

Original Article

Comparison of absorbable with non- absorbable sutures in closure of laparotomy incisions

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ABSTRACT:

Background: Wound dehiscence in post-operative period is and undesirable condition with high- risk complications which may lead to morbidity and mortality. The present study was conducted to compare absorbable with non- absorbable sutures in closure of laparotomy incisions. **Materials & Methods:** 56 patients of both genders were divided into 2 groups. In group I patients, fascia were closed with Prolene and in group II fascia were closed with Vicryl. **Results:** Group I comprised of 15 males and 13 females and group II 16 males and 12 females. Diagnosis was intestinal perforation seen in 7 in group I and 8 in group II, intestinal obstruction 3 in group I and 4 in group II, hemoperitoneum 10 in group I and 11 in group II, blunt trauma abdomen 5 in group I and 2 in group II, gut gangrene 2 each in group I and II, mass abdomen 1 each in group I and II. Procedure was elective 19 in group I and 16 in group II and emergency 9 in group I and 12 in group II. Group I had wound dehiscence seen in 5 and 11 in group II. The difference was significant ($P < 0.05$). **Conclusion:** Prolene has better outcome and less wound dehiscence and other complication as compared to absorbable Vicryl suture.

Key words: Prolene, Vicryl, Wound dehiscence

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INTRODUCTION

Wound dehiscence in post-operative period is and undesirable condition with high- risk complications which may lead to morbidity and mortality. From a long time surgeons are in continuous struggle to overcome postoperative complications relevant to wound closure with different methods and suturing materials.¹ Many studies have been conducted on closing abdominal fascia with different sutures used, but no definite suggestions were made for better outcomes. Many factors should be kept in mind while choosing suture, like knot tying, handling of suture, cost effectiveness, strengthening and susceptibility. Durability of tensile strength is also a factor and most important to be considered.²

Wound dehiscence is a multifactorial problem, conditioned by local and systemic, as well as pre-, per-, and postoperative factors. Wound dehiscence occurs because of the distracting forces in a wound which exceed the holding forces.³ It is also important

to acknowledge that the failures after abdominal wound closure (early dehiscence and late incisional hernia) 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. Each suture should be tied loosely with a measured tension sufficient to hold the wound together while avoiding pressure necrosis.⁴ Classification of available sutures done on three categories; non-absorbable or permanent suture, slowly absorbable and third one is rapidly absorbable suture. Another criterion that surgeons mostly used to choose a suture is early and wound dehiscence.⁵ Prolene is a non- absorbable clear blue colored 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 The

present study was conducted to compare absorbable with non- absorbable sutures in closure of laparotomy incisions.

MATERIALS & METHODS

The present study was conducted on 56 patients of both genders. All agreed to participate in the study. Patients with abdominal hernia, less than 18 years age and history of previous laparotomy were excluded from the study. Demographic data of each patient was recorded in case performa. 2 groups were made. Group I patients, fascia were closed with Prolene and in group II fascia were closed with Vicryl. All underwent assessment of

complete blood count, urine examination, random blood sugar, renal parameters, Liver function tests, chest X ray ultrasound abdomen, CT scan, echocardiogram and serum electrolytes. Fascia was closed after surgery with same size suture in both groups by using continuous suturing technique. Length of suture in both groups was constant 4:1 and preoperative and post- operative management was same. Follow ups done for observation of infection at 3rd, 5th, 7th and 9th post- operative days. Patient’s hospital stay, duration of surgery 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	15:13	16:12

Table I shows that group I comprised of 15 males and 13 females and group II 16 males and 12 females.

Table II Comparison of parameters

Variables	Parameters	Group I	Group II	P value
Diagnosis	Intestinal perforation	7	8	0.91
	Intestinal obstruction	3	4	0.80
	Hemoperitoneum	10	11	0.94
	Blunt trauma abdomen	5	2	0.05
	Gut gangrene	2	2	1
	Mass abdomen	1	1	1
Procedure	Elective	19	16	0.12
	Emergency	9	12	

Table I, graph I shows that diagnosis was intestinal perforation seen in 7 in group I and 8 in group II, intestinal obstruction 3 in group I and 4 in group II, hemoperitoneum 10 in group I and 11 in group II, blunt trauma abdomen 5 in group I and 2 in group II, gut gangrene 2 each in group I and II, mass abdomen 1 each in group I and II. Procedure was elective 19 in group I and 16 in group II and emergency 9 in group I and 12 in group II. The difference was significant (P< 0.05).

