Association between First Day Drain Output and Complications in Incisional Hernia Repair

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Abstract

Background: Exudation of serum is a part of process of healing of a synthetic mesh implant in incisional hernia repair. The amount of serous discharge depends on the quality of surgical repair and is clinically identified as a seroma, increased drain output or prolonged drain output.

Objective: The present study was conducted to know Co-relation between first day drain output and complication in incisional hernia repair.

Methods: The study was a hospital based prospective observational study where 90 patients having incisional hernia and undergoing hernia repair surgery by conventional open method, using prolene mesh and same prophylactic antibiotic were followed by to see development of post incisional hernia repair complications.

Results: Incisional hernia was more common in obese patients and High BMI is an independent risk factor for its occurrence. The amount of drain on the first day was significantly related to the presence of wound discharge and seroma development in the patients.

Conclusion: Drain output on first day was linked to complications like wound discharge and seroma and apart from that these are more significantly linked to factors like surgical technique and patients' comorbidity.

Keywords: Incisional Hernia, Complications, Drain Output, Wound Discharge, Seroma.

Introduction

A major post-operative complication of laparotomy is incisional hernia. It can occur after abdominal surgery in 2 to 11% of cases. [1] Additionally, 15-20% of all abdominal wall hernias are caused by it. [2] The majority of incisional hernias can be successfully treated by using the patient's own tissues and following standard surgical procedures. The suture material used in abdominal wound closure is significant in addition to the technique. A stable aponeurotic structure should result from effective hernia wound closure. It's crucial that the suture-line be free of stress. The correct hydroxylation of proline and lysine is hampered by tension, which also reduces local tissue oxygenation and hinders microcirculation. Scar tissue becomes disorganised because normal

collagen-fibrin polymerization and cross-linking cannot take place. [3]

Currently, one of the most well-tolerated and popular treatments is open retro-muscular prosthetic repairs utilising polypropylene or polyester mesh. [4,5] Due to the comprehensive surgical dissection of the prosthesis' integration plan during this surgery, there was a large and quick local inflammatory response connected to the implantation of the prosthesis.

Many writers argue that contact drainages are justified in order to avoid the development of seroma or hematoma that may become infected as a result of the local inflammatory response that results in a serous effusion. It is unknown at this time if these drains have sped up the healing of the wounds. [6] Despite the fact that general surgeons conduct VHR often and that more than 50% of mesh hernia repairs involve the use of surgical drains,[7] the lack of information available to surgeons regarding the potential effects of surgical drains in VHR is a challenge.

In earlier trials, patients with a negative suction in the wound were favoured. Since serous exudation starts immediately after the closure, the amount of exudate that the drain indicates in the first 24 hours is a reliable indicator of a well-done surgery with adequate hemostasis. Low volume without the development of haematoma or seroma is positive.

Serum exudation is a stage in a synthetic mesh implant's healing process. The quantity of serous discharge, which is clinically recognised as a seroma, increased drain output, or extended drain output, relies on the effectiveness of the surgical repair. According to our hypothesis, good hemostasis and properly executed surgical procedures are indicated by low drain flow on day 1 and limited seroma formation, both of which have an effect on wound healing.

Subjects and Methods

Study design, settings and participants

It was a hospital based prospective observational study conducted over a period of eighteen months from January 2022 to July 2023 in Department of general surgery of tertiary care hospital in Southern Rajasthan, India. 90 Patient having incisional hernia undergoing hernia repair surgery by conventional open method, using prolene mesh and same prophylactic antibiotic constituted the study population.

Subjects in whom inability to close the abdominal wall at the index procedure, pregnant women, patient suffering from any cancer, patients who were immunocompromised (Diabetes Mellitus, HIV, etc.) assuming low healing power, obstructed incisional hernia and subjects undergoing laproscopic incisional hernia repair were excluded from the study.

