

Comparison of Abdominal Binder Use Versus No Abdominal Binder Use After Ventral Abdominal Wall Hernia Repair

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ABSTRACT

Objective: The aim of this study is to compare the outcome of binder use versus no abdominal binder use after ventral abdominal wall hernia repair

Material and methods: Hundred patients were included and underwent ventral hernia repair under general anesthesia. Then patients were randomly divided in two groups. Group A for Abdominal Binder and Group B for without Abdominal Binder by using lottery method. During 8 weeks, patients were followed-up in OPD fortnightly. Patient were evaluated for pain, Pulmonary Function Assessment on spirometer, Physical Function Assessment by 6 minutes' walk test, Seroma formation assessment, wound infection, wound dehiscence and patients' satisfaction. Data was analyzed in SPSS version 22

Results: In this study, the mean age of patients was 43.63 ± 7.25 years in binder group while 44.24 ± 09.23 years in non-binder group. There were 23 males and 27 females in binder group while 25 males and 25 females in non-binder group. At the end of study, the mean pain score was 0.0 ± 0.0 in binder group while 0.9 ± 0.06 in non-binder group ($p < 0.05$), the mean FEV1 was 91.12 ± 5.93 in binder group while 90.19 ± 14.22 in non-binder group ($p > 0.05$) and the mean 6MWT was 548.94 ± 41.09 m in binder group while 508.79 ± 38.93 m in non-binder group ($p < 0.05$). Seroma formation occur in 4 (8%) cases in binder group while in 12 (24%) in non-binder group ($p < 0.05$). Wound infection occurred in 2 (4%) in binder group while in 8 (16%) cases of non-binder group ($p < 0.05$). While wound dehiscence was not observed in any case in binder group (0%) but in 3 (6%) cases in non-binder group ($p > 0.05$).

Conclusion: Therefore, the findings of this study have shown that abdominal binder can strengthen the physical condition and treat the wound.

Key words: Ventral hernia, laparotomy, abdominal binder, pain, abdominal wall

INTRODUCTION

Hernia is an intestinal protrusion into an opening of the abdominal wall muscles. 1 Abdomen's central hernias are described in the abdominal fascia as a non-induinal, non-hiatal defect. 2, 3 In 2006 348,000 ventral hernia repairs were conducted in the US, costing around 3.2 billion dollars. 4 Sangwan et al., found inguinal hernia prevalence 76.4%, for umbilical hernia 12.38%, for umbilical hernia 3.95% and incisional hernia 2.7%. Males (67.3 percent) were more likely to develop hernia than women (32.7 percent). 5 Ventral hernia prevalence depends on the related risk factors. 5. These include age, gender, prolonged constipation, coughing, obesity, multifarious pregnancy, smoking or heavy-lifting. 6 Hernia repairs are the most common operations conducted in an operating environment. The world over is repaired every year by >20 million hernias. The operation of hernias, however, does not take into account the value of public health in developed countries but is extremely cost-effective. 7 The abdominal wall hernia is a very common surgical phenomenon and accounts for 15-18% of all operations. The existence of incisional hernia requires many imaging methods. The first approach to diagnosis of the incisional hernia in two projections remains flat abdominal X. In effect, while x-rays easy to do, are appropriate, low-cost and canonically detect loops of the bowel within the hernia sac, which point to both center- and peripheral occlusive phenomena, and free bowel perforation air is also detected.

9 X-ray cannot fund all critical morphological structural details of the abdominal wall, lesion site and likely complications, caused by obstruction of the cangrow inside of the hernia. 9, 10 Currendly, various hernia repair are operating techniques have been employed, such as easy closure, laparoscopy, canoduplication, onlay and sublay mesh prothesis as well as self-dermalplasty. The selection of the operating technology depends principally on the surgeon's preferences and the clinical context. 11 Laparoscopic repair is becoming increasingly common as an alternative technique of abdominal repair. Despite this, laparoscopy alarms have not been developed for many trials. 12 The use of an abdominal binder during after-operative rehabilitation is a potentially non-pharmacological way to minimize postoperative pain and bleeding. 13 Elastic binders are usually used in routine during the operation for abdominal areas such as the abdominal braces, girdles, trusses, lorgnette, etc. 14 The belt, wide and capable of supporting incision in the abdomen area after surgery, is elastic or abdominal. 14

