

# Comparative Study of Non-Absorbable Versus Delayed Absorbable Suture Material and Suturing Technique in Midline Abdominal Closure

Ashok Kumar Jha<sup>1</sup>, R. N. P. Sinha<sup>2</sup>, Prem Prakash<sup>3</sup>

<sup>1</sup>Associate Professor, Department of Surgery, Vardhman Institute of Medical Sciences, Pawapuri, Nalanda, Bihar.

<sup>2</sup>Assistant Professor, Department of Surgery, Vardhman Institute of Medical Sciences, Pawapuri, Nalanda, Bihar.

<sup>3</sup>Tutor, Department of Surgery, Vardhman Institute of Medical Sciences, Pawapuri, Nalanda, Bihar.

Received: July 2019

Accepted: July 2019

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## ABSTRACT

**Background:** Closure of the abdominal wall is a routine procedure and one of the first things a surgeon is taught in his career. Secure wound closure is an essential requirement for an uncomplicated and expedient recovery after an abdominal operation. **Methods:** We 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 sinus formation with delayed absorbable sutures (Vicryl). **Conclusion:** Closure of a mid-line laparotomy wound can be done by using either Prolene or Vicryl suture material, with either continuous or an interrupted fashion. Continuous technique is time saving and delayed absorbable suture (Vicryl) results in less wound sinus formation.

**Keywords:** Suture, Absorbable, Delayed Absorbable, Interrupted, Continuous.

## INTRODUCTION

Surgeons have to inflict wounds on their patients and it's their duty to endeavor 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. 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.

## MATERIALS AND METHODS

The present study was carried Vardhman Institute of Medical Sciences, Pawapuri, Nalanda, on 100 patients during the period of Jan. 2019 to Mar 2019 in whom mid line incision laparotomy was carried out. The aim of the above study was to compare the incidence of wound infection and burst abdomen between non-absorbable like Prolene and delayed absorbable like Vicryl suture material and concurrently continuous versus interrupted suture

technique. Age of patients ranged from 16-75 years. Overall, nearly 50% of patients were in 16-35 years age group in both suture material and suture technique group. Total male to female ratio was found to be 70:30 (3:1), indicating a male predominance in the study.

The occurrence of various risk factors such as diabetes mellitus, anemia, malnutrition, jaundice, uremia, sepsis, cough, other pulmonary complications and also the duration of surgery and the suturing technique were identical ( $p > 0.05$ ) for the two groups in both study and was attributed to an adequate randomization process.

## RESULTS

The rate of wound complications in suture material study such as wound infection ( $A1 = 20$ ;  $A2 = 19$ ); Burst abdomen ( $A1 = 11$ ;  $A2 = 10$ ) were not statistically significant ( $p > 0.05$ ) but 25 cases developed sinus formation with prolene suture in contrary, no patient with vicryl group develop such complication. [Table 1]

The rate of wound complication in suture technique study such as wound infection ( $B1 = 20$ ;  $B2 = 20$ ); Burst abdomen ( $B1 = 11$ ;  $B2 = 11$ ) were not statistically significant ( $P > 0.05$ ) but 2 cases of continuous technique with prolene suture had sinus

### Name & Address of Corresponding Author

Dr. Ashok Kumar Jha  
Associate Professor,  
Department of Surgery,  
Vardhman Institute of Medical Sciences,  
Pawapuri, Nalanda, Bihar.

formation (1.39%) while in interrupted technique with prolene suture 20 pts. develop sinus formation (11.37%). [Table 2]

**Table 1: Rate of wound complications (suture material)**

	Non -absorbable (A 1)	Delayed absorbable (A2)
wound infection	20	19
Burst abdomen	11	10
sinus formation	10	0

**Table 2: Rate of wound complications (suture technique)**

	Continuous (B 1)	Interrupted (B 2)
wound infection	20	20
Burst abdomen	11	11

In infected cases the rate of wound complications in the suture material, study group such as wound infection (A1 = 28; A2 = 25); Burst abdomen (A1 = 19; A2 = 17) were not statistically significant (p>0.05) but 12 cases develop sinus formation with Prolene suture in contrary, no case with Vicryl group develop such complication.

**Table 3: Rate of wound complications in infected case (suture material)**

	Non -absorbable (A 1)	Delayed absorbable (A2)
wound infection	28	25
Burst abdomen	19	17
sinus formation	12	0

In infected cases the rate of wound complications in suture technique study such as wound infection (B1 = 26 ; B2 = 28); Burst abdomen (B1 = 16 ; B2 = 16) were not statistically significant (p>0.05) but 1 case of continuous technique with Prolene suture had sinus formation while in interrupted technique with Prolene suture 9 patients develop sinus formation.

**Table 4: Rate of wound complications in infected case (suture technique)**

	Continuous (B 1)	Interrupted (B 2)
wound infection	26	28
Burst abdomen	16	16

Older age (>55 years), male sex, diabetes, anemia, malnutrition and sepsis were found to be a highly significant risk factor for wound infection (p<0.001). Older age (>55 years), male sex, malnutrition and cough were found to be a highly significant risk factor for burst abdomen. (P<0.001)

### DISCUSSION

We found no statistical difference in wound infection and burst abdomen in either of suture material or suturing technique. Since the presence of infection is associated with higher incidence of dehiscence, emphasis to reduce dehiscence should be placed on prevention of infection rather than a

method of closure. If infection develops, both methods of closure are insecure.

The suture material or the suturing technique does not play a significant role because both methods have been shown to resist and retard the development of infection. However, since Prolene is non absorbable, it may serve as a foreign body that maintains a superficial sinus tract until it is removed. Many factors other than suture material and surgical technique influence the occurrence of burst abdomen, which includes the age of the patient, sex of the patient, anemia, diabetes, nutrition status of the port., sepsis, cough and pulmonary complications and so on. So it can be concluded that closure of a mid-line laparotomy wound is safe, whether using Prolene or Vicryl suture material, with either a continuous or an interrupted for the fascial closure.

### CONCLUSION

As the continuous technique is time saving, reducing the length of time under anesthesia, and as there appear to be fewer cases of wound sinus formation when using delayed absorbable sutures (Vicryl), we recommend continuous delayed absorbable suture in the closure of the fascial layer.

### REFERENCES

- Dudley HAK. layered and mass closure of the abdominal wall. A theoretical and experimental analysis. Br J Surg 1999; 57(9):664-667.
- Bucknall TE, Teare L, Ellis H. The choice of a suture to close abdominal incision. Eur surg. Res 1998; 15(2):197-204 .
- Galbadi RA, Cushng D, Lerer T. Risk factors for post-operative wound infection. Am J Med. 2001; 91B:223-227 .
- Mullen JL, Gertner MH, Buuzby GP. Implication of malnutrition in the surgical pt. Arch Surg, 1999, 114-121.
- Carlson MA. Acute wound failure. Surg clinic north America 2001; 177:605-612.
- Riou JP, Cohen JR, Johnson H Jr. Factors influencing wound dehiscence. Am J Surg. 2002, 162-324.
- Mead PB, Paries SE, Hall P. Decreasing the incidence of surgical site infections. Arch Surg 1986; 121:458.
- Haley RW, Culver DH, Morgan WM. Identifying patients at high risk of surgical wound infection. Am J Epidemiology., 1995, 121-206.
- Sahlin S, Ahlberg J, Granstrom L. Monofilament vs multifilament absorbable sutures for abdominal closure. Brit. J Surgery, 2003, 322-324.
- Israelsson LA, Johnsson T, Knuttson A. Suture technique and wound healing in midline laparotomy incisions. Eur J Surg. 2006; 162(8):602-609.
- 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.
- Weiland DE, Bay C, Del Sordy S. Choosing the best abdominal closure by meta-analysis. Am J Surg. 2008; 176:666-670.
- Mathur SK, Supe AN, Parulkar BG. Monolayer closure of abdominal incisions. Ind J Surg. f; 51:229-234.
- Poole GV JR, Meredith JW, Kon ND, Martin MB. Suture technique and wound bursting strength. Am J Surg. 2004; 150:569-572.
- Effron G. Abdominal wound disruption; Lancet 1965; 1:1287-90.

**How to cite this article:** Jha AK, Sinha RNP, Prakash P. Comparative Study of Non-Absorbable Versus Delayed Absorbable Suture Material and Suturing Technique in Midline Abdominal Closure. *Ann. Int. Med. Den. Res.* 2019; 5(5):SG11-SG13.

**Source of Support:** Nil, **Conflict of Interest:** None declared