Data collection

After receiving written or informed consent, study volunteers' information was entered into a pre-made proforma. In this series, patients who were admitted to surgical wards in all surgical units underwent examinations to determine the severity of tissue defects, aetiology of the patient's complaints, and other factors. Any comorbid conditions were recognised and managed before surgery. According to the proforma, a thorough case history, clinical examination, and required investigations were conducted. Clinical diagnoses were made after thorough physical exams of the patients, taking into account the related etiological, precipitating, and predisposing factors. A Body Mass Index of more than 29.99 kg/m2 was deemed obese.

In order to achieve the necessary level of muscular relaxation during the procedure, either general or spinal anaesthetic was used. At the moment of the skin incision, a single dosage of intravenous third-generation

cephalosporin (Intravenous Cefotaxime 1 gm) was given. The sac was recognised and defined intraoperatively. The pouch was unzipped.

The volume of the sac's contents was decreased [Figure 1]. Omentum was ligated and removed if it was adherent to the sac and could not be decreased. All across, the fascial defect was seen. The fascial defect's largest dimension was measured in millimetres. Simple sutures made of non-absorbable suture material were used to approximate the defect's borders (Polypropylene, size: No. 1). The distance between adjacent sutures was 1 cm, and the sutures were placed 1.5 cm from the margin of the defect. Just enough sutures were placed in place to approximate the edges. A polypropylene mesh of the appropriate size was then applied over the rectus sheath using the Onlay technique,

being sure to overhang the healthy fascia by at least 5 cm all around. With a size 1.0 Polypropylene suture, the mesh was attached to the rectus sheath and secured in place. Hemostasis had been achieved. The mesh was put superficially, and the wound was then stitched up. In the initial postoperative phase (first 24 hours), tramadol (50 mg intravenously Q8h) was given to provide postoperative analgesia.

When the patient experienced discomfort after that time, oral analgesics were then given. After the drain production was less than 20 ml per day for at least two days, the drain was removed. On the eighth postoperative day, the sutures were taken out. To monitor the emergence of problems following incisional hernia surgery, postoperative follow-up was conducted.
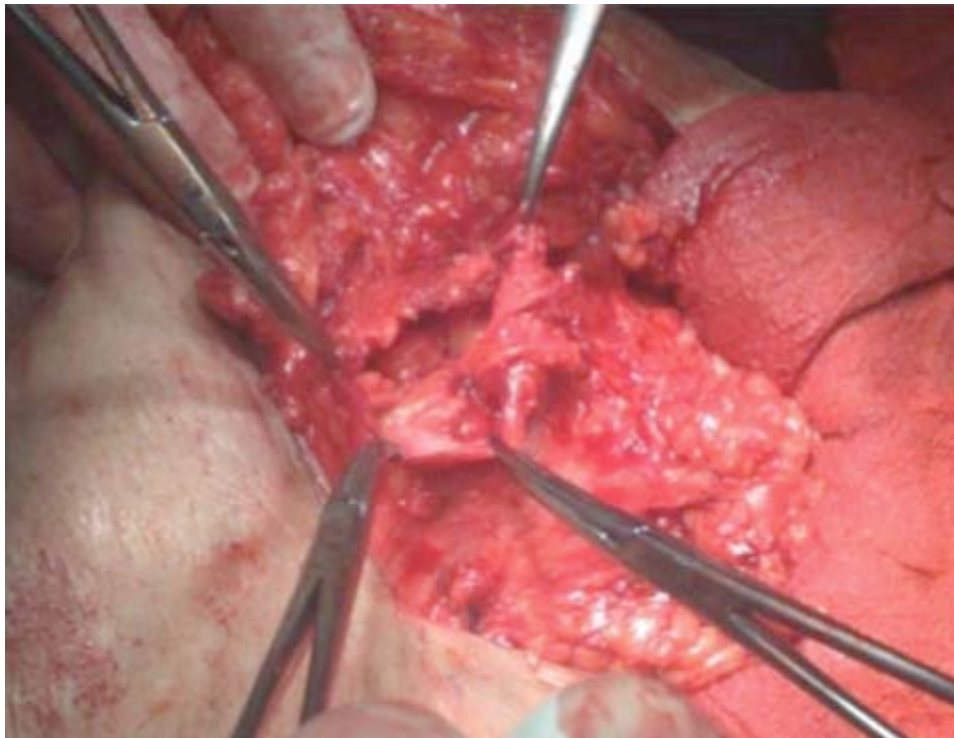
Figure 1: Contents of hernia sac reduced and fascial defect visualized

