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Post Operative Wound Complication in Ma-Jor Abdominal Surgeries By Using Prolene ,Pds 11 and Pds Plus Suture Material

KEYWORDS

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INTRODUCTION

Approximately 700,000 open abdominal procedures are performed annually in Germany and 4,000,000 in the United States.[1] Incidence (annual) of abdominal surgery around the world is 25 per 10000.[2] Development of incisional hernia remains the major postoperative wound complication after open abdominal surgery with a stable incidence of 5% to 24% over the last decades.[3,4]

52% of incisional hernias occur within 6 months post operatively, burst abdomen occurs within 6 to 8 days after surgery and infections are excess in the early days of post op.

The ideal method of abdominal wound closure should be technically simple and should be free from the post operative wound complications like wound infection, wound dehiscence, incisional hernia, suture sinus formation and should leave a reasonably aesthetic scar.

Closure of abdominal incision with different suture materials has been a matter of great controversy. Prolene is amongst the common materials used for closure of abdominal incision.

The introduction of PDS plus for closure of abdominal incisions has completely changed the scenario in form of Surgical site infections.

Both the techniques of abdominal closure and the suture material to be used, continue to excite debate.

OBJECTIVES OF THE STUDY

To measure the frequency of occurrence of post-operative surgical site infection in cases undergoing use of Prolene, PDS 11 and PDS plus.

To identify and isolate the best suture material for incision closure in terms of occurrence of incisional hernia

REVIEW OF LITERATURE

After abdominal incisions, patient's skin has always to be closed separately at the time of operation.

There are two other layers to be closed, i.e., peritoneum, which is attached to posterior rectus sheath in case of midline incisions or inner muscular layers in case of lateral incisions, and anterior rectus sheath in case of midline wound or muscular layers in laterally placed incisions.[8,9]

These layers are usually closed in two-layers with the skin as second layer. However, they can also be closed in classical three layers, i.e., peritoneum as first layer muscles, rectus sheath or linea alba as second layer, and skin as third layer.[10,11]

Different types of suture materials are used for closure of abdominal incisions. Great variety of suture materials and needles has been developed to provide an adequate closure of the fascia and thus the abdominal wall.

Despite advances in surgical techniques and materials, abdominal personal preference with reliance on tradition and anecdotal experience.[12,13]

Evidence from randomized clinical trials and meta-analysis indicate that a continuous running non-absorbable or slowly absorbed suture such as polydioxanone is the method of choice for abdominal wall closure. Continuous polydioxanone has a similar incisional hernia rate of to its non-absorbable counter parts but causes less chronic pain and wound sinuses. Lateral paramedian incision is associated with a lower incidence of incisional hernia when compared with other abdominal incisions. Transverse abdominal incisions have no advantage over midline incisions in reducing incisional hernia rate.[14]

Sutures- would have less than 5 percent of normal tissue strength during the first postoperative week, thus wound security is dependent solely upon the suture closure.[15]

Size – Suture should be the smallest caliber that is strong enough to re-approximate the tissue and keep the wound intact during normal postoperative activity.[16] Suture caliber is one factor in minimizing the amount of foreign material in the wound. Fascia closure has remained a procedure that often reflects a surgeon's.

OBSERVATION AND RESULT

This study was undertaken from October 2014 to January 2016 in the department of surgery, Yenepoya medical college and hospital, Mangalore.

The observations of our study were as follows:

Total patients –90

All patients were operated in an elective and emergency setup, with use of midline incision for exploration and sutured with en mass continuous running technique.

En mass closure was done with the use of Prolene, PDS II and PDS Plus with 30 patients for each in a randomized way.

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Total male patients were 59.

Total female patients were 31, with M:F ratio of 1.9:1.

Out of 90 cases, the maximum numbers of cases were seen in the age group of 51 to 60 and 61 to 70 years of age group and the least number of cases were seen in the lesser than 31 to 40 years of age group. The youngest patient in our study was 16 year old and oldest was 72 years old

Table1: Distribution according to suture material used and wound complications

Suture	Wound complications(percentage)				
	Wound dehiscence	SSI	Chronic pain	Sinus Formation	Incisional Hernia
Prolene	36.7%	53.3%	33.3%	10.0%	3.3%
PDS	16.7%	26.7%	13.3%	0	6.7%
PDS Plus	6.7%	3.3%	6.7%	0	0

Table 2: Distribution of complications according to Intra operative diagnosis

Diagnosis	Total patients	Wound dehiscence	SSI	Pain	Sinus	Incisional Hernia
CA Rectum	15	4	5	4	1	0
CA Sigmoid colon	8	1	3	3	0	0
CA Ascending colon	10	3	3	2	0	1
Cholangiocarcinoma	6	1	2	0	0	0
Intestinal obstruction	25	5	8	5	2	2
Gastric outlet obstruction	5	0	1	0	0	0
Chronic calcific pancreatitis	5	1	0	1	0	0
Mesenteric cyst	6	1	1	1	0	0
CA Stomach	4	1	1	0	0	0
CA Head of pancreas	2	0	0	0	0	0
CA 1/3rd lower esophagus	1	0	0	0	0	0
GIST	3	1	1	0	0	0

SUMMARY

The objective of the study was to measure the frequency of occurrence of post-operative surgical site infection in cases undergoing use of Prolene, PDS and PDS plus and to identify and isolate the best suture material for incision closure in terms of occurrence of incisional hernia. All patients were operated in an elective and emergency setup, with use of midline incision for exploration and sutured with en mass continuous running technique.En mass closure was done with the use of Prolene, PDS II and PDS Plus with 30 patients for each in a randomized way.

There are no significant differences between PDS II and PDS Plus except the rate of infection being less with PDS Plus due to the presence of antiseptic (3.3% in PDS Plus and 26.7% in PDS II). There was statistically significant higher risk of knot palpability, chronic pain and suture sinus development following the use of prolene compared to PDS II and PDS Plus.

According to this study PDS Plus should be given preference in the closure of laparotomy wounds especially when colorectal surgeries have been carried out. If cost effectiveness is the issue then PDS II should be preferred over Prolene.

CONCLUSION

In present study the results were compared with the studies done previously. In the fixed effect model the comparison between Prolene, PDS II and PDS Plus was carried out in terms of risk of post operative complications like SSI, wound dehiscence, risk of incisional hernia, suture sinus formation and post operative chronic wound pain.

Prolene, PDS II and PDS Plus were equally effective for closure of midline wound following laparotomy closed by continuous running technique.

There are no significant differences between PDS II and PDS Plus except the rate of infection being less with PDS Plus due to the presence of antiseptic (3.3% in PDS Plus and 26.7% in PDS II).

However use of PDS Plus is not cost effective and so it requires further studies to be conducted to evaluate the availability, cost effectiveness and measurement of health related quality of life, instead of analyzing there effectiveness in laparotomy closure. PDS Plus and PDS II use was favored over Prolene to avoid the palpability of knot beneath the skin, chronic pain due to irritation and subsequent sinus formation, prolene being non absorbable synthetic material. There was statistically significant higher risk of knot palpability, chronic pain and suture sinus development following the use of prolene compared to PDS II and PDS Plus.

In present study it was found that wounds closed with PDS II and PDS Plus were more comfortable, fewer knots were palpable and vey less patients experienced wound pain. Therefore PDS Plus and PDS II have advantage over Prolene.

The average incidence of 3.3% patients who developed incisional hernia are required additional surgery for repair of hernia. This brings morbidity and extra cost associated with incisional hernia repair. The development of incisional hernia following laparotomy is not suture specific, but is multifactorial including (a) patient related factors – age, higher BMI index and multiple co morbid conditions, (b)

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biological factors – include the capacity of normal collagen synthesis and subsequent organization affecting sound biological repair, where abnormal biological healing of the fascial sheaths leads to the development of incisional hernia and therefore these biological factors cannot be modified (c) the operative and technical factors – are considered in causation of incisional hernia should get more focus and priority in preventive strategies. There was no significant statistical difference in the incidence of incisional hernia following the use of Prolene and PDS – II sutures for abdominal fascial closure. In present study overall wound dehiscence rate of 36.76% with Prolene as against an average dehiscence rate of 11.5% with PDS II and PDS plus taken together. The high failure rate with prolene may be related to tendency of knot slippage, suture cutting through the tissues and fracture of Prolene suture material.

PDS II and PDS Plus retains its strength for a considerable time and is eventually absorbed. PDS Plus is coated with Triclosan antiseptic which inhibits the growth of common bacteria implanted in the laparotomy wound, which brings down the overall rate of post operative wound infection, therefore decreasing the hospital stay, use of sophisticated dressings, need of isolation of bacteria by culture and sensitivity test and overall morbidity.

The complete prevention of wound dehiscence and incisional hernia formation seems to be unattainable goal, but in present study the incidence of these complications can be reduced by preventing abdominal wound sepsis. The incidence of post operative abdominal wound infection can be significantly reduced by prophylactic use of antiseptic coated suture material like PDS Plus.

Therefore PDS Plus should be given preference in the closure of laparotomy wounds especially when colorectal surgeries have been carried out. If cost effectiveness is the issue then PDS II should be preferred over Prolene.

No further trials are required for the evaluation of suture materials in laparotomy wound closure according to the results of outcomes of our study. Further randomized trials may be directed to evaluate variables such as availability, cost effectiveness, health related quality of life measurement, duration of hospital stay, operative time, long term follow up and readmission rate due to post operative adhesion formations.

In conclusions PDS Plus and PDS II may be an alternative suture to Prolene for midline laparotomy incisions using continuous running closure technique