Graph I Comparison of parameters

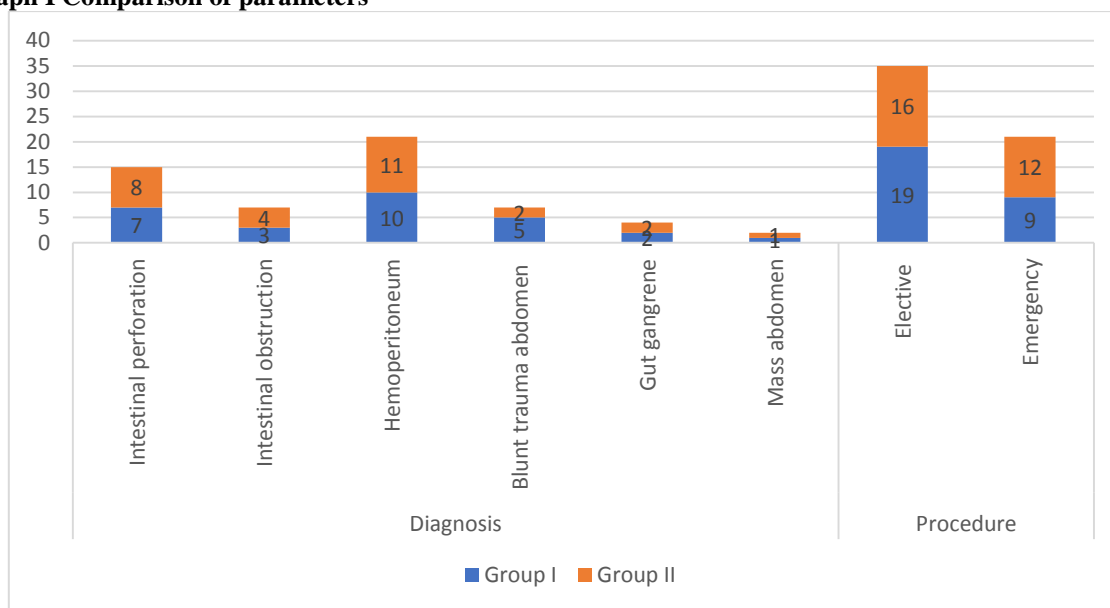
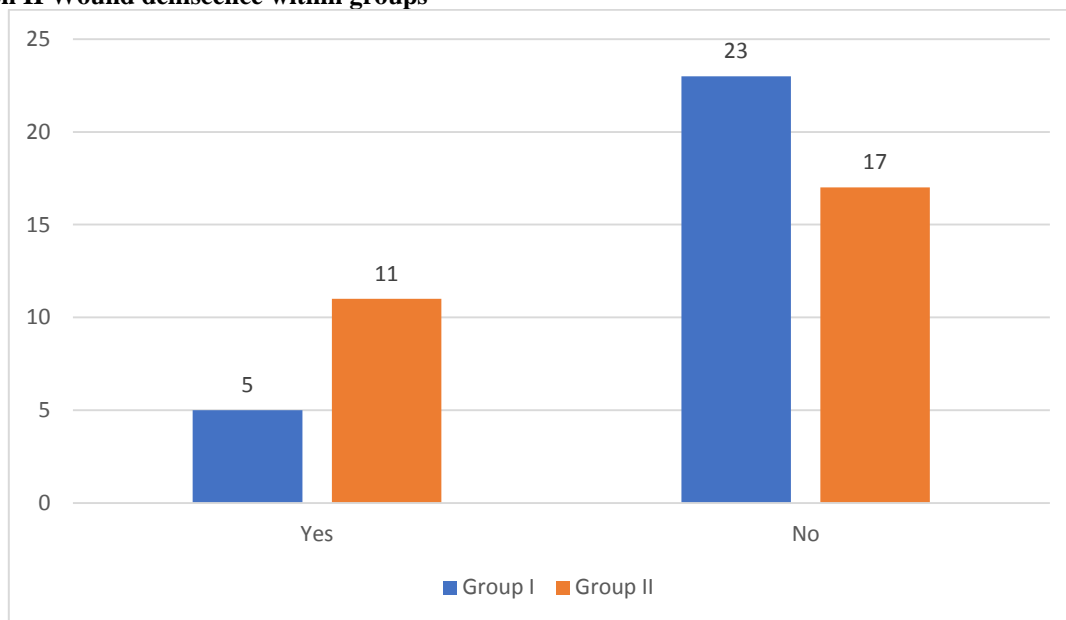


Table III Wound dehiscence within groups

Wound dehiscence	Group I	Group II	P value
Yes	5	11	0.05
No	23	17	0.02

Table III, graph I shows that group I had wound dehiscence seen in 5 and 11 in group II. The difference was significant (P< 0.05).

