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General Surgery

EVALUATION OF ABSORBABLE VICRYL 910 VS NON-ABSORBABLE PROLENE SUTURE MATERIALS FOR CLOSURE OF EMERGENCY MIDLINE LAPAROTOMY WOUNDS

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ABSTRACT **Background:** The abdominal cavity is an intricate and vital anatomical space where numerous essential physiological processes take place to sustain life. However, it's vulnerable to various extrinsic and intrinsic disruptions, such as injuries, infections, and diseases, which can lead to organ dysfunction and compromise overall health. Surgical intervention, in the form of laparotomy, is often necessary to address these issues and restore normal functioning. However, postoperative complications can arise, including wound dehiscence, a condition where the surgical wound re-opens, compromising the healing process and potentially leading to further complications. To address this, a comprehensive prospective randomized study was conducted to compare the efficacy and safety of using absorbable Vicryl 910 and non-absorbable Prolene sutures in closing abdominal wounds following emergency surgeries. The primary objective was to determine which suture material is associated with a lower incidence of wound dehiscence, promoting optimal wound healing and reducing the risk of postoperative complications. **Materials And Methods:** In this study, two groups of patients underwent abdominal surgery and were analyzed for wound closure outcomes. Group A consisted of 20 patients whose incisions were closed using a continuous far and near suture technique with absorbable Vicryl 910 sutures. In contrast, Group B comprised 20 patients whose incisions were closed using the same technique but with non-absorbable Prolene sutures. **Conclusion:** The study revealed a higher incidence of wound dehiscence in both groups compared to previous research. Out of the 40 patients analyzed, 4 experienced wound dehiscence, with 3 cases occurring in the absorbable Vicryl 910 group and 1 case in the non-absorbable Prolene group. Contrary to expectations, the results suggest that non-absorbable Prolene suture material was a better and more cost-effective option for closing vertical laparotomy wounds, as it demonstrated a lower incidence of wound dehiscence compared to absorbable Vicryl 910.

KEYWORDS :

INTRODUCTION

As for skin incisions, all abdominal incisions should be planned in advance of surgery and take into consideration access to the relevant organs, surface landmarks, pain control and cosmetic outcome. The incision should be carried deeper through the subcutaneous tissues and then, depending on the site of the incision, the muscle layers should be divided or split, and the peritoneum displayed. Every incision should be made with closure in mind, and the layers appropriately delineated. Mass closure of the abdominal wall is usually advocated, using large bites and short steps in the closure technique and either non-absorbable (e.g. nylon or polypropylene) or very slowly absorbable suture material (e.g. polydioxanone suture (PDS). It has been estimated that, for abdominal wall closure, the length of the suture material should be at least four times the length of the wound to be closed to minimize the risk of abdominal dehiscence or later incisional hernia.[1]

Abdominal wall closure has changed over time in large part due to improvements in suture materials and characteristics. The ideal suture material for abdominal wall closure is one that resists infection, provides adequate tensile strength to prevent abdominal wall disruption, minimizes tissue damage, and is absorbable. In current practice, a significant percentage of abdominal wall incisions are closed with slow-absorbing monofilament sutures such as polydioxanone (PDS, Ethicon and Johnson & Johnson). Polydioxanone has an advantage over polyglactin(vicryl) with longer strength retention profile and absorption time, as well as being a monofilament that may resist infection to a greater degree than the braided suture. Use of non-absorbable sutures for abdominal closure (e.g., polypropylene) has been associated with increased patient pain and sinus tract formation, and their use has shown no significant difference in the incidence of incisional hernia formation, wound dehiscence, or surgical site infection (SSI) as compared to that of absorbable suture.[2]

One postoperative complication that might arise after abdominal surgery is wound dehiscence. Post operative complete wound dehiscence is an unfortunate condition, and serious complication is associated with a high morbidity and mortality rate. Using improved methods and suture materials, surgeons have been working tirelessly to overcome postoperative difficulties related to laparotomy wound closure. Several reviews have studied the optimal suture repair for closing the abdominal fascia, but no consensus has been reached.

Aim Of The Study

To compare Absorbable vicryl 910 and Non-absorbable prolene suture material in closing emergency midline laparotomy wound.

MATERIALS AND METHODS

A prospective study was conducted on 40 patients undergoing an emergency midline laparotomy for various indications in the department of general surgery at Navodaya Medical College Hospital and Research Centre, Raichur over a period of 12 months. Patients for emergency abdominal surgeries can be of any gender and any age groups were included in the study. Pregnant females, patients with presence of abdominal hernias, patients with previous laparotomy and patient unfit for spinal anesthesia were excluded from the study. The patients were divided into two groups:20 patients were allocated in two groups each, namely group A or Group B, randomly using randomization tables.In study group A, patients undergoing mass closure of abdominal wound was done using an absorbable vicryl 910, where as in study group B, mass closure of abdominal wound was done using non-absorbable prolene .Comorbid factors such as anemia, hypertension, and diabetes mellitus will be corrected where possible.For both the suture materials, a similar strength of suture material was used (No. 1) and broad bite across the rectus sheath were used to close the fascia in a single layer using a continuous far-and near-suture method.. The wound was inspected on the third, fifth, seventh, and ninth post-operative days for evidence of any redness, infection, or dehiscence. Analysed data was presented in suitable graphical and tabular form by using SPSS software. Categorical data was presented as proportions and continuous data was presented as mean and standard deviation.

RESULTS

The study aimed to investigate the comparative efficacy of absorbable Vicryl 910 and non-absorbable Prolene suture materials for rectus closure in emergency cases, with a focus on early postoperative outcomes. A total of 40 patients who met the inclusion criteria were randomly divided into two groups of 20 each, with one group receiving Vicryl 910 and the other receiving Prolene.

Demographically, the study population consisted of more males

(52.5%) than females (47.5%), with a median age range of 40-50 years (53% of patients were older than 45 years). Notably, there was no significant association between age or gender and the development of burst abdomen.

Postoperatively, four patients (10%) developed burst abdomen, with three (60%) of these cases occurring in the Vicryl 910 group and one (40%) in the Prolene group. Interestingly, all four patients who developed burst abdomen had a surgical duration exceeding 2.5 hours, and all had a midline incision (one female and three males).

These findings suggest that the use of absorbable Vicryl 910 may be associated with a higher risk of burst abdomen compared to non-absorbable Prolene, particularly in patients with prolonged surgical durations.

Table 1: Gender Distribution

Gender	Male	52.50%
	Female	47.50%

Table 2 : Age Distribution

Age Distribution	Frequency
Less than 20	0
20-30	4
30-40	8
40-50	16
50-60	8
60-70	4

Table 3: Burst Abdomen Occurrence

Burst Abdomen	Occurrence
Yes	4
No	36

Table 4: Day off Occurrence of burst abdomen

Day	Number of patients
Day 2	1
Day 5	1
Day 8	2

Table 5: Duration of Surgery

Duration of surgery	Frequency
1 Hours	3
1.5 Hours	4
2 Hours	9
2.5 Hours	5
3 Hours	11
3.5 Hours	5
4 Hours	2

