

MANAGEMENT OF VENTRAL HERNIAS WITH LOSS OF DOMAIN

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ABSTRACT

Background: Ventral hernias with loss of domain has significant effects on the patient's quality of life. This study was undertaken to assess the outcomes, complications and recurrence. **Methods:** This longitudinal descriptive study was done between Jan 2021 and Dec 2021 after ethical clearance. A total of 42 patients were included who reported with and diagnosed with ventral hernia with loss of domain. The data was analyzed using SPSS V21 software. **Results:** The mean age of the subjects was 58.37 ± 5.307 years consisting of 18 males and 24 females. Almost 60% of the patients were overweight and obese. The mean width was 11.92 ± 2.82 (Cms), mean length 13.38 ± 2.43 (Cms) and mean defect area was 108.3 ± 15.56 (Cm²). As per the EHS classification majority of the subjects had hernia in the M2 region i.e 47.6%, 30.9% had in M3 region, 19.1% had M4 and 2.4% in the L3 region. Table 8 suggests 15 subjects underwent bilateral TAR and 27 subjects underwent unilateral TAR with contralateral RS. On follow-up none of the patients had recurrence. **Conclusion:** Ventral hernias need be operated cautiously. Unilateral TAR provides a bigger space for mesh placement than the bilateral TAR.

KEYWORDS: Ventral hernia, Loss of domain, Transversus abdominis release (TAR).**INTRODUCTION**

Abdominal wall hernias are a familiar surgical problem. Millions 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. The complication rate of abdominal surgery due ventral hernias is between 4 to 20%. Advances in the basic and clinical sciences have allowed a better understanding of the pathophysiology of hernia formation. It is known, that a hernia will continue to enlarge over time if not treated.

CT of abdomen is of high accuracy in quantifying hernia sac volume and without prejudice defines ventral hernias. Depending on the surgical techniques used at the time of the initial repair, recurrence rates as high as 50% have been documented for ventral and incisional hernias. In ventral incisional hernias, placement of the mesh in a sublay position has been found to be effective with a low recurrence rate.

AIM: To study and describe the management of large ventral hernia's with loss of domain.

OBJECTIVES

1. To study the clinical findings and outcomes during

pre, intra and post-operatively.

2. To assess the post-operative adverse events, complications, recurrence and quality of life.

METHODOLOGY**Study Area/place**

The study was conducted among patients attending department of general surgery of navodaya medical college hospital and research center.

Study Design

Longitudinal descriptive study.

Study Period

January 2021 to December 2021.

Ethical approval

Institutional ethical committee approval was obtained prior to the initiation of the study.

Study Population

The patients selected for this study are those who were admitted with ventral hernias.

Inclusion Criteria

- Patients who are clinically found to be suffering from ventral hernias with loss of domain, as determined by Tanaka's Index.
- Patients aged more than 18 years.

- Patients who consent to undergo the procedure and whose consent to be included in the study.
- Patients fit for general anesthesia.
- Patients in whom post-operative follow up is feasible.

Exclusion Criteria

- Patients presenting with features of acute complications i.e. strangulation or obstruction.
- Patients without loss of domain.

Sample Size

All patients who reported to department of general surgery with ventral hernia's and who fulfilled the inclusion criteria during the study period. A total of 42 subjects were taken for this study.

Data collection methodology

Mode of selection: Patients presenting in Out Patient Department who meet the inclusion criteria and who do not possess any exclusion criteria, consenting to be a part of the study.

Procedure to be followed.

- ✓ All patients to be subjected to detailed history and clinical examination
- ✓ Routine hematological and biochemical tests to ascertain the presence of any comorbidities and the suitability for general anesthesia, would be performed.
- ✓ Radiological investigations such as X ray chest, X-ray abdomen erect, Ultrasonography (Abdomen + pelvis), Contrast Enhanced Computerized Tomography (Abdomen + pelvis) will be done and Tanaka score will be calculated i.e... the ratio of volume of the hernial sac with that of peritoneal sac.

Patient data will be collected according to information in case record sheet, which is attached herewith. Intra-operative findings will be noted. Regular follow up will be maintained until at least 6 months post operatively. Written informed consent will be obtained from patients. The personal details of patients included in the study will not be revealed.

Every patient will be subjected to Computed Tomography (CT), with need of contrast determined on a case by case basis. Those patients who undergo progressive pre-operative pneumoperitoneum will be subjected to repeat abdominal X-rays to ascertain the effectiveness of therapy, the copies of which will be maintained with their case records.

Intra-operative findings will be noted as per the case record form.

Post-operative follow-up for each patient will be maintained for a minimum of 6 months & relevant details will be added to the case record forms.

Data analysis

The collected data was collected, coded, entered into Microsoft excel work sheet and exported to SPSS. Data was analyzed using SPSS version 21. Data is presented as percentage in categories and then presented as tables and diagrams. Fisher test was used for test of significance.

RESULTS

Table 1: Demographic distribution.