Graph II Wound dehiscence within groups



DISCUSSION

Surgeons have to inflict wounds on their patients and it's their duty to endeavour constantly to get such wounds to heal as quickly, reliably and securely as possible.⁷ It has been said that nearly half of all post-operative complications are related to wounds.⁸ It increases the morbidity and hospitalization of the patient as well as total cost of treatment and at times leads to an increase in mortality.⁹ Suture should be tied loosely with a measured tension sufficient to hold the wound together while avoiding pressure necrosis.¹⁰ It is important for the surgeons to know that wound healing demands oxygen consumption, normoglycemia, and absence of toxic or septic factors, which reduces collagen synthesis and oxidative killing mechanisms of neutrophils.¹¹ The present study was conducted to compare absorbable with non-absorbable sutures in closure of laparotomy incisions. In present study, in group I patients, fascia was closed with Prolene and in group II, fascia was closed with Vicryl. Group I comprised of 15 males and 13 females and group II 16 males and 12 females. Singh et al¹² assessed wound infection rates in 320 patients 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. Results: 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 showed 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). We found that diagnosis was intestinal perforation seen in 7 in group I and 8 in group II, intestinal obstruction 3 in group I and 4 in group II, hemoperitoneum 10 in group I and 11 in group II, blunt trauma abdomen 5 in group I and 2 in group II, gut gangrene 2 each in group I and II, mass abdomen 1 each in group I and II. Procedure was elective 19 in group I and 16 in group II and emergency 9 in group I and 12 in group II. Pandey et al¹³ compared the incidence of wound dehiscence with a delayed absorbable and a nonabsorbable suture material in the mass closure of vertical laparotomy wounds. In one group, 100 patients were analyzed after closure with Prolene®, and in another group, 100 patients were analyzed after closure with Vicryl®. The incision was closed by continuous far and near suture technique using polypropylene (Prolene) suture in one group and a synthetic delayed absorbable polyglactin 910 (Vicryl) suture in the other group. There was significant difference in the incidence of wound dehiscence between the two groups: 6 % with Prolene and 17 % with Vicryl, ($\chi^2 = 5.944$, 1 DF, P value = 0.0148). The overall incidence of wound dehiscence was 11.5 % in this study. The incidence of wound dehiscence in both the study groups was higher than expected as compared to

previous literature. There was a significant difference between the two suture materials.

We observed that group I had wound dehiscence seen in 5 and 11 in group II. Parell et al¹⁴ 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. In this study, wound dehiscence occurred in 6.2% (n=4) cases in whom Prolene was used whereas 21.5% (n=14) had wound dehiscence with the use of Vicryl suture. Vicryl was followed by significantly higher incidence of wound dehiscence than closure by Prolene.

CONCLUSION

Authors found that Prolene has better outcome and less wound dehiscence and other complication as compared to absorbable Vicryl suture.

REFERENCES

1. Bucknall TE, Teare L, Ellis H. The choice of a suture to close abdominal incision. *Eur surg. Res* 1998; 15(2):197-204.
2. Galbadi RA, Cushing D, Lerer T. Risk factors for post-operative wound infection. *Am J Med.* 2001; 91B:223-227.
3. Mullen JL, Gertner MH, Buuzby GP. Implication of malnutrition in the surgical pt. *Arch Surg*, 1999; 114-121.
4. Carlson MA. Acute wound failure. *Surg clinic north America* 2001; 177:605-612.
5. Riou JP, Cohen JR, Johnson H Jr. Factors influencing wound dehiscence. *Am J Surg.* 2002; 162-324.
6. Mead PB, Paries SE, Hall P. Decreasing the incidence of surgical site infections. *Arch Surg* 1986; 121:458.
7. Haley RW, Culver DH, Morgan WM. Identifying patients at high risk of surgical wound infection. *Am J Epidemiology.*, 1995; 121-206.
8. Sahlin S, Ahlberg J, Granstrom L. Monofilament vs multifilament absorbable sutures for abdominal closure. *Brit. J Surgery*, 2003; 322-324.
9. Israelsson LA, Johnsson T, Knuttson A. Suture technique and wound healing in midline laparotomy incisions. *Eur J Surg.* 2006; 162(8):602-609.
10. O' Dwyer PJ, Courtney CA. Factors involved in abdominal wall closure and subsequent incisional hernia; a randomized study. *Surg JR Coll Surg*, 2003, 17-22.
11. Weiland DE, Bay C, Del Sordy S. Choosing the best abdominal closure by meta-analysis. *Am J Surg.* 2008; 176:666-670.
12. Singh S, Singh V. Comparative study of non-absorbable versus delayed absorbable suture material and suturing technique in midline abdominal closure. *Int J Med Health Res.* 2015;2:19-22.
13. Pandey S, Singh M, Singh K, Sandhu S. A prospective randomized study comparing non-absorbable polypropylene (Prolene®) and delayed absorbable polyglactin 910 (Vicryl®) suture material in mass closure of vertical laparotomy wounds. *Indian Journal of Surgery.* 2013 Aug;75(4):306-10.
14. Parell GJ, Becker GD. Comparison of absorbable with nonabsorbable sutures in closure of facial skin wounds. *Archives of facial plastic surgery.* 2003 Nov 1.