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Comparative study of non-absorbable versus delayed absorbable suture material and suturing technique in midline abdominal closure

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Abstract
Introduction: 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.
Methodology: We assessed, wound infection rates in 320 patents 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 sius 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.

1. Introduction
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. 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.

2. Material and methods
The present study was carried out in a private university hospital, Bhopal on 250 patients during the period of Jan. 2013 to July 2014 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 pts ranged from 16-75 years. Overall, nearly 50% of pts. were in 16-35 years age group in both suture material and suture technique group. Total male to female ratio was found to be 186:64 (3:1), indicating a male predominance in the study.

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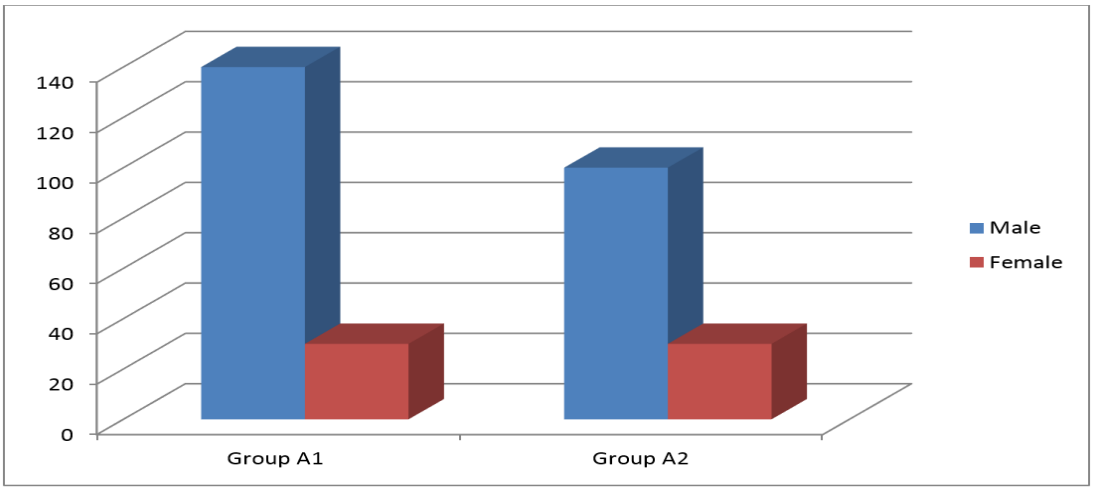
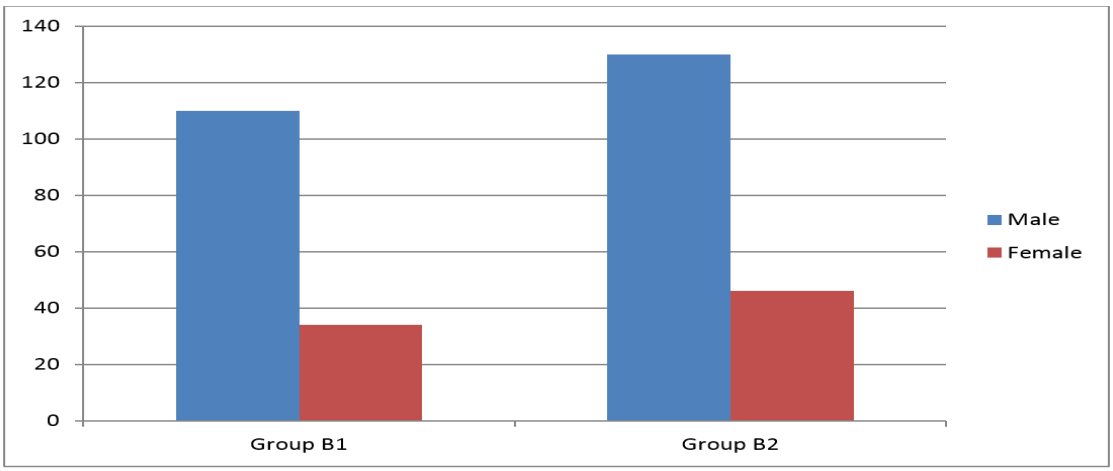
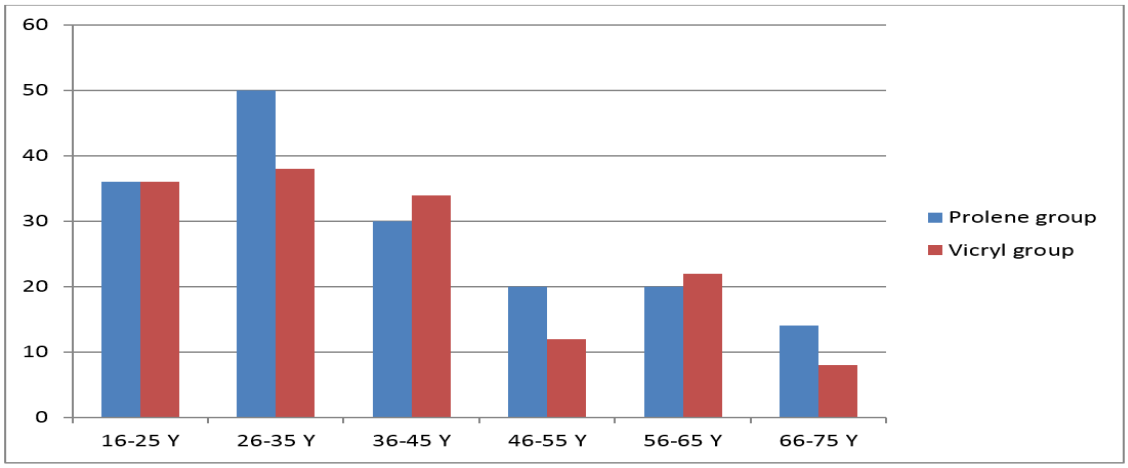