Age group	Frequency	Percentage
51-55 years	13	30.9%
56-60 years	12	28.5%
61-65 years	09	21.4%
66-70 years	08	19.2%
Total	42	100%
Males	18	42.9%
Females	24	57.1%
Mean age: 58.37±5.307 years; Sex ratio [M:F]: 0.75:1		

Table 1 shows the distribution of age were 30.9% subjects were between 51-55 years, 28.5% were between 56-60 years, 21.4% were 61-65 years and 19.2% were between 66-70 years. The mean age of the subjects was 58.37±5.307 years. The study consisted of 18 males and 24 females. The sex ratio in the present study was 0.75:1. According to the WHO classification, table 3 shows the BMI of the subjects were 40.5% had normal BMI, 30.9% were overweight and 28.6% were obese (table 2). 61.9% subjects had progressive bulge/abdominal disfigurement and 38.1% subjects had painful bulge and 73.8% subjects had symptoms since two years and 26.2% had symptoms since a year as seen in table 3. The mean width was 11.92±2.82 (Cms), mean length 13.38±2.43 (Cms) and mean defect area was 108.3±15.56 (Cm²) (table 4).

Table 2: Distribution of subjects according to BMI.

BMI	Frequency	Percentage
Normal (18- 24.9)	17	40.5%
Overweight (25-29.9)	13	30.9%
Obese (>30)	12	28.6%
Total	42	100%

Table 3: Distribution of subjects according to symptoms and duration.

Symptoms	Frequency	Percentage
Progressive bulge /abdominal disfigurement	26	61.9%
Painful bulge	16	38.1%
Total	42	100%
Duration of symptoms		
< 1 year	11	26.2%
2 years	31	73.8%
Total	42	100%

Table 4: Hernia size description among the subjects.

Dimensions	Means
Width (Cm)	11.92±2.82
Length (Cm)	13.38±2.43
Area size (cm ²)	108.3±15.56

Table 5: Distribution of defects among the subjects as per EHS classification.

EHS classification	Frequency	Percentage
M1 (Subxyphoidal)	00	-
M2 (Epigastric)	20	47.6%
M3 (Umbilical)	13	30.9%
M4 (Infraumbilical)	08	19.1%
M5 (Suprapubic)	00	-
L1 (Subcostal)	00	-
L2 (Flank)	00	-
L3 (Iliac)	01	2.4%
L4 (Lumbar)	00	-
Total	42	100%

Table 6: Distribution according to indication.

Indication	Frequency	Percentage
Hernial repair	22	52.4%
Bowel obstruction	10	23.8%
Traumatic hallow organ injury	06	14.3%
Traumatic solid organ injury	04	9.5%
Total	42	100%

As per the EHS classification majority of the subjects had hernia in the M2 region i.e 47.6%, 30.9% had in M3 region, 19.1% had M4 and 2.4% in the L3 region. None of the subjects had M1, L1, L2 and L4 involvement (table 5).52.4% was due to hernia repair, 23.8% was due to bowel obstruction, 14.3% was due to traumatic hallow organ injury and 9.5% was traumatic solid organ injury mainly (table 6). The pre-operative optimization was done were 66.6% were planned for PPP, 21.5% for both i.ebotox+ PPP and11.9% botox (table 7).

Table 7: Pre-operative optimization distribution.

Pre-operative optimization	Frequency	Percentage
Botox	05	11.9%
PPP	28	66.6%
Botox+ PPP	09	21.5%
Total	42	100%

Table 8: Distribution of subjects according to procedure done.

Procedure	Frequency	Percentage
Bilateral TAR	15	35.7%
Unilateral TAR with contralateral RS	27	64.3%
Total	42	100%
Mesh area	Mean	p-value
B/L TAR	781.5±127.64 cms	p<0.001
Unilateral TAR	1209±468.37 cms	
Statistical significance ≤0.05		

Table 8 suggests 15 subjects underwent bilateral TAR and 27 subjects underwent unilateral TAR with contralateral RS. The average mesh area used in the B/L TAR procedure was 781.5±127.64 cms, whereas that used for Unilateral TAR was 1209±468.37 cms. This was significantly higher in the unilateral TAR subjects with p<0.001, suggesting that unilateral TAR provides a larger space for mesh placement. The main reason for component separations were 83.3% subjects was due to posterior reconstruction and 16.7% was anterior reconstruction (table 9).

Table 9: Main reason for component separation.

Component separation	Frequency	Percentage
Posterior reconstruction	35	83.3%
Anterior reconstruction	07	16.7%
Total	42	100%

Table 10: Intraoperative characteristics (Anterior).

Anterior reconstruction	Frequency	Percentage
Fascial approximation	39	92.8%
Bridged	3	7.2%
Total	42	100%
Anterior reconstruction suture		
Permanent interrupted	05	11.9%
Permanent continuous	37	88.1%
Total	42	100%

Table 10 shows majority, 92.8% subjects had facial approximation anterior reconstruction and suturing was permanent continuous in 88.1% subjects and permanent interrupted in 11.9%. The mean operative time was 240± 30 Minutes for component separation and 180± 30 Minutes for TAR. The mean blood loss noted was 250± 35 ml for component separation and 165± 28 ml for TAR. The mean hospital stay noