

A Study of Role of Wound Drain in the Open Mesh Repair of Incisional Hernia

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Abstract: A sum of 50 patients with incisional hernia were included in this study. The clinical features, symptomatology, investigations, operative findings, postoperative wound complications and length of hospital stay were analysed. Onlay Prolene mesh of size 15 x 15 cm was inserted in all patients. In half of them (25 patients) Redivac suction drains were kept and in remaining (25) patients no drains were inserted. Parameters like wound infection, wound seroma, reoperation for wound healing complications and postoperative length stay were monitored. From this study it was concluded that in cases of incisional hernias, during mesh repair, the usage of negative pressure Redivac suction drain helps in reducing wound infection rate, preventing the formation of seroma, reducing the number of secondary suturing and reducing the postoperative length of hospital stay. The advantages of the negative pressure therapy have been demonstrated as it improves healing times by increasing blood flow, extracting secreted fluid and maintaining the wound margins and protecting the wound from contamination.

Keywords: Incisional hernia, Mesh repair, Wound drain, Wound infection, Seroma, Secondary suturing, Length of hospital stay.

INTRODUCTION

An incisional hernia is a hernia that occurs through a previously made incision in the abdominal wall. They occur by definition after an operation, and are a remarkably common complication of abdominal surgery, with reported prevalence after 1 year at 5.2% and 2 years at 10.3% [1].

The layers of the anterior abdominal wall are normally strong, and act to maintain the integrity of the abdominal cavity. The intra-abdominal pressure is considerable and the surgeon aims at leaving the abdominal wall as strong as possible after operation, otherwise there exists a very real fear that portions of the abdominal contents may leave the abdominal cavity through the weak area, which are caused by a badly placed incision resulting in a condition known as incisional hernia [2]. There are numerous methods of repair of abdominal incisional hernia. They are simple suturing, shoe lace darn repair, Cattell's and Maingot's Kael repair etc., which are associated with recurrence. Since, the prosthetic graft has revolutionised the surgical field, the Prolene mesh is widely used to cover the defects in incisional hernia [3]. In this article, we shall analyse the advantage of inserting wound drain during mesh repair in an incisional hernia.

MATERIALS AND METHODS

A total of 56 patients who were admitted on elective basis were analysed for this prospective study conducted from 2014 to 2016. Out of 56 cases, 50 cases

were taken up for surgery. The remaining 6 cases not convincing to warrant surgery were excluded.

Inclusion Criteria

The patients with a previous history of abdominal surgery were only included in the study.

Exclusion Criteria

The patients who were on long time steroid therapy and chemotherapy were not taken for the study.

The detailed history, clinical examination, routine blood investigations, urinary parameters, ultrasound abdomen including measurement of size of hernial defect, ECG, echocardiogram and physicians fitness for the patients above 40 years were done. All diabetic patients were switched over from oral hypoglycaemic drugs to insulin and their blood sugar levels were maintained according to the diabetologist opinion. Patients with hypertension were controlled with antihypertensives. Patients having chest infection were treated with antibiotics. Hence, the patients were completely evaluated and assessed and then they were taken up for surgery.

In this study open mesh repair was done in all cases. The onlay technique involves primary closure of fascial defect and subsequent reinforcement by placing the mesh prosthesis on the top of the fascial repair. The mesh was secured to anterior rectus sheath. Closed suction drain catheter was placed over mesh and brought out through separate stab wound remote from incision in 25 patients. Remaining twenty five patients drain was not inserted. The decision to place the wound drain was based solely on the experienced surgeon's judgement who was not part of/involved in the study. In the present study, we had followed up all the patients after discharge for 15 days, 1 month, 3 months and few cases up to 12 months of duration.

RESULTS

Age distribution

Age distribution of incisional hernia in our study is as follows-

Table-1: Age distribution

Age in Years	Number of Cases	Percentage
21-30	2	4
31-40	6	12
41-50	24	48
51-60	13	26
61-70	5	10
Total	50	100

Among 50 patients, 24 patients (48%) were in the age group of 41-50 years, 13 patients(26%) were in the age group of 51 to 60 years, 6 patients (12%) were in the age group of 31-40 years, 5 patients(10%) were in the age group of 61-70 years and the remaining two patients were in the age group of 21-30 years, which was calculated as 4%.

Sex Distribution

Sex distribution of incisional hernia in our study is as follows-

Table-2: Sex Distribution

Sex	No. of cases	Percentage
Male	10	20
Female	40	80
Total	50	100

In our study, out of 50 patients, 40 patients (80%) were females and the remaining 10 patients were males, which were calculated as 20%.

Associated risk factors

Associated risk factors of incisional hernia in our study is as follows-

Table-3: Associated risk factors

Associated risk factors	No. of cases	Percentage
Diabetes mellitus	10	20
Obesity	9	18
Grand multi para	7	14
Hypertension	4	8
COPD	2	4
No risk factors	18	36
Total	50	100

In our study group associated risk factors like diabetes mellitus (20%), obesity (18%), grand multi para (14%), hypertension (8%) and COPD (4%) were seen.

Previous surgery

Details of previous surgery of our series is as follows-

Table-4: Previous surgery

Previous surgery	No. of Cases	Percentage
Duodenal perforation	3	6
Appendicectomy	1	2
Hysterectomy	10	20
Ileal perforation	3	6
LSCS	13	26
Transabdominal tubectomy	20	40
Total	50	100

In our study, out of 50 patients, 20 patients (40%) of incisional hernia had previous surgery of transabdominal tubectomy, 13 patients (26%) had previous surgery of lower segment caesarean section, 10 patients (20%) had previous surgery of hysterectomy, three patients each had previous surgery of duodenal (6%) and ileal perforation (6%) and one patient had previous surgery of appendicectomy, which was calculated as 2%.

Previous Incisions

The details of previous incision of our study population is as follows-

Table-5: Previous incisions

Incision	No. of Cases	Percentage
Infraumbilical midline	23	46
Right upper paramedian	06	12
Supraumbilical midline	06	12
Transverse infraumbilical	14	28
Macburney's incision	01	2
Total	50	100

Out of 50 patients, 23(46%) had infra umbilical midline incisional scar followed next by Pfannensteil incision in 14(28%) of patients.

Size of the hernia defect on USG

The ultrasound measured size of hernia defect in our study group is as follows-

Table-6: Hernial defect size on USG

USG Defect(cm)	Number of Cases	Percentage
<3	33	66
4	14	28
>5	3	6
Total	50	100

In our series, 33(66%) patients had USG measured defect of 3 cms or less and 3(6%) USG measured defect of 5 cms or more than 5 cms.

Wound drain

In our study population, after open mesh repair for all patients, Redivac suction drain was kept over the mesh in 25 patients and then subcutaneous tissue and skin was closed with 2-0 vicryl and 3-0 ethilon, respectively. This was drain arm group. In the remaining 25 patients, no drains were kept and hence after mesh repair the subcutaneous tissue and skin was closed with 2-0 vicryl and 3-0 ethilon respectively. This was the no drain arm.

Table-7: Wound Drain

Wound Drain	No. of cases	Percentage
Yes (drain arm)	25	50
No (No drain arm)	25	50
Total	50	100

Wound Infection

The wound infections as defined by CDC recommendations was followed. In our study, all wound infections were superficial incisional only neither deep incisional nor organ space infections. Results are tabulated below-

Table-8: Comparison of Wound Infection

Wound drain	Wound Infection- Yes	Wound Infection- No
Drain (25)	3(12%)	22(88%)
No drain (25)	6(24%)	19(76%)
Total	9(18%)	41(82%)

In present study, postoperative wound infection occurred in 9 cases (18%), out of which 3(12%) cases were those in whom during mesh repair, negative pressure Redivac suction drain were used compared to 6(24%) cases developed wound infection in whom no negative pressure Redivac suction drain were used suggesting that negative pressure Redivac suction drain helps in reducing the wound infection rate.

Wound Seroma

Seroma is defined as the collection of any volume of subcutaneous fluid without debris. The postoperative occurrence of a seroma is identified by clinical examination. A significant seroma is defined as a seroma that caused pain or discomfort, erythema, or

infection. Wound seroma was assessed clinically in the postoperative period and the results were tabulated below.

Table-9: Comparison of Wound Seroma

Wound Drain	Wound seroma-Yes	Wound seroma-No	Percentage
Drain (25)	0	25	0
No drain(25)	25	0	100

Among the twenty five cases in whom no negative pressure Redivac suction drain were used, all cases developed wound seroma(100%) compared to those cases where negative pressure Redivac suction drain were used, none developed wound seroma.

Secondary Suturing

Secondary suturing is defined as being done to remove the unhealthy, infected and dead tissue in the primarily sutured but gaping wound to freshen the wound edges and to approximate the wound edges in conditions like unhealthy wounds, approximated and infected wounds.

Table-10: Comparison of Secondary Suturing

Wound Drain	Secondary suturing	
	Yes	No
Drain (25)	3(12%)	22(88%)
No drain (25)	15 (60%)	10 (40%)
Total	18(36%)	32(64%)

Secondary suturing was higher in cases where no negative pressure Redivac suction drains were kept. Negative pressure Redivac drain helps in reducing the wound secondary suturing rate. Secondary suturing was required in 60% cases where no negative pressure Redivac suction were used compared to those cases where negative pressure Redivac suction drain were used, only in 3% cases required secondary suturing thus suggesting that negative pressure Redivac suction drain helps in reducing the wound secondary suturing rate.

Postoperative Length of Hospital Stay

Total length of hospital stay was not taken into consideration because of differing health aspects of the patient in the preoperative period and hence the postoperative length of hospital stay was taken into consideration.

Table-11: Length of Hospital Stay

Stay	Number of Cases	Percentage
<5days	8	16
6-10 days	18	36
11 to 15 days	12	24
16 to 20 days	7	14
>21 days	5	10
Total	50	100

Table-12: Comparison of post-operative length of stay

Wound drain	Mean post post operative length of stay
Drain kept(25Patients)	9.6 days
No drain kept(25Patients)	19.6 days
Total 50 Patients	

Post-operative length of stay was higher in cases where no negative pressure Redivac suction drain used (mean 19.6 days) compared to those cases where negative pressure Redivac suction drain was used(mean 9.6 days) thus suggesting that negative pressure Redivac suction drain helps in reducing post-operative length of stay.

DISCUSSION

Incisional hernia is the second most common type of hernia. The first being inguinal hernia. Incidence of incisional hernia is more common in females especially in obese and multiparous woman [2]. The incidence is more common in the age group 51 to 50 years.

The incidence is more after LSCS and puerperal sterilisation and more after midline incision following LSCS. The incidence is more common following usage of absorbable suture materials like catgut and vicryl for closure. Postoperative wound infection and anaemia were the leading associated factors for incisional hernia. Only reinforced primary repair using Proline mesh in selected patients have given good results. Proline mesh appears to be best tolerated by body tissues.

In the present study, age ranged from 20 years to 70 years and with peak incidence in 41 to 50 age group (48%) mean age was around 45 years. There was a female preponderance noticed with 80%. In the present study, over 86% of cases occurred following obstetrics and gynaecological operations, and around 14% of cases following general surgical operations. Out of 50 cases, 20% of patients had hysterectomy, 40% of cases tubectomy, 26% of patients had LSCS, 12% of cases had underwent laparotomy for duodenal and ideal perforations closure procedure and 2% of cases had appendectomy. In this study, 46% of cases developed incisional hernia through lower midline incision, 28% through Pfannenstiel incision, 12% through upper midline incision, 2% through upper right paramedian incision, 2% through Mc Burney's incision and 12% each through supra umbilical midline and right paramedian incision.

In present study, postoperative wound infection occurred in 9 cases (18%), out of which 3(12%) cases were those in whom during mesh repair, negative pressure Redivac suction drain was used compared to 6(24%) cases developed wound infection in whom no negative pressure Redivac suction drains

were used suggesting that negative pressure Redivac suction drain helps in reducing the wound infection rate.

Among the twenty five cases where no negative pressure Redivac suction drain was used, all cases developed wound seroma(100%) compared to those cases where negative pressure Redivac suction drain was used, none developed wound seroma thus suggesting that negative pressure Redivac suction drain prevents wound seroma formation .

The requirement for secondary suturing was higher in cases where no negative pressure Redivac suction drains were used. Re-suturing was done 15 patients(60%) where negative pressure Redivac suction drains were not used compared to 3 cases(12%) where negative pressure Redivac suction drain was used thus suggesting that negative pressure Redivac suction drain helps in reducing the wound secondary suturing requirement.

Post-operative length of stay was higher in cases where no negative pressure Redivac suction drain were used(mean 19.6 days) compared to those cases where negative pressure Redivac suction drain was used (mean 9.6 days) thus suggesting that negative pressure Redivac suction drain helps in reducing post-operative length of stay.

There was 2% recurrence of incisional hernia noticed in the present study. Luidendi JK *et al.* reported a recurrence rate of 46% with suture repair technique and 23% with mesh repair technique [5]. When our study is compared to that of the other study conducted by Sunderaraj SSN *et al.* [3], we are in agreement with it.

CONCLUSION

Over the years, the advantages of the negative pressure therapy have been demonstrated as it improves healing times. The use of closed suction drains has significantly reduced the postoperative wound complications. From this study it was concluded that in cases of incisional hernias, during mesh repair, the usage of negative pressure Redivac suction drain helps in reducing wound infection rate, preventing the formation of seroma, reducing the requirement for secondary suturing and reducing the postoperative length of hospital stay. The advantages of the negative pressure therapy have been demonstrated as it improves healing times by increasing blood flow, extracting secreted fluid, maintaining the wound margins and protecting the wound from contamination.

This study is intended to help the practicing surgeons and also the young budding surgeons to understand the disease in detail as well as importance of using closed suction drains for improving outcome and minimising post-operative complications.

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