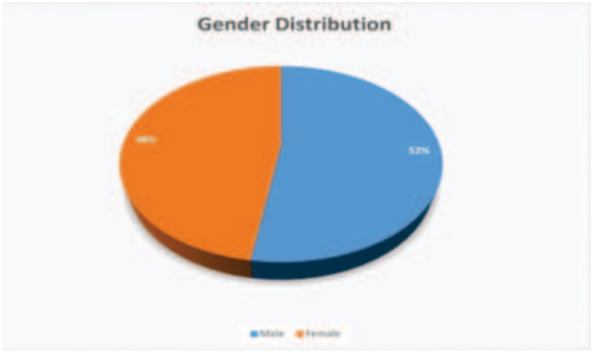

Figure 1: Gender Distribution

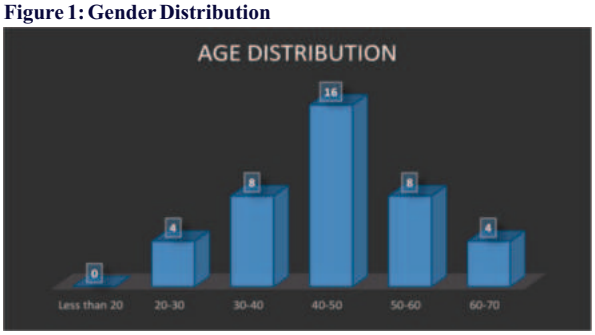

Figure2 : Age Distribution

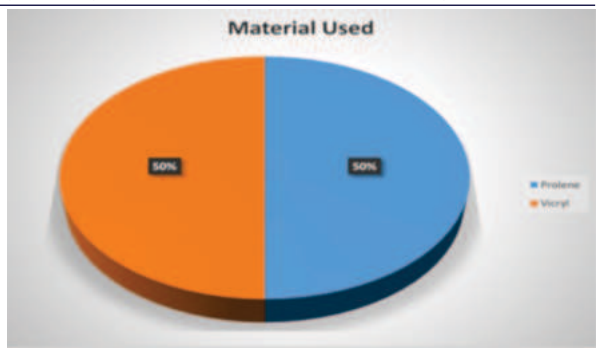

Figure3: Materials used

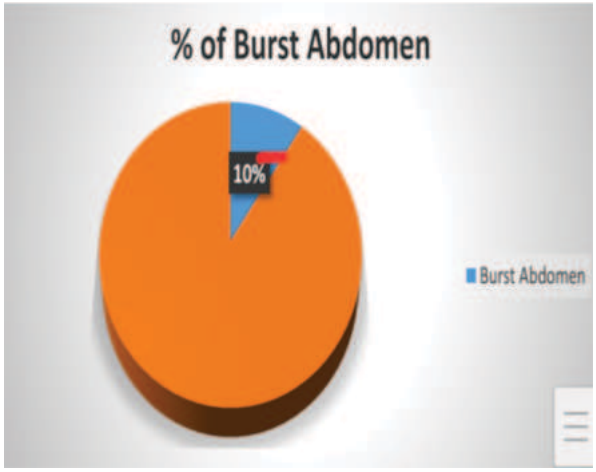

Figure 4: Burst Abdomen Occurrence

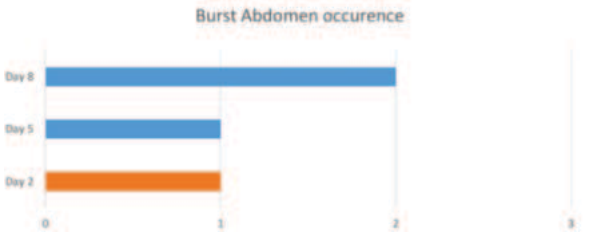

Figure 5: Day of Occurrence

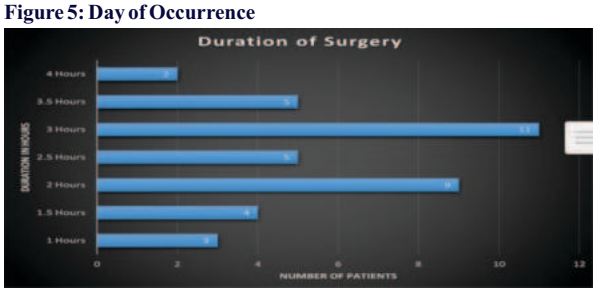

Figure 6: Duration of Surgery

DISCUSSION

Laparotomy wounds can deteriorate in various ways, including abdominal wound dehiscence, which involves the disruption of few layers, and burst abdomen, a more severe complication characterized by the give-way of all layers, with or without evisceration. The occurrence of wound dehiscence is multifactorial, dependent on both patient-related factors (age, gender, glycemic control, respiratory tract infections, surgical site infections, malnutrition, obesity, etc.) and technical factors (surgical technique, suture material, suturing technique, surgical duration, incision type, intraoperative sepsis, blood loss, hypotension, and closure method).

Several risk factors are associated with a higher likelihood of wound dehiscence, including advanced age, male gender, uncontrolled diabetes, surgical site infections, violent coughing, and prolonged surgical duration, sepsis, and midline incisions. The interplay of these factors contributes to wound dehiscence, making it unlikely that a single factor solely leads to this complication.

The standard technique for rectus closure involves continuous mass closure with delayed absorbable sutures, adhering to a suture-to-wound length ratio of 4:1, with 1.5 cm interbite distance and 1.5-2 cm from the wound edge. High-risk patients may receive prophylactic retention sutures. Preoperative comorbidities, intraoperative sepsis, and postoperative complications are associated with wound dehiscence, which can be assessed using various risk indices, such as the Rotterdam, Webster, and VAMC scores. Recently, novel suturing methods have emerged for rectus closure, offering potential improvements in wound closure outcomes.

CONCLUSION

The present study observed a higher incidence of wound dehiscence in both groups compared to previous literature. Notably, the group using ABSORBABLE VICRYL 910 sutures had a significantly higher rate of wound dehiscence compared to the group using non-absorbable Prolene sutures. Our findings suggest that NON-ABSORBABLE PROLENE is a superior and more cost-effective suture material for closing vertical laparotomy wounds, contrary to previous studies that favored absorbable sutures. These results have important implications for surgical practice and wound management, highlighting the need for further research to optimize suture material selection and reduce wound complications.

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