Pain relief, less chances of seroma formation, improved respiratory function and consistency are among the necessary results. Positive, findings of only few studies indicate that abdominal binders minimize post-operative pain, seroma formation and emotional stress. Abdominal binders are also designed to improve mobility, protect coughing wound and thus help in and improve respiratory efficiency. 15 Therefore it is important not to ignore the

beneficial function of abdominal binders in the postoperative recovery process. This analysis has been performed to obtain the proof that hernia is more adequately managed. Binders used will help increase the hernia repair performance, according to a literature. But there was little work to be done and there was also no local documentation.

MATERIAL AND METHODS

This randomized controlled trial was conducted at department of Surgery Darul Sehat Hospital, Karachi for duration of one and half year from Jan 2017 to June 2018. 100 patients aged 15-65 years, either gender presented with ventral (Paraumbilical/Epigastric/Incisional) hernia and planned to undergo hernia repair under general anesthesia were enrolled. Patients with ASA III or IV, diabetes (BSR>200mg/dl), COPD/COAD, CLD with cirrhosis/Ascites, Cardiac Failure, Renal Failure, Abdominal Kocks or intra-abdominal Malignancy, pregnant females, obstructed / strangulated Hernia, BMI >45kg/m², patients on steroid / immunosuppressive therapy were excluded. Informed consent were obtained and demographics were noted. Then patients were randomly divided in two groups. Group A for Abdominal Binder and Group B for without Abdominal Binder by using lottery method. Pre-operatively, patients were prescribed clipping of hairs from site of surgery on day of Surgery, Inj Augmentin/ Cephadrine I/V 1-2hrs and Inj Toradol 30mg I/V 1-2 hrs. Then surgery was done as per standard protocol by a single surgical team. In group A, Abdominal Binder was applied immediate post operatively continue for 8 weeks i.e. 24 hrs a day for one week and then apply for >12hrs/day mostly during sitting and standing. But in group B, no binder was applied. After surgery, patients were prescribed Antibiotics; I/V for 48 hrs/6 doses days then oral for 5 days. Inj Ketorolac I/V BD for 4 doses, Inj Provas 1g TDS for 6 doses, Inj Nalbuphine as required or if pain on VAS>4. Then patients were followed-up in OPD for 6 weeks. During 6 weeks, patients were followed-up in ODP fortnightly. On each visit patient was evaluated for pain, Pulmonary Function Assessment on spirometer, Physical Function Assessment by 6 minutes' walk test, Seroma formation assessment, wound infection, wound dehiscence and patients' satisfaction.

Data was analyzed in SPSS version 22.0. Both groups were compared by applying chi-square test for categorical outcome and independent samples t-test for quantitative outcome variable. P-value≤0.05 was considered as significant.

RESULTS

In this study, the mean age of patients was 43.63±7.25years in binder group while 44.24±09.23 years in non-binder group. There were 23 males and 27 females in binder group while 25 males and 25 females in non-binder group. The mean BMI of binder group was 28.98±11.05kg/m² while mean BMI of non-binder group was 29.35±17.18kg/m². The mean duration of hernia was 4.74±0.22 years in binder group while 5.08±1.02 years in non-binder group. There were almost similar number of patients of para-umbilical hernia i.e. 20 vs. 17 in both groups respectively. Epigastric hernia was present in 22 patients randomized to binder group while in 19 patients

randomized to non-binder group and incisional hernia was present in 8 patients randomized to binder group while in 14 patients randomized to non-binder group. (Table 1)

Table 1: Baseline characteristics of patients

Characteristics	Binder	No-binder
n	50	50
Age (yr)	43.63±7.25years	44.24±09.23
Gender (M:F)	23:27	25:25
Duration of hernia (yr)	4.74±0.22	5.08±1.02
BMI	28.98±11.05	29.35±17.18
Type of hernia		
Para-umbilical	20	17
Epigastric	22	19
Incisional	8	14

