8 in group II, intestinal obstruction 10 in group I and 11 in group II, gut gangrene 3 in group I and 4 in group II, mass abdomen 1 in group I and 2 in group II, hemoperitoneum 1 in group I and 1 in group II, blunt trauma abdomen 1 in group I and 2 in group II. Procedure was elective 18 in group I and 15 in group II and emergency 10 in group I and 13 in group II. Wound dehiscence was seen in 5 in group I and 9 in group II.Parell et al[14] compared the absorbable with non- absorbable sutures in wound dehiscence after closure of Laparotomy incisions. In this study, a total number of 100% (n=130) patients were included, divided into two equal groups, 65 in each i.e. group Prolene and group Vicryl. Wound dehiscence occurred in 6.2% (n=4) cases in whom Prolene was used whereas 21.5% (n=14) had wound dehiscence with

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the use of Vicryl suture. Vicryl was followed by significantly higher incidence of wound dehiscence than closure by Prolene.

Singh et al[15]assessed wound infection rates in 320 patents in the four randomized groups according to the suture and technique of closure used. Patients were followed for a period of 2 weeks and using well set definition were placed in infected, uninfected and burst abdomen. Older age, male sex, diabetes, anemia malnutrition and sepsis were found to be highly significant risk factor for wound infection. Suture material (Prolene vs Vicryl) and technique (continuous vs interrupted) arms did not show statistically significant differences outcomes in regard to wound infection rates, however there appears to be less incidences of wound dehiscence formation with delayed absorbable sutures(Vicryl). Pai et al[16] in their study hundred patients were included. The two study groups (Prolene and Polydioxanone) were homogenous, with no significant difference between age, BMI, co-morbidities and indication for surgery. Surgical site infection was significantly more in prolene group (p=0.031). Duration of surgeries was longer in prolene group (p=0.020) hence, a subgroup analysis was done and only surgeries under 4-hour duration were analysed. It showed no difference between the two groups with respect to surgical site infection (p=0.320). There was no significant difference between the two groups in burst abdomen and incisional hernia

Conclusion

Authors found that Prolenesuture had less wound dehiscence and has better outcome as compared to absorbable Vicryl suture.

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