Statistical Analysis

Data were analyzed and statistically evaluated using SPSS software, version 20 (Chicago II, USA). Quantitative data was expressed in mean, standard deviation while qualitative data were expressed in percentage. Statistical differences between the proportions were tested by chi square test or Fisher's exact test. 'p' value less than 0.05 was considered statistically significant.

Observation & Results

A majority of study subjects belonged to the age-group of 41-50 years with the mean age of study subjects was 46.58±7.35 years. Baseline demographic and clinical profile is shown in table 1. Mean duration of presenting complaint was 8.96±2.84 months with all the patients presenting within one year of presenting symptoms of incisional hernia. 93.3 % of the participant presented before within the six years of previous surgery. On further observation it can be seen that most of them presented within 2-4 years of the last surgery, while the proportion of patients presenting within 2 years and between 4-6 years of previous surgery was 28.8 and 26.7% respectively. 86.7% of the patients had only omentum as the content of hernia sac while 13.3% patients had both omentum and intestine in the hernia sac. All the patients had serosanguinous discharge in the drain output.

Table 1: Demographic and clinical profile of study subjects (n=45)

	Mean±SD/No. (%)
Mean age in years	46.58±7.35 years
Male : Female	19 (42.2%)/26 (57.8%)
Mean duration between previous surgery and presentation	3.82±1.89 years
Type of previous surgical incision	
Midline vertical	21 (46.7%)
Transverse	24 (53.3%)
Mean time taken for surgery	90.89±33.93 minutes
Mean drain output on 1st day	62.78±46.88 ml
Mean duration of suction drain insitu	7.0±5.31 days
Mean duration to taken for wound healing	17.98±7.14 days
Mean duration of hospital stay	6.87±3.92 days
Complications	
Wound dehiscence	8 (17.8%)
Wound discharge	8 (17.8%)
Mesh Infection	7 (15.6%)
Seroma	5 (11.5%)

There was no association of the quantity of drain output and the presence of wound dehiscence or mesh infection as a complication in any patient, as seen by applying chi-square test (p value = 0.16 & 0.71). while the drain output on first day was significantly associated with wound discharge and seroma, on applying the statistical test the p-value was 0.01 which shows that the association was statistically significant (Table 2).

Table 2: Association of drain output on 1st day with different complications

	Drain output on 1st day			p value
	Upto 50 ml (n=23)	51-100 ml (n=14)	>100 ml (n=8)	
Wound dehiscence				
No	21 (91.3%)	11 (78.6%)	5 (62.5%)	0.16
Yes	2 (8.7%)	3 (21.4%)	3 (37.5%)	
Wound discharge				
No	22 (95.7%)	11 (78.6%)	4 (50.0%)	**0.01**
Yes	1 (4.3%)	3 (21.4%)	4 (50.0%)	
Mesh infection				
No	20 (87.0%)	12 (85.7%)	6 (75.0%)	0.71
Yes	3 (13.0%)	2 (14.3%)	2 (25.0%)	
Seroma				
No	23 (100.0%)	12 (85.7%)	5 (62.5%)	**0.01**
Yes	0	2 (14.3%)	3 (37.5%)	

Discussion

Our study's main objective was to measure the amount of drainage on the first postoperative day and determine whether it was related to any problems. The patients' drained output varied greatly, as shown by the drain output's mean and standard deviation, which were 62.7846.88 ml. In the drain that was left in place for the duration of the post-operative period, all patients had serosanguinous output, and 97.8% of all patients had wound healing in less than one month. The average amount of time it took for a wound to fully heal in our study was 17.98 7.14 days, indicating that there was little variation in this period among the study patients.