At baseline, the mean pain score was 6.5±1.2 in binder group while 6.3±2.1 in non-binder group (p>0.05). After 2 weeks (14 days), the mean pain score was 3.7±0.3 in binder group while 4.3±2.8 in non-binder group (p<0.05). After 4 weeks, the mean pain score was 2.6±0.1 in binder group while 3.1±0.2 in non-binder group (p<0.05). After 8 weeks, the mean pain score was 0.0±0.0 in binder group while 0.9±0.06 in non-binder group (p<0.05). Seroma formation occur in 4 (8%) cases in binder group while in 12 (24%) in non-binder group (p<0.05). Wound infection occurred in 2 (4%) in binder group while in 8 (16%) cases of non-binder group (p<0.05) While wound dehiscence was not observed in any case in binder group (0%) but in 3 (6%) cases in non-binder group (p>0.05).

Table 2: comparison of outcome in both groups

Variables	Binder	No-binder	p-value
n	50	50	
Pain			
Preoperative	6.5±1.2	6.3±2.1	0.555
Day 14	3.7±0.3	4.3±2.8	0.003
Week 4	2.6±0.1	3.1±0.2	<0.0001
Week 8	0.0±0.0	0.9±0.06	<0.0001
Seroma formation	4	12	0.038
Wound infection	2	8	0.044
Wound dehiscence	0	3	0.472
FEV1			
Preoperative	76.45±15.19	78.58±17.23	0.653
Day 14	81.22±5.63	82.85±16.21	0.261
Week 4	84.63±14.43	85.55±7.98	0.629
Week 8	91.12±5.93	90.19±14.22	0.906
6 minute walk (m)			
Preoperative	414.01±80.69	418.03±78.95	0.629
Day 14	480.76±90.14	438.45±66.14	0.035
Week 4	520.98±47.21	489.014±57.46	0.044
Week 8	548.94±41.09	508.79±38.93	0.0006

At baseline, the mean FEV1 was 76.45±15.19 in binder group while 78.58±17.23 in non-binder group (p>0.05). After 2 weeks (14 days), the mean FEV1 was 81.22±5.63 in binder group while 82.85±16.21 in non-binder group (p>0.05). After 4 weeks, the mean FEV1 was 84.63±14.43 in binder group while 85.55±7.98 in non-binder group (p>0.05). After 8 weeks the mean FEV1 was 91.12±5.93 in binder group while 90.19±14.22 in non-binder group (p>0.05) At baseline, the mean 6MWT was 414.01±80.69m in binder group while 418.03±78.95m in non-binder group (p>0.05). After 2 weeks (14 days), the mean 6MWT was 480.76±90.14m in binder group while 438.45±66.14m in non-binder group (p<0.05). After 4 weeks, the mean 6MWT was 520.98±47.21m in binder group while 489.014±57.46m

in non-binder group ($p < 0.05$). After 8 weeks, the mean 6MWT was 548.94 ± 41.09 m in binder group while 508.79 ± 38.93 m in non-binder group ($p < 0.05$). Table 2

DISCUSSION

Major abdominal operation is a source of enormous body tension. The body is able to cope with surgical stress in its own way, but the postoperative time must be tailored to increase the recovery. Wound-related complications and discomfort on the incision site include morbidity associated with such operations. Abdominal binders are recognized to strengthen the recovery process and encourage wound healing [17].

Mobility and postoperative pain were the main results variables for the research. 6MWT and VAS evaluated pain were used to monitor mobility. Due to its excellent reliability and performance in the monitoring of surgical outcomes, the 6MWT has been chosen [18]. In clinical studies, VAS pain score is a commonly used means for evaluating the level of pain [19].

