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Prospective Study of Effect of Prophylactic Retention Sutures in Midline Laparotomy in High Risk Patient for Prevention of Wound Dehiscence

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Abstract: ***Aim and Objectives of the Study: To assess the reduced rate of dehiscence in midline laparotomy using prophylactic retention sutures in high-risk patients. Materials and Methods: 100 patients undergoing midline laparotomy within the inclusion criteria in General Surgery Department Of Govt Rajaji Hospital for a period of 1 year. This divided into two categories and followed up and findings were collected. A central randomization was performed. wound dehiscence wound infection ,pain on pod 1 pod3 , pod 5, pod 7 were assessed results were analysed using chi square test and paired t test. Results: Only one patient in test group developed post operative wound dehiscence compared to 8in control group p value (<0.001). 22 patients developed wound infection in test group compared to 21 patients in control group p value(0.342).mean pain score on POD 5 in test group was 3.19 compared to 2.67 in control group p –value(<0.001) mean pain score on POD 7 in test group was 1.68 compared to 1.19 in control group p value(<0.001) Conclusion: In the presence of a high possibility for developing wound dehiscence due to the accompanying conditions, the benefits of retention sutures may outweigh the disadvantages and the technique should be considered.***

Keywords: Prophylactic Retention Sutures, Wound Dehiscence

1. Introduction

The occurrence of sudden disruption of the abdominal laparotomy wound is a major disaster in the life of a patient who has undergone an abdominal operation and a major psychological blow to the patient as well as the surgeon. The partial or complete postoperative separation of abdominal wound closure is known as wound dehiscence or acute wound failure. Acute wound failure is defined as postoperative separation of the abdominal musculoaponeurotic layers, within 30 days after operation and requires some form of intervention, usually during the same hospitalization. Most Wound dehiscence occur between the 6th and 9th postoperative day.

The integrity of the sutured abdominal wound depends on a balance between the suture holding capacity of tissues and tissue holding capacity of sutures. Numerous clinical trials have compared layered to mass abdominal closure. Some studies have shown an increased incidence of wound dehiscence and incisional hernia with layered closure, and some studies show no difference in these complications, but no studies have shown an advantage of layered over mass closure. With recent advances in suture material and the use of mass closure technique the rate of dehiscence has generally been less than 1%, The prevalence of wound dehiscence in Indian scenario is found to range from 10-30% for emergency cases and 0-5% for elective cases

2. Review of Literature

It has been shown experimentally by Jenkins that the length of a midline laparotomy incision can increase up to 30% in the postoperative period in association with several factors that increase the intra-abdominal pressure and determined that a suture length-to-wound length ratio should be 4:1. A meta analysis on 23 randomized trials showed that odds of wound dehiscence was reduced to half with interrupted method of closure compared to continuous method.

In emergency surgery, interrupted sutures are better than continuous method as they have “gigli saw” or “hack saw” effect. Various types of interrupted sutures are described. They are Smead-Jones far and near technique, figure of eight, Huges technique of double far and near horizontal mattress and the latest interrupted X suture by Srivastava A et al.

Bucknall et al prospectively studied 1129 abdominal operations and demonstrated that layered closure was associated with a significantly higher dehiscence rate compared with mass closure (3.81% vs. 0.76%). Similarly other studies have also shown that mass closure have low incidence of both wound dehiscence and incisional hernia.

In Asian countries the incidence of abdominal wound dehiscence is still very high and stays above the 10% level due to various factors which include the following;

1) Widely prevalent malnutrition
2) Lack of proper health care delivery system providing emergency surgical treatment.
3) The operation at the rural and suburban level may be often delayed for a day or more resulting in much tissue necrosis of the linea alba
4) More marked systemic inflammatory response syndrome adversely affecting healing and collagen synthesis.

3. Materials and Methods

100 patients undergoing midline laparotomy within the inclusion criteria in General Surgery Department Of Govt Rajaji Hospital for a period of 1 year where included in our study after getting proper written informed consent. This patients was followed for 2 week period and were divided into two categories and followed up and findings were collected. A central randomization was performed. The randomization sequence was based on a computer-generated list. In the control group, the fascia is closed in a continuous manner using continuous 1 prolene located 1 cm from the edge of the linea alba with 1-cm intervals. The continuous suture was locked intermittently every 5 cm to divide the long continuous suture into multiple smaller sections .Subcutaneous tissue was not sutured, and skin was closed using interrupted suture of 2-0 silk

In the intervention group, the fascia was sutured using the same technique as the control group in addition, to it retention sutures were added using a1 prolene every 10 cm and contained 5 cm of the skin, subcutaneous tissue, rectus muscle, and abdominal fascia (except peritoneum) on each side. The first retention suture was placed 5 cm above the lower end of the incision and repeated every 10 cm toward the upper part of the incision.

Inclusion Criteria

Patient undergoing midline laparotomy 10-cm surgical incision minimum, and having 2 of the following preoperative risks factors for WOUND DEHISCENCE

1) Poor nutritional status (clinical cachexia or hypoalbuminemia);
2) Intra-abdominal infection;
3) Uncured extensive-stage malignancy;
4) Use of corticosteroids in the last 12 mo (>10 mg/d prednisolone or equivalent for 3 mo);
5) Uremia;
6) Hemodynamic instability (bp _90mmhg);
7) Haemoglobin <10 mg/dl (due to perioperative blood loss or anemia);
8) Predicted abdominal distension (due to ascites or prolonged ileus);
9) Chronic pulmonary diseases;
10) Clinical jaundice (total bilirubin >3 mg/dl);
11) Diabetes mellitus;
12) Age >60 y

Exclusion Criteria

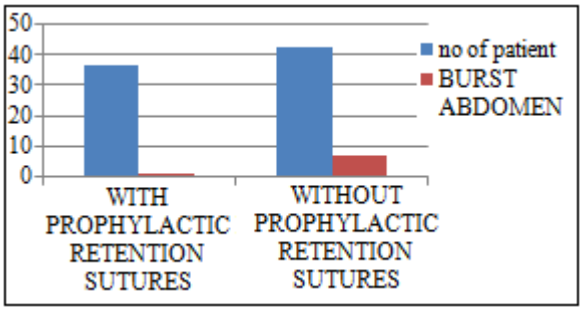
1) Patients younger than 18 y
2) Incision length of <10 cm

4. Results

Wound Dehiscence

Among the 80 patients in our study prophylactic retention sutures were applied for 37 patients and 53 patients were taken as control. Among the 37 patients only one patient developed post operative wound dehiscence comparing to the control group in which among the 53 patients 8patients developed post operative wound dehiscence ,with a significant p value(<0.001).

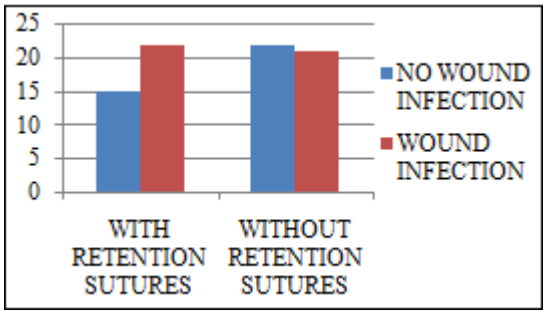
	No of Patients	Wound Dehiscence
With Prophylactic Retention Sutures	37	1
Without Prophylactic Retention Sutures	43	7



Wound Infection

Among the 80 patients 41 patients developed wound infections which was treated appropriately, among the patients with prophylactic retention sutures 22 patients out of 37 developed wound infection in comparison with those without prophylactic sutures 21 patients out of 43 developed wound infection without a significant p value(p value 0.342)

Prophylactic Retention Sutures	Wound_Infection		Total	p value	Odds Ratio (95% CI)
	Yes	No			
YES	22 (59.45%)	15 (40.54%)	37 (100%)		1.54
NO	21 (48.83%)	22 (51.16%)	43 (100%)	0.342	(0.63-
Total	43 (53.75%)	37 (46.25%)	80 (100%)		3.73)



Pain Assessment

Among the patients with prophylactic retention sutures the mean pain score on day 1 was 7.08 when compared to the mean score of without prophylactic sutures being 7.21 without significant p value (p value-0.414).Mean pain score on day3 for patients with prophylactic retention sutures were 4.95 when cared to that without prophylactic retention sutures being 4.84 without significant p value(p value-0.463)

But when comparing the pain score on POD 5 the mean pain score for those with prophylactic retention sutures was 3.19 compared to those without retention sutures being 2.67 with a significant p –value(p value-<0.001)

Again when comparing the pain score on POD 7 the mean pain score for those with prophylactic retention sutures was 1.68 compared to those without retention sutures being 1.19 with a significant p value (p value-<0.001)

	Prophylactic Retention Sutures	N	Mean	Std. Deviation	P Value by 't' Test
Pain Score Day 1	YES	37	7.08	0.76	0.414
	NO	43	7.21	0.64	
Pain Score Day 3	YES	37	4.95	0.66	0.463
	NO	43	4.84	0.65	
Pain Score Day 5	YES	37	3.19	0.57	< 0.001
	NO	43	2.67	0.57	
Pain Score Day 7	YES	37	1.68	0.53	< 0.001
	NO	43	1.19	0.45	

5. Conclusion

When risk factors of wound dehiscence are in opposition to the complications of retention sutures, surgeons should determine which condition is more serious. Complications such as intestinal damage, skin maceration and cutting lesions, surgical site infections, and patient pain or discomfort prohibit the surgeons from performing this technique. However, in the presence of a high possibility for developing wound dehiscence due to the accompanying conditions, the benefits of retention sutures may outweigh the disadvantages and the technique should be considered.

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Author Profile

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