

(Original Article)

8 A COMPARATIVE STUDY ON OUTCOME OF MIDLINE LAPAROTOMY WOUND CLOSURE AUTHORS Dr. Pratik H.Vyas^[1], Dr Jaykumar B.Pandya^[2], Dr Shruja D.Narola^[3],

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ABSTRACT

Background ,Abdominal wound dehiscence is a common complication of emergency laparotomy in Indian setup. Factors as relates to burst abdomen and they recommended certain surgical measures. These measures included control of nausea and vomiting, decompression of distended abdomen, choice of appropriate sutures, control of infection and use abdominal drains. Wound dehiscence is related to the technique of closure of abdomen and the suture used. it is interned to study the closure of abdomen with non-absorbable (Polypropylene, Nylon) versus delayed-absorbable (Polydioxanone)in cases operated at V.S. Hospital , Ahmedabad with respect to the effectiveness of these different suture materials in our setup.

METHODS AND MATERIALS:The present clinical Prospective comparative study was carried out at the surgery department of V.S. hospital from June2014 to Jan 2017. Patients underwent both elective and emergency laparotomy through midline vertical incisions. First 50 cases of midline laparotomy closure were studied with these three suture materials; Polydioxanone (PDS), Nylon and Polypropylene (PPL) with/without retention suture. The patients were followed regularly after surgery up to 6 months.

RESULT: Wound infection is the most important single factor in the development of burst abdomen and incisional hernia.61The incidence of wound infection was in Polypropylene (Prolene)(12.5%), in Polydioxanone (PDS) (20%) and in Loop Nylon(12.5%) .The incidence of wound infection was related to type of surgery . As in over study infections were higher in emergency surgery then planned surgery, it was 10% in PDS group,12.5% in PPL group and 12.5% in loop nylon group. And in planned surgery only one case had wound infection, which was in nylon group.

CONCLUSION: continuous suture technique using no.1 loop Polydioxanone (PDS) had comparatively higher incidence of wound infection, and also report a case of burst abdomen, but had low incidence of scar pain for closure of midline laparotomy incision, No.1 Polypropylene had high incidence of stitch granuloma and Loop nylon no.1 had a low incidence of infection and stitch granuloma but high incidence of scar pain.. Burst abdomen had high

incidence in high risk patient irrespective of suture material used, however this incidence can be reduced by prophylactic retention suturing .

KEY-WORDS: Abdominal wound dehiscence , Burst abdomen, Incisional hernia, Stitch granuloma.

INTRODUCTION:

Whether inflicted by chance or sustained during a surgical procedure, every wound is simply a disruption of the normal continuity of tissue. When tissue has been disrupted so severely that it cannot heal naturally (without complications or possible disfiguration) it must be held in opposition until the healing process provides the wound with sufficient strength to withstand stress without mechanical support. Although the skill and technique of the surgeon is important, so is the choice of wound closure material^[1,2]. Every surgeon's dream is to close the abdominal incisions securely, so as to prevent complications, such as wound infection, dehiscence, incisional hernia, suture sinuses^[3]. Abdominal wound dehiscence is a common complication of emergency laparotomy in Indian setup. Wound dehiscence carries with it a substantial morbidity and mortality in addition to increase in cost of care. Its prevention is important to reduce postoperative morbidity and mortality. This however has not deterred continuing research in attempts to eliminate the problem^[4]. Factors as relates to burst abdomen and they recommended certain surgical measures. These measures included control of nausea and vomiting, decompression of distended abdomen, choice of appropriate sutures, control of infection and use abdominal drains. In this study surgeon's experience and use of more than two abdominal drains were factors significantly associated with wound dehiscence^[8]. Many patients have a poor nutritional status and the presentation of patients is often delayed. This makes the problem of wound dehiscence more common and graver. Wound dehiscence is related to the technique of closure of abdomen and the suture used. While the choice may not be so important in elective patients who are nutritionally adequate, do not have any risk factor for dehiscence and are well prepared for surgery, however it may prove crucial in emergency patients who often have multiple risk factors for developing dehiscence and strangulation of sheath is the proverbial last straw in precipitating wound failure^[9]. Since decades Polypropylene and loop nylon have been widely used for closure of laparotomy wound. Both are a monofilament, non-absorbable suture. Tensile strength of both lasts >1 year^[10]. A suture material Polydioxanone (PDS) was introduced to reduce the complication rate of laparotomy by its newer properties. Polydioxanone (PDS) is a monofilament, delayed absorbable

suture^[5]. So it is intended to study the closure of abdomen with non-absorbable (Polypropylene, Nylon) versus delayed-absorbable (Polydioxanone) in cases operated at V.S. Hospital, Ahmedabad with respect to the effectiveness of these different suture materials in our setup.

METHODS AND MATERIALS: The present clinical Prospective comparative study was carried out at the surgery department of V.S. hospital from June 2014 to Jan 2017. Patients underwent both elective and emergency laparotomy through midline vertical incisions. First 50 cases of midline laparotomy closure were studied with these three suture materials; Polydioxanone (PDS), Nylon and Polypropylene (PPL) with/without retention suture. The patients were followed regularly after surgery up to 6 months. A predesigned proforma was used to collect the information for individual cases. Data was collected, based on post-operative wound complications including post-operative wound infection, wound dehiscence, stitch granuloma, scar pain and incisional hernia.

Inclusion criteria:

- Both male and female patients.
- Patients older than 15 years.
- Consent to participate in study.
- Study included both emergency and elective laparotomy.
- Only continuous suture technique was used.
- Only vertical midline abdominal incision closures were included.

Exclusion criteria:

- Age < 15 years
- Patients with Pre or Postoperative diagnosis of advance stage malignancy
- Patients who have abdominal skin infection
- Patients who have previous history of laparotomy operation
- patients who have HIV infection

RESULTS: A total of 50 patients randomly selected were included from June 2014 to Jan 2017. After midline incisions, closure was performed with PDS loop, Polypropylene and Loop Nylon in 50 cases. Preference to mass closure was given to all patients. Proper skin care was taken and pre-operative and intra-operative antibiotic was given in all laparotomy.

TABLE – 1 : DISTRIBUTION ACCORDING TO AGE

AGE IN YEAR	NUMBER OF PATIENTS	CLOSURE WITH PPL	CLOSURE WITH PDS	CLOSURE WITH NYLON
16 – 25	14(28%)	5	4	5
26 – 35	11(22%)	3	3	5
36 – 45	12(24%)	6	1	5
46 – 55	8(16%)	1	2	5
56 – 65	4(8%)	1	0	3
66 – 75	1(2%)	0	0	1
TOTAL	50	16(32%)	10(20%)	24(48%)

PPL= Polypropelene, PDS= Polydiaxanone.

The mean age is 32 years and ranges from 16 to 75 years.

Majority of the study participants are in the age group of 16 – 25 years constituting 28 %.

TABLE – 2 : DISTRIBUTION ACCORDING TO SEX

SEX	PATIENTS	PERCENTAGE(%)
FEMALE	16	33
MALE	34	67
TOTAL	50	100

In our study, no. of male patients operated for laparotomy were more as compared to no. of females.

Here Male to female ratio is 1.94: 1.

TABLE 3 : DISTRIBUTION ACCORDING TO NATURE OF OPERATION AND SUTURE

MATERIAL

	EMERGENCY	PLANNED	PERCENTAGE
LOOP PDS (out of 10)	4	6	20%
POLYPROPYLENE (out of 16)	10	6	32%
LOOP NYLON (out of 24)	20	4	48%
TOTAL (50)	34	16	100%

PPL was used in 6 planned & 10 emergency laparotomy. Loop PDS was used in 6 planned & 4 emergency laparotomy. Loop Nylon was used in 4 planned & 20 emergency laparotomies

TABLE – 4 : INCIDENCE OF COMPLICATIONS

	PDS LOOP Out of 10	PROLENE Out of 16	LOOP NYLON Out of 24	TOTAL Out of 50	%
WOUND INFECTION	E=2 P=0 20%	E=2 P=0 12.5%	E=2 P=1 12.5%	6	12 %

BURST ABDOMEN	E=1 P=0 10%	E=0 P=0 0%	E=1 P=0 4%	2	4%
STITCH GRANULOM A	E=1 P=0 10%	E=2 P=2 25%	E=2 P=1 12.5%	8	16%
SCAR PAIN	E=0 P=0 0%	E=1 P=1 12.5%	E=3 P=1 16.66%	6	12%
INCISIONAL HERNIA	0	0	0	0	0

E=emergency operation, P= planned operation

The early and late wound complications encountered in all three suture materials used were as follows

- Wound infection is the most important single factor in the development of burst abdomen and incisional hernia.^[6] The incidence of wound infection was in Polypropylene (Prolene)(12.5%), in Polydioxanone (PDS) (20%) and in Loop Nylon(12.5%) .The incidence of wound infection was related to type of surgery.As in over study infections were higher in emergency surgery then planned surgery, it was 10% in PDS group,12.5% in PPL group and 12.5% in loop nylon group. And in planned surgery only one case had wound infection, which was in nylon group.
- The incidence of stitch granuloma was 1 (10%) in Polydioxanone (PDS loop),4 in Polypropylene (Prolene) sutures (25%) and 3 in loop nylon (12.5%).
- The incidence of scar pain was 2 in Polypropylene (Prolene) sutures (12.5%) and 4 in loop nylon (16.6%). Incidence of scar pain was more in loop nylon group then polypropylene group, however no pain was observed in PDS group. Pain which occurred, was mild pain(2-3) according to VAS scoring system and relieved by analgesic medicine. Similar study demonstrated a statistically higher incidence of scar pain in the Nylon group.^[6]
- There were 2 case of burst abdomen in the present study, which was done on an emergency basis in Polydioxanone (PDS) group and loop nylon group, both patient had high risk for burst abdomen.⁶³ There was no case reported with burst

abdomen in prolene group .one similarly study shows that there was high risk of burst abdomen with PDS group compare to other group.^[6]

□□Incidence of burst abdomen was 10% in high risk group if prophylactic retention suture not taken. Total 20 high risk patients were operated in them 2 patients had burst abdomen in whom prophylactic retention suture not taken. Retention suture was beneficial in high risk patients for prevention of burst abdomen irrespective of suture material used. Our conclusion that prophylactic retention sutures can decrease the incidence of abdominal wound dehiscence without imposing remarkable postoperative complications.^[5,6]

□□There was no incidence of incisional hernia in any group till 6 months follow up. The short follow up period (6 months) may be a possible reason for the absence of incisional hernias in this study since > 5% of incisional hernias have been reported to occur after 6–12 months⁶⁴. So this study required more follow up period for any comment on incisional hernia.

CONCLUSION:Based on the observations made in this study, it has been concluded that continuous suture technique using no.1 loop Polydiaxanone (PDS) had comparatively higher incidence of wound infection, and also report a case of burst abdomen, but had low incidence of scar pain for closure of midline laparotomy incision, No.1 Polypropylene had high incidence of stitch granuloma and Loop nylon no.1 had a low incidence of infection and stitch granuloma but high incidence of scar pain.. Burst abdomen had high incidence in high risk patient irrespective of suture material used, however this incidence can be reduced by prophylactic retention suturing .

REFERENCES:

1. Schwart'z principles of surgery, 9th edition
2. Mastery of surgery, 6th edition, surgical anatomy of hernia rings and editor's comment.
3. Eillis H. *Maingot's Abdominal Operations*. New York, NT: McGraw-Hill; 1997:395

4. Smith J A R. Complications: -Prevention And Management. Clinical Surgery in General 3rd edition. Edinburgh: Churchill-Livingstone 1999; 350.
5. Gislason H, Viste A. Closure of burst abdomen after major gastrointestinal operations: *European Journal of Surgery* 1999 Oct; **165**: 958 – 61.
6. Fleischer G M, Renner A, Rulmer M. infected abdominal wall and burst abdomen: *Chirurgische (Germany)* July 2000; **71**: 754- 62.
7. Graham D J, Stevenson J T, McHenry C R. The association of intraabdominal infection and abdominal wound dehiscence. *American Journal of Surgery*, July 1998; **64**: 660 – 5.
8. Soran A, Col C, Col M. Can postoperative abdominal wound dehiscence be predicted? *Tokai Journal of Clinical Medicine (Japan)* June 1998; **23**:123-7.
9. Hodgson NC, Malthaner RA, Ostbye T. The search for an ideal method of abdominal fascial closure: a meta-analysis. *Ann Surg.* 2000;231:436–442.
10. Bedside clinics in surgery , 2nd edition , page – 943 . suture materials
11. Anthony G. Healing and management of Wounds. Bailey & Love's Short practice of surgery, 21st edition, Chapman & Hall 1991; 1.