In this study, the mean age of patients was 43.63 ± 7.25 years in binder group while 44.24 ± 09.23 years in non-binder group. There were 23 males and 27 females in binder group while 25 males and 25 females in non-binder group. The mean BMI of binder group was 28.98 ± 11.05 kg/m² while mean BMI of non-binder group was 29.35 ± 17.18 kg/m². The mean duration of hernia was 4.74 ± 0.22 years in binder group while 5.08 ± 1.02 years in non-binder group. There were almost similar number of patients of para-umbilical hernia i.e. 20 vs. 17 in both groups respectively. Epigastric hernia was present in 22 patients randomized to binder group while in 19 patients randomized to non-binder group and incisional hernia was present in 8 patients randomized to binder group while in 14 patients randomized to non-binder group. The pain score in both groups has declined significantly, but the pain score of the binder group has decreased less. These results were comparable to the some studies. [20,21]

At baseline, the mean pain score was 6.5 ± 1.2 in binder group while 6.3 ± 2.1 in non-binder group ($p > 0.05$). After 2 weeks (14 days), the mean pain score was 3.7 ± 0.3 in binder group while 4.3 ± 2.8 in non-binder group ($p < 0.05$). After 4 weeks, the mean pain score was 2.6 ± 0.1 in binder group while 3.1 ± 0.2 in non-binder group ($p < 0.05$). After 8 weeks, the mean pain score was 0.0 ± 0.0 in binder group while 0.9 ± 0.06 in non-binder group ($p < 0.05$). Seroma formation occur in 4 (8%) cases in binder group while in 12 (24%) in non-binder group ($p < 0.05$). Wound infection occurred in 2 (4%) in binder group while in 8 (16%) cases of non-binder group ($p < 0.05$). While wound dehiscence was not observed in any case in binder group (0%) but in 3 (6%) cases in non-binder group ($p > 0.05$). At baseline, the mean FEV1 was 76.45 ± 15.19 in binder group while 78.58 ± 17.23 in non-binder group ($p > 0.05$). After 2 weeks (14 days), the mean FEV1 was 81.22 ± 5.63 in binder group while 82.85 ± 16.21 in non-binder group ($p > 0.05$). After 4 weeks, the mean FEV1 was 84.63 ± 14.43 in binder group while 85.55 ± 7.98 in non-binder group ($p > 0.05$). After 8 weeks the mean FEV1 was 91.12 ± 5.93 in binder group while 90.19 ± 14.22 in non-binder group ($p > 0.05$). Gillier et al., however, reported no significant difference amongst VAS pain score between the binder and non-binder group

[22]. Stoker et al. in a recent integrative review concluded that use of abdominal binder postoperatively provides pain relief, improves patient satisfaction, and reduces psychological distress [23]. Rothman et al. did report decreased psychological distress, however, their effect on postoperative pain was unclear [24].

At baseline, the mean 6MWT was 414.01 ± 80.69 m in binder group while 418.03 ± 78.95 m in non-binder group ($p > 0.05$). After 2 weeks (14 days), the mean 6MWT was 480.76 ± 90.14 m in binder group while 438.45 ± 66.14 m in non-binder group ($p < 0.05$). After 4 weeks, the mean 6MWT was 520.98 ± 47.21 m in binder group while 489.014 ± 57.46 m in non-binder group ($p < 0.05$). After 8 weeks, the mean 6MWT was 548.94 ± 41.09 m in binder group while 508.79 ± 38.93 m in non-binder group ($p < 0.05$). [25,26]

But a binder increases the patient's mobility immediately after surgery. There were also observable consequences for pain in which fewer patients who used an abdominal binder showed a lower score during exercise or activities. This has proven to be useful for patients with major abdominal operation by using a routine abdominal binder.

The adverse effects of ABs on the body should also be observed. Lasithiotakis et al. have studied a spontaneous, non painful intercostal transdiaphragmatism and recorded that high intraabdominal pressures due to long-term abdominal wear will make it slim and loosely resistant to quickly increasing thoracic-abdominal cavity pressures by using diaphragms and intercostal musculature. In addition, the occurrence of oesophagogastric crossover Adenoma in patients without any symptoms of reflux acido is mainly due to oesophageal partial hiatal hernia and small segments Acid Reflux caused by a high intraabdominal pressure.

CONCLUSION

This research has shown that the abdominal binder can both strengthen the condition and treat the wound. Now, in the future, the abdominal binder may be recommended after hernia restoration to maximize surgical outcome. However, the analysis was performed on a small sample. Therefore it is also recommended that further studies reconfirm the above results.

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