

A PROSPECTIVE STUDY OF COMPONENT SEPARATION IN VENTRAL HERNIA

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Abstract

Background: Abdominal wall hernias are a familiar surgical problem. Millions of patients are affected each year, presenting most commonly with primary ventral, incisional, and inguinal hernias. In this study we have done a prospective study of 25 cases of patients with ventral hernia in whom component separation technique is used to close the midline defect with the use of prosthetic mesh.

Methods: This prospective randomized comparative study was conducted on 25 patients in each group of ventral hernia in the department of surgery, Sir T Hospital and medical college, Bhavnagar. It is a prospective study of component separation in ventral hernia repair in view of surgical site pain, recurrence rate post op complication, post op hospital stay.

Results: It was found that average age was 50.8 years. That showed ventral hernia was more common in 5th and 6th decade of life. Out of 25 subjects 13(52%) were male and 12 (48%) were female. The component separation is mainly done in large ventral hernias, these included: Incisional hernia 20 patients (80%), Umbilical hernia 3 patients (12%), Paraumbilical hernia 2 patients (8%). It was seen that diabetes and COPD was found in major of the cases with ventral hernia. Patients with diabetes as comorbidity had more incidence of surgical site infection leading to high incidence of flap necrosis. Due to high, uncontrolled blood sugar during emergency operation, there were more incidence of both infection and flap necrosis.

Conclusion: It was seen that component separation technique resulted in better mesh integration as the vascularity was preserved, significant reduction in morbidity, low incidence of wound discharge, gaping and flap necrosis, resulting in early discharge of patient.

Keywords: Ventral hernia, Incisional hernia, Umbilical hernia, Para umbilical hernia, Component separation technique.

Introduction

Abdominal wall hernias are a familiar surgical problem. Millions of patients are affected each year, presenting most commonly with primary ventral, incisional, and inguinal hernias. Whether symptomatic or asymptomatic, hernias commonly cause pain or are aesthetically distressing to patients. These concerns, coupled with the risk of incarceration, are the most common reasons patients seek surgical repair of hernias. Incisional hernia is defined as an abdominal wall defect at the site of abdominal wall closure and more than 10% of patients, who undergo laparotomy, experience the hernia.[1,2] It is estimated the number of incisional hernia repair cases would reach 90,000 in USA, 41,000 in Germany[3] and 2,150 in Korea per year. Approximately 50% of incisional hernia develop or present within the 2 years following surgery, and 74% occur within 3 years.[4,5] Ventral hernia is a bulge of tissues through an opening of weakness within abdominal wall muscles without surgery. There is an ongoing discussion concerning which factor contributes to such situation; is there a 'hernia disease' or simply the coincidence of several conditions or even a physiological

reaction to tensile forces stretching the abdominal wall. Predisposing factors are obesity, diabetes, emergency surgery, postoperative wound dehiscence or infection, smoking, immunosuppression, prostatism, and collagen disorders such as abdominal aortic aneurysm and Ehlers-Danlos Syndrome.[6,7]The presence of a ventral hernia is itself, an indication for repair when no substantial co morbid conditions exist. Elective ventral and incisional hernia repair are undertaken largely to alleviate symptoms and to prevent hernia incarceration with subsequent strangulation of the intestine. The field of hernia repair has evolved as a result of surgical innovation and has benefited significantly from technologic improvements. The tension-free repair is one of the key concepts that have revolutionized hernia surgery. The use of mesh prosthesis to approximate the fascial defect has resulted in a decrease in recurrence rates for inguinal and incisional hernias. Large / Giant hernia has been defined arbitrarily in the literature as greater than a diameter of 10 to 15 cm or an area of 170 to 200cm[8]. Closing such defects is a significant problem in obtaining a reliable, durable repair with low morbidity and recurrence rate. Open component separation technique comprising posterior component

separation along with Transverse Abdominis Release (PCS-TAR) has overcome these difficulties. The success of the procedure is attributed to five principles [9] : 1. Translation of the muscular layer of the abdominal wall to enlarge the tissue surface area. 2. Separation of muscle layers that allows for maximal individual expansion of each muscle unit. 3. Disconnection of the muscle unit from its fascial sheath envelope, which restricts horizontal motion and thereby facilitates expansion. 4. Abdominal wall musculature in approximately 70% of its surface is covering hollow viscus, which is more easily compressed than solid structures. 5. Bilateral mobilization works more efficiently than unilateral advancement by equilibrating forces of the abdominal wall and centralizing the midline.

Aim: Prospective study of 25 patients operated for ventral hernia by component separation technique.

Material and Methods:

A prospective randomized controlled trial was conducted among 25 patients of ventral hernia in the Department of General Surgery, Sir T hospital Bhavnagar starting from August 2018 to August 2020 for a period of two years. This study was approved by institutional review board/ human ethic committee of government medical college and Sir T hospital, Bhavnagar. IRB (HEC) no: 848/2018 and General surgery no: 74/2018. Informed consent for Anaesthesia and Surgery was taken from each patient in their local language.

Site of study: It was conducted in Sir T hospital, Bhavnagar.

Study population: All the patients diagnosed with ventral hernia attending surgery OPD was taken as study population. Study design: This study is prospective study.

All the patients diagnosed with ventral hernia attending surgery OPD constituted the sample size. 25 patients were enrolled for the study after obtaining proper informed consent.

Inclusion criteria

Patient of both sex with age group 18-65 years with uncomplicated ventral hernia including incisional hernia.

Exclusion criteria

Infants and Children (<18 years).

Strangulated hernia.

Patients unfit for surgery due to any reason.

All Patients of group were subjected to open component separation technique for ventral hernia. And the following parameters were evaluated.

Evaluation parameters

A. Early post-operative parameters:

1. Post-operative pain scored from 0-10 on a visual analogue scale (VAS) on post operative day 0,1 and 2.

2. Length of hospital stay: patients will be kept in surgery post operative Ward for minimum 2 days. But the total duration of stay will be individualized as per their needs.

3. Time to resume normal activity (in days).

B. Late post-operative parameters and follow up:

Patients will be followed up to a minimum of 3 months after the surgery.

Follow up would be done in the surgery outpatient department at 7 days, 1 Month, 3 months and 6 months from the date of surgery.

Those who will not report back in OPD will be contacted on phone. Following parameters were evaluated: Chronic pain and its assessment on visual analogue scale- It is a psychometric response scale which can be used in questionnaires. It is a measurement instrument for subjective characteristics or attitudes that cannot be directly measured. Using a ruler, the score is determined by measuring distance (mm) on the 10 cm line between the no pain anchor and a patient mark providing a range of score from 0-100. a higher score indicates greater pain intensity.

No pain (0-4mm)

Mild pain (5-44mm)

Moderate pain (45-74 mm)

Severe pain (75-100 mm)

The scale has to be shown to the patient otherwise it is an auditory scale not a visual one.

C. Recurrence

A detailed history of Ventral hernia followed by complete examination was done. All ventral hernia patients falling under exclusion criteria were excluded. History of associated diseases like chronic cough, constipation, urinary obstruction was also taken. Past history of any operative procedure and history of recurrence was taken. History of any co-morbid illness (viz. diabetes mellitus, hypertension, ischemic heart disease, chronic obstructive airway disease, tuberculosis) was taken. Complete general physical examination with vitals, systemic examination. Local examination of the swelling was performed in detail.

Patients had undergone following laboratory investigations preoperatively:

Complete hemogram, Serum creatinine, Blood urea, Serum electrolytes, Blood sugar, Urine routine and microscopy Investigations required by the Anesthetist such as liver function tests, chest x-ray, ECG. All patients were sent for a pre-anesthetic checkup to the anesthesia department. Consent for Anesthesia and surgery will be obtained in patient's local language.

Results:

A prospective randomized controlled trial was conducted among 25 patients of ventral hernia in the Department of General Surgery, Sir T hospital Bhavnagar and following results were observed in various fields.

Table 1: Age distribution.

Age group (years)	Number	Percentage
20-30	2	8%
31-40	2	8%
41-50	8	32%
51-60	7	28%
61-70	6	24%

It was found that average age was 50.8 years. That showed ventral hernia was more common in 5th and 6th decade of life.

Out of 25 subjects 13(52%) were male and 12 (48%) were female.

The component separation is mainly done in large ventral hernias, these included:

Incisional hernia 20 patients (80%) , Umbilical hernia 3 patients (12%) , ,Paraumbilical hernia 2 patients (8%).