All of the aforementioned evidence suggests that in our investigation, complications including infection and wound dehiscence were rare. The low rate of infection in the study is caused by these elements working together and each making a contribution. According to earlier studies[7,8], the decreased infection rate results in shorter hospital stays and a lower recurrence rate. In our study, the median length of stay in the hospital was just 6.873.92 days, and over two-thirds of patients were discharged within 5 days of surgery. When compared to earlier research, the study by Berger *et al* [9]. showed an average hospital stay of 10 days for recurrent hernias and 9 days for primary hernias. In their study [10]. Dur *et al*. reported a post-operative hospital stay of 9 days. The existence or absence of problems affects how long a patient stays in the hospital.

In-depth research has not previously been done on the quantity of wound drain that occurs after the first day as an independent factor. Fahmi Hamila *et al* study .'s of the wound drain in patients undergoing incisional hernia repair [11] found that the average first day drain output was 167/173 ml for two patient groups, and that it gradually decreased until it was similar in both groups by day 4. However, the study did not examine the likelihood of complications developing in those patients. Similar to the current study, Shehab *et al* previous .'s study likewise used the sole mesh repair procedure and split the patients according to the existence or absence of the suction drain. The amount of drain in the two groups significantly differed, with the

suction drain group having a mean output of 485.0395.63 as opposed to 637.12133.20 in the suction pipe group. The Cochrane review [6] of the drain also found it to be of no significance in the final outcome of the surgery, and the length of stay in the patients was between 10-14 days regardless of the amount of drain or the type of drain used. A randomised control study by Peiper *et al* [12] had amount of drain as one variable; the amount of drain had no significant effect on the outcome of surgery and complications following it.

Since there is a paucity of the study which exclusively explores the amount of drain in the post-operative stage of the incisional hernia it is imprudent to comment on the optimum quantity of drain fluid, however most of the studies which deal with the topic have been already discussed above. Along similar lines there are very few studies which relates the amount of drainage fluids with the complications in such patients which is one of the primary objectives of our research. The complications of incisional hernia repair can be wound dehiscence, wound discharge, mesh infection, surgical site infection, seroma formation, cellulitis, soft tissue necrosis, anastomotic leak, hematoma formation or organ space infection.

In the present study the number of complications in the patients were few and majority of them who had complications at all, suffered from wound dehiscence or wound discharge. When association between the drain and these complications was studied, it was seen that the amount of drain output on the first day was significantly associated with wound discharge and seroma complications of the incisional repair process. The studies done in the past have not paid more attention to the association between amount of discharge and complications, in the study by Krpata *et al* [13] there was no difference in the event of surgical site infection or surgical site

occurrence requiring procedural interventions in the groups with placement of drain insitu and the patients without drain, similar to other studies they also did explored the correlation between the amount of wound discharge and the occurrence of these complications. Acar *et al* [14] in their study had more number of complication involving paralytic ileus, mesh rejection, hematoma and seroma but the complications depended more on the technique of operation rather than drainage which was not studied by them, since our study employed only "onlay technique" for repair the comparison is impossible.

Majority of the studies done in the study complications in the light of the technique employed for the repair [10-15,16]. The studies which have explored the amount of drain output [11-17] after the repair have not studied it with complications hence the literature which can be compared with our study findings is scanty. However, it is clear from the present study and the previous literature that the placement of suction drain and the amount of drainage output was significantly associated with the complications after the repair.

Conclusion & Recommendation

Our study is novel in its approach towards the surgical treatment of incisional hernia as it tries to explore the relationship of wound drain on the first day with the complications in the surgical repair which has not been done frequently in the past. Our study found out that the number drain output was linked to complications like wound discharge and seroma and apart from that these are more significantly linked to factors like surgical technique and patients' comorbidity.

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