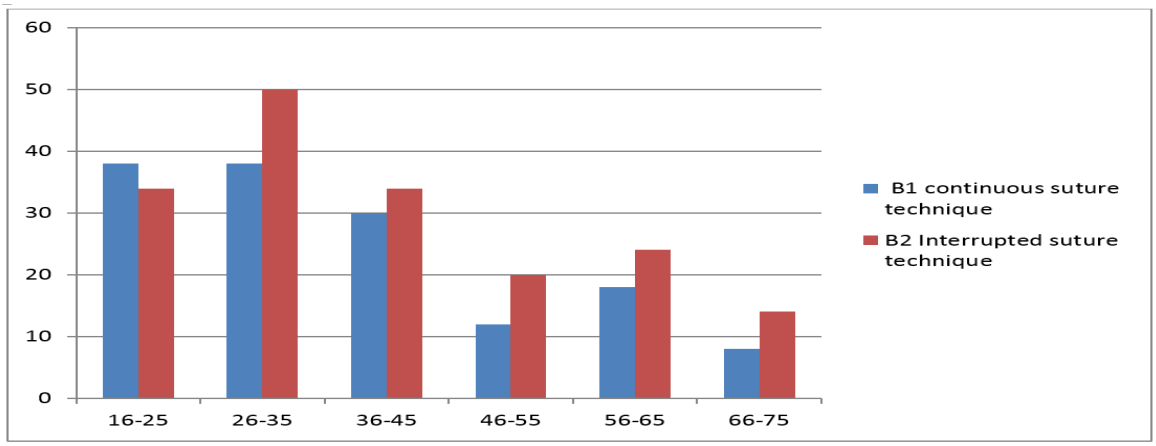
Sex distribution in suture material study



Sex distribution in suture technique study

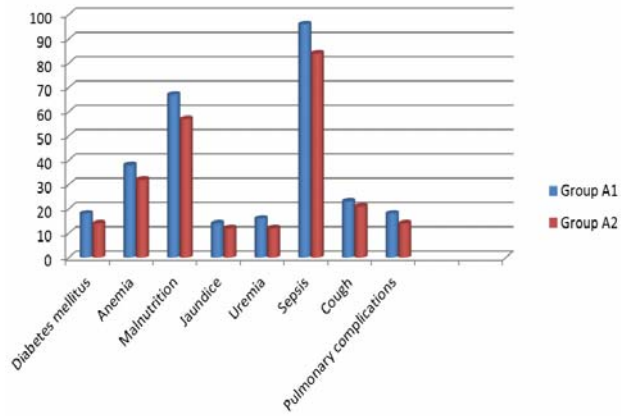


Age distribution in suture material group



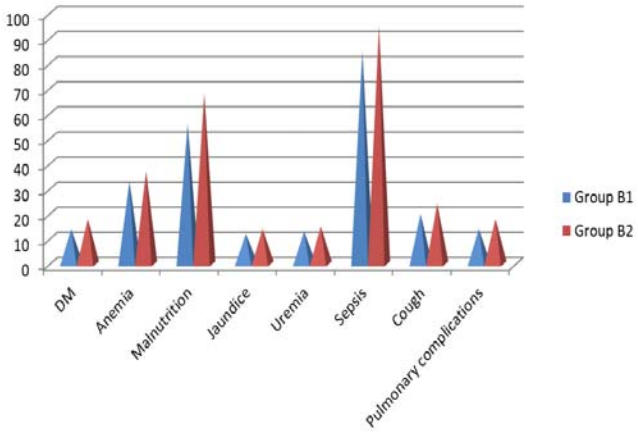
Age distribution in suture study technique study

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.



Risk factors distribution in suture material study

The rate of wound complications in suture material study such as wound infection (A1, 20.35%; A2 19.33%); Burst abdomen (A1, 10.94%; A2 10.00%) 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.



Risk factors distribution in suture technique study

The rate of wound complication in suture technique study such as wound infection (B1, 20.22%; B2 19.59%); Burst abdomen (B1, 10.5;B2, 10.5%) were not statistically significant (P>0.05) but 2 cases of continuous technique with prolene suture had sinus formation (1.39%) while in interrupted technique with prolene suture 20 pts. develop sinus formation (11.37%).

In infected cases the rate of wound complications in the suture material, study group such as wound infection (A1, 28.20%; A2 25.38%); Burst abdomen (A1, 18.76%; A2, 16.67%) were not statistically significant (p>0.05) but 12 cases (10.5%) develop sinus formation with Prolene suture in contrary, no case with Vicryl group develop such complication.

In infected cases the rate of wound complications in suture technique study such as wound infection (B1, 26.23; B2, 27.48%); Burst abdomen (B1, 15.65%; B2, 15.89%) were not statistically significant (p>0.05) but 1 case of continuous technique with Prolene suture had sinus formation (1.17%) while in interrupted technique with Prolene suture 9 patients develop sinus formation (10.52%).

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)

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. 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.

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