Distribution of study group according to pain score on. Pain was assessed by using pain visual analogue score 0-10 (10 = maximum pain).

Table 2: VAS score.

Post-operative duration	Pain score according to VAS
Day 0	5.9
Day 1	5.0
Day 2	4.2
Week 1	2.7
Month 1	1
Month 3	0.36
Month 6	0.28

It was seen that pain was maximum on day of operation 5.9, On post op day 1 pain score was 5.04, On post operative day 2 pain score was 4.2, On post operative week 1 visual analogue score was 2.7. On post operative month 1 visual analogue score was 1, On post operative month 3 visual analogue score was 0.36, On post operative month 6 visual analogue score was 0.28.

Table 3: VAS score in different types of ventral hernia

Post-operative duration	Incisional	Umbilical	Para- Umbilical
	(Mean VAS score \pm SD data)	(Mean VAS score \pm SD data)	(Mean VAS score \pm SD data)
Day - 1	5.1 \pm 0.55	3.33 \pm 0.57	3 \pm 0.11
Week -1	2.8 \pm 0.89	2 \pm 0.72	1.5 \pm 0.7
Month -3	0.4 \pm 0.5	0.33 \pm 0.57	0
Month -6	0.3 \pm 0.47	0.33 \pm 0.57	0

Distribution of study according to pain score in different types of ventral hernia on post operative day 1, post

operative week 1, post operative month 3, post operative month 6. Patients who had incisional hernia experienced maximum pain according to VAS, followed by umbilical then paraumbilical hernia.

Table 4: Post operative complications.

Post operative complication	Percentage (%)
Seroma	2(8%)
Wound infection	4(16%)
Flap necrosis	3(12%)
Wound dehiscence	1(4%)
Recurrence	1(4%)

Post operative complications were seroma (8%), wound infection (16%), flap necrosis (12%), wound dehiscence (4%) and recurrence (4%).

**Figure 1: ventral hernia****Figure 2: Intraoperative image after content reduced and sac excised****Figure 3: Intraoperative image after creating a plane between rectus muscle and posterior sheath**



Figure 4: Release of Transverse abdominus from its attachment to linea semilunaris



Figure 5: Component separation completed and Mesh placement

Discussion:

In this study, we address the component separation, a medial fascial advancement technique to aid in abdominal wall reconstruction for Ventral hernia. It was found that average age was 50.8 years. That showed ventral hernia was more common in 5th and 6th decade of life. The component separation is mainly done in large ventral hernias, these included Incisional hernia 20 patients. Umbilical hernia 3 patients. Paraumbilical hernia 2 patients. Patients with diabetes as comorbidity had more incidence of surgical site infection leading to high incidence of flap necrosis. Emergency operations are more prone to incisional hernia. It may be due to inadequate bowel preparation, active peritonitis during the time of operation and poor nutritional status at the time of operation. Number of days of hospital stay by a patient after being operated for ventral hernia by component separation was 15.6 days of hospital stay, on an average. Few elderly patients with age above 55 years and with associated comorbidities had longer duration of stay. In cases of flap necrosis, the stay of hospital was increased. It was seen those patients who had incisional hernia had longer duration of stay than umbilical and paraumbilical hernia, this was due to increased morbidity in patients with incisional hernia due to large defects, longer duration of operation, increased rate of wound infection as compared to umbilical and paraumbilical hernias. It was seen that pain was maximum on day of operation 5.9. On post op day 1 pain score was 5.04. On postop day 2 pain score was

4.2, on post op week 1 was 2.7, post op month 1 was 1, post op month 3 was 0.36 and post op month 6 was 0.28. Patients who had incisional hernia experienced maximum pain according to VAS, followed by umbilical then paraumbilical hernia. Post op complications were seen in 10% patients which included seroma (8%), wound infection (16%), flap necrosis (12%), wound dehiscence (4%) and recurrence (4%).

Conclusion:

The present study of total of 25 patients of ventral hernia, who underwent surgical repair by Component Separation followed by meshplasty, had developed less post operative complications like Pain, Seroma, Wound infection, Flap necrosis and Wound debridement. Patient who had undergone meshplasty with component separation had improved quality of life due to cosmesis and least recurrence of hernia. However our study has its own Limitations due to small sample size and less duration of follow-up.

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