

## Original Research

## Absorbable versus non- absorbable sutures in closure of laparotomy incisions

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**ABSTRACT:**

**Background:** Wound dehiscence is a multifactorial problem, conditioned by local and systemic, as well as pre-, per-, and postoperative factors. The present study was conducted to compare absorbable with non- absorbable sutures in closure of laparotomy incisions. **Materials & Methods:** 68 patients of laparotomy 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. Parameters were compared in both groups. **Results:** Group I comprised of 20 males and 14 females and group II had 18 males and 16 females. Diagnosis was intestinal perforation seen in 10 in group I and 8 in group II, intestinal obstruction 2 in group I and 6 in group II, hemoperitoneum 8 in group I and 10 in group II, blunt trauma abdomen 7 in group I and 5 in group II, gut gangrene 4 in group I and 3 in group II, mass abdomen 3 in group I and 2 in group II. The difference was significant ( $P < 0.05$ ). Procedure was elective 20 in group I and 19 in group II and emergency 14 in group I and 15 in group II. Wound dehiscence was seen in 6 in group I and 12 in group II. The difference was significant ( $P < 0.05$ ). **Conclusion:** Prolene has better outcome and less wound dehiscence in contrast to absorbable Vicryl suture.

**Key words:** Prolene, Vicryl, Wound dehiscence

Received: 12-07- 2019

Accepted: 20-08-2019

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**This article may be cited as:** Prasad B. Absorbable versus non- absorbable sutures in closure of laparotomy incisions. J Adv Med Dent Scie Res 2019;7(9):251-254.

**INTRODUCTION**

A number of studies have been reported in search of improving the skin closure related outcome measures following various surgical procedures, and due to this fact the skin closure techniques are evolving vastly and immensely, predominantly over the last few decades.<sup>1,2</sup> Innumerable 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.<sup>3</sup>

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.<sup>4</sup> 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.<sup>5</sup> 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.<sup>6</sup> 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 68 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 and patients were divided into 2 groups. In group I patients, fascia were closed with Prolene and in group II fascia were closed with Vicryl. Routing investigations such as complete blood count (CBC), urine examination, RBG, renal parameters, liver

function tests, chest X ray ultrasound abdomen, CT scan, echocardiogram and serum electrolytes were performed.. Length of suture in both groups was constant 4:1 and preoperative and post- operative management was same. Follow ups was done. 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 (34)	Group II (34)
Method	Prolene suture	Vicryl suture
M:F	20:14	18:16

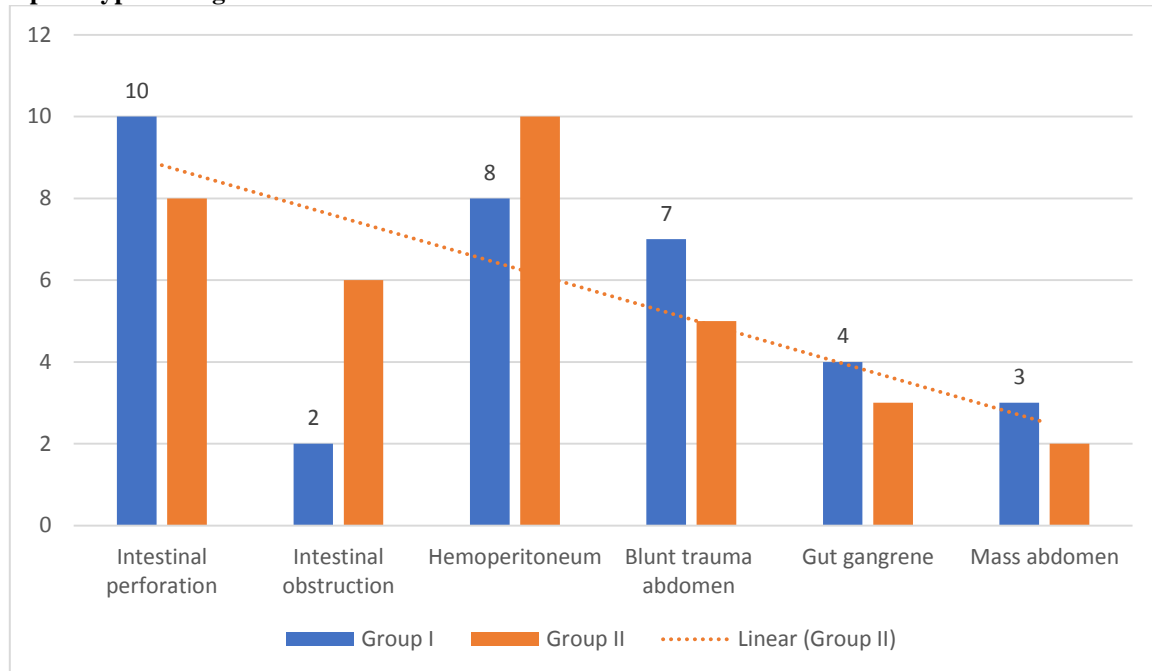
Table I shows that group I comprised of 20 males and 14 females and group II had 18 males and 16 females.

**Table II Type of diagnosis**

Perforation	Group I	Group II	P value
Intestinal perforation	10	8	0.05
Intestinal obstruction	2	6	
Hemoperitoneum	8	10	
Blunt trauma abdomen	7	5	
Gut gangrene	4	3	
Mass abdomen	3	2	

Table II, graph I shows that diagnosis was intestinal perforation seen in 10 in group I and 8 in group II, intestinal obstruction 2 in group I and 6 in group II, hemoperitoneum 8 in group I and 10 in group II, blunt trauma abdomen 7 in group I and 5 in group II, gut gangrene 4 in group I and 3 in group II, mass abdomen 3 in group I and 2 in group II. The difference was significant (P< 0.05).

**Graph I Type of diagnosis**



**Table III Type of procedure**

Procedure	Group I	Group II	P value
Elective	20	19	0.18
Emergency	14	15	

Table III shows that procedure was elective 20 in group I and 19 in group II and emergency 14 in group I and 15 in group II.

**Table IV Assessment of wound dehiscence**

Groups	Number	P value
Group I	6	0.02
Group II	12	

Table IV shows that wound dehiscence was seen in 6 in group I and 12 in group II. The difference was significant ( $P < 0.05$ ).

## DISCUSSION

Wound dehiscence in post-operative period is an 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.<sup>7</sup> 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.<sup>8</sup> 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. It has been said that nearly half of all post-operative complications are related to wounds.<sup>9</sup> 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.<sup>9</sup> Suture should be tied loosely with a measured tension sufficient to hold the wound together while avoiding pressure necrosis.<sup>10</sup> 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.<sup>11</sup> The present study was conducted to compare absorbable with non-absorbable sutures in closure of laparotomy incisions. In present study, group I comprised of 20 males and 14 females and group II had 18 males and 16 females. Parell et al<sup>12</sup> 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.

We found that diagnosis was intestinal perforation seen in 10 in group I and 8 in group II, intestinal obstruction 2 in group I and 6 in group II, hemoperitoneum 8 in group I and 10 in group II, blunt trauma abdomen 7 in group I and 5 in group II, gut gangrene 4 in group I and 3 in group II, mass abdomen 3 in group I and 2 in group II. Pandey et al<sup>13</sup> 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. 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 procedure was elective 20 in group I and 19 in group II and emergency 14 in group I and 15 in group II. Wound dehiscence was seen in 6 in group I and 12 in group II. Singh et al<sup>14</sup> 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 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).

## CONCLUSION

Authors found that Prolene has better outcome and less wound dehiscence in contrast 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. 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.