ORIGINAL RESEARCH

Absorbable versus non- absorbable sutures in closure of laparotomy incisions

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ABSTRACT

Background: In the post-operative phase, wound dehiscence is an unpleasant condition with high-risk complications that can result in mortality and morbidity. **Materials & Methods:** 80 patients with abdominal hernia of both genders were divided into 2 groups. Patients in group I had their fascia closed with Prolene, whereas those in group II had their fascia closed with Vicryl. On the third, fifth, seventh, and ninth post-operative days, follow-ups were conducted to monitor for infection. **Results:** Group I comprised of 21 males and 19 females and group II had 18 males and 22 females. Diagnosis was intestinal perforation seen in 8 in group I and 9 in group II, intestinal obstruction 4 in group I and 7 in group II, hemoperitoneum 12 in group I and 13 in group II, blunt trauma abdomen 6 in group I and 3 in group II, gut gangrene 5 in group I and 7 in group II, mass abdomen 5 in group I and 1 in group II. Procedure was elective 19 in group I and 18 in group II and emergency 21 in group I and 22 in group II. The difference was non- significant (P> 0.05). Group I had wound dehiscence seen in 8 and 14 in group II. The difference was significant (P< 0.05). **Conclusion:** Compared to absorbable Vicryl suture, Prolene has a better result and causes less wound dehiscences and other complications.

Keywords: absorbable Vicryl, Prolene, Wound

INTRODUCTION

In the post-operative phase, wound dehiscence is an unpleasant condition with high-risk complications that can result in mortality and morbidity. Surgeons have long struggled to use various techniques and suturing materials to address postoperative difficulties related to wound closure.[1] There have been numerous research on the closure of abdominal fascia using various sutures, but no firm recommendations for improved results have been given. When selecting sutures, a number of considerations should be made, including susceptibility, cost effectiveness, knotting, handling, and strengthening. The most crucial thing to take into account is the durability of tensile strength.[2]

Wound dehiscence is a complex issue that is influenced by pre-, post-, and per-operative factors in addition to local and systemic causes.[3] When a wound's distracting forces outweigh its holding forces, wound dehiscence takes place. It's also critical to recognize that poor closure technique, deep wound infection, postoperative vomiting, persistent postoperative cough, postoperative abdominal distension, and the patient's poor overall health—which includes obesity, jaundice, malignant disease, hypoproteinemia, and anemia—are the main causes of the failures following abdominal wound closure (early dehiscence and late incisional hernia). To keep the incision intact and prevent pressure necrosis, each suture should be tied loosely with a precise tension.[4]

Three categories were used to classify the available sutures: slowly absorbable, fast absorbable, and non-absorbable or permanent sutures. Early wound dehiscence is another characteristic that surgeons typically employ when selecting a suture.[5] Prolene is a clear, blue, non-absorbing suture composed of isoprotective crystalline steroids. Omer is used to ligate or close soft tissues. Due to the additional time required for its removal and the need to address patient issues, it appears to be somewhat less appealing to surgeons.[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 80 patients with abdominal herniaof both genders. All agreed to participate in the study.

Demographic data of each patient was recorded in case performa. Two groups of 40 patients were formed. Patients in group I had their fascia closed with Prolene, whereas those in group II had their fascia closed with Vicryl. Complete blood count, urine analysis, random blood sugar, renal parameters, liver function tests, chest X-ray, abdominal ultrasound, CT scan, echocardiogram, and serum electrolyte levels were all evaluated. Following surgery, the fascia was closed in both groups using a continuous suturing approach with sutures of the same size. Both groups received the identical preoperative and postoperative care, and the suture length remained constant at 4:1. On the third, fifth, seventh, and ninth post-operative days, follow-ups were conducted to monitor for infection. 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	21:19	18:22

Table I shows that group I comprised of 21 males and 19 females and group II had 18 males and 22 females.

Table II Comparison of parameters

Variables	Parameters	Group I	Group II	P value
Diagnosis	Intestinal perforation	8	9	0.82
	Intestinal obstruction	4	7	
	Hemoperitoneum	12	13	
	Blunt trauma abdomen	6	3	
	Gut gangrene	5	7	
	Mass abdomen	5	1	
Procedure	Elective	19	18	0.71
	Emergency	21	22	

Table II, graph I shows that diagnosis was intestinal perforation seen in 8 in group I and 9 in group II, intestinal obstruction4 in group I and 7 in group II, hemoperitoneum12 in group I and 13 in group II, blunt trauma abdomen 6 in group I and 3 in group II, gut gangrene5 in group I and 7 in group II, mass abdomen5 in group I and 1 in group II. Procedure was elective 19 in group I and 18 in group II and emergency21 in group I and 22 in group II. The difference was non- significant (P> 0.05).

Graph I Comparison of parameters

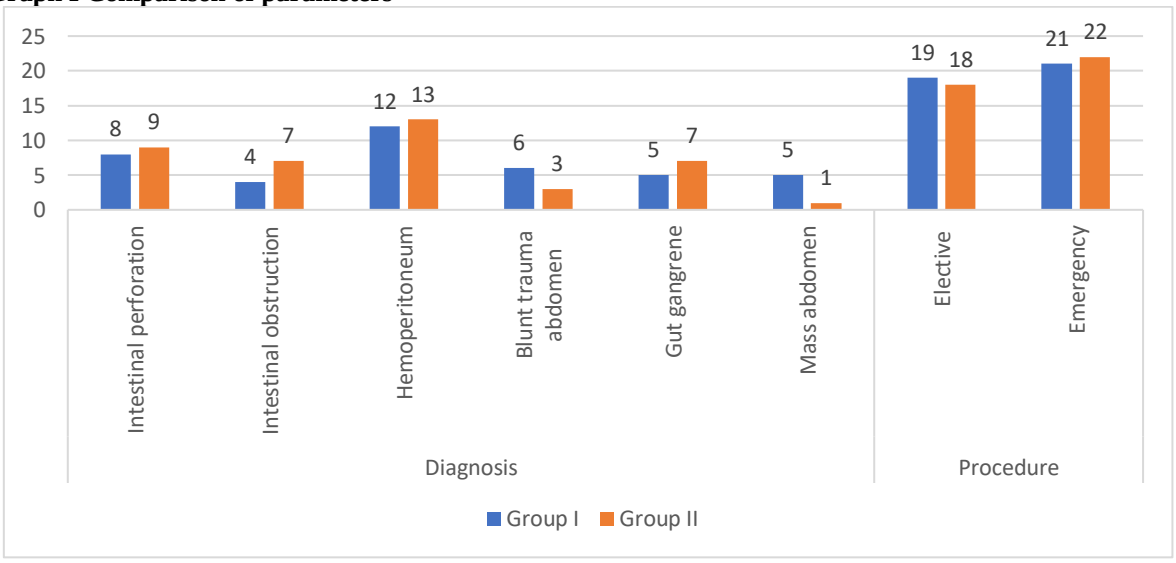

Table III Wound dehiscence

Groups	Wound dehiscence	P value
Group I	8	0.01
Group II	14	

Table III shows that group I had wound dehiscence seen in 8 and 14 in group II. The difference was significant (P< 0.05).

DISCUSSION

Patients must sustain wounds from surgeons, and it is their responsibility to make every effort to ensure that these wounds heal as swiftly, consistently, and safely as possible. It has been reported that wounds account for about half of all post-operative problems.[7] It raises the patient's hospitalization and morbidity, raises the overall cost of care, and occasionally raises mortality. In order to keep the incision intact and prevent pressure necrosis, the suture should be tied loosely and with a precise tension.[8,9] Surgeons should be aware that oxygen consumption, normoglycemia, and the lack of septic or toxic variables are necessary for wound healing. These parameters decrease collagen synthesis and neutrophil oxidative killing mechanisms.[10,11]The present study was conducted to compare absorbable with non- absorbable sutures in closure of laparotomy incisions.

We found that group I comprised of 21 males and 19 females and group II had 18 males and 22 females.In the mass closure of vertical laparotomy wounds, Pandey et al[12] examined the incidence of wound dehiscence using delayed absorbable and nonabsorbable suture materials. One hundred patients were examined following closure with Prolene® in one group, while another hundred patients were examined following closure with Vicryl® in another. Polypropylene (Prolene) suture was used in one group to close the wound using the continuous far and near suture technique, whereas a synthetic delayed absorbable polyglactin 910 (Vicryl) suture was used in the other group. The incidence of wound dehiscence was significantly different in the two groups: 6% with Prolene and 17% with Vicryl ($\chi 2$ = 5.944, 1 DF, P value = 0.0148). In this study, the overall incidence of wound dehiscence was 11.5%. Compared to earlier research, the incidence of wound dehiscence in both study groups was higher than anticipated. The two suture materials differed significantly from one another.

We found that diagnosis was intestinal perforation seen in 8 in group I and 9 in group II, intestinal obstruction 4 in group I and 7 in group II, hemoperitoneum12 in group I and 13 in group II, blunt trauma abdomen 6 in group I and 3 in group II, gut gangrene 5 in group I and 7 in group II, mass abdomen 5 in group I and 1 in group II. Procedure was elective 19 in group I and 18 in group II and emergency 21 in group I and 22 in group II. Group I had wound dehiscence seen in 8 and 14 in group II. After laparotomy incisions were closed, Parell et al[13] compared absorbable and non-absorbable sutures in terms of wound dehiscence. A total of 130 patients, or 100% of the total, were included in this trial and split into two equal groups, Prolene and Vicryl, each consisting of 65 people. In this study, wound dehiscence happened in 6.2% (n=4) of cases where Prolene was used, while it happened in 21.5% (n=14) of cases where Vicryl suture was used. Compared to Prolene closure, Vicryl had a noticeably higher frequency of wound dehiscence.

Singh et al[14] evaluated the rates of wound infection in 320 patients across the four randomized groups based on the closure method and suture used. Using a well-defined criterion, patients were categorized as having an infected, uninfected, or ruptured abdomen and monitored for two weeks. Results: It was discovered that sepsis, diabetes, anemia, male sex, older age, and malnutrition were all extremely significant risk factors for wound infection. Suture material (Prolene vs. Vicryl) and technique (continuous vs. interrupted) did not exhibit statistically significant differences in wound infection rates; however, delayed absorbable sutures (Vicryl) seem to have a lower incidence of wound dehiscence formation.

CONCLUSION

Authors found that compared to absorbable Vicryl suture, Prolene has a better result and causes less wound dehiscences and other complications.

REFERENCES

1. Mullen JL, Gertner MH, Buuzby GP. Implication of malnutrition in the surgical pt. Arch Surg, 1999; 114-121.
2. Carlson MA. Acute wound failure. Surg clinic north America 2001; 177:605-612.
3. Riou JP, Cohen JR, Johnson H Jr. Factors influencing wound dehiscence. Am J Surg. 2002; 162-324.
4. Mead PB, Paries SE, Hall P. Decreasing the incidence of surgical site infections. Arch Surg 1986; 121:458.
5. 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.
6. Weiland DE, Bay C, Del Sordy S. Choosing the best abdominal closure by meta-analysis. Am J Surg. 2008; 176:666-670.
7. Haley RW, Culver DH, Morgan WM. Identifying patients at high risk of surgical wound infection. Am J Epidemiology., 1995; 121-206.
8. Bucknall TE, Teare L, Ellis H. The choice of a suture to close abdominal incision. Eur surg. Res 1998; 15(2):197- 204.
9. Galbadi RA, Cushng D, Lerer T. Risk factors for post-operative wound infection. Am J Med. 2001; 91B:223-227.
10. Sahlin S, Ahlberg J, Granstrom L. Monofilament vs multifilament absorbable sutures for abdominal closure. Brit. J Surgery, 2003; 322-324.
11. Israelsson LA, Johnsson T, Knuttson A. Suture technique and wound healing in midline laparotomy incisions. Eur J Surg. 2006; 162(8):602-609.
12. 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.
13. Parell GJ, Becker GD. Comparison of absorbable with nonabsorbable sutures in closure of facial skin wounds. Archives of facial plastic surgery. 2003 Nov 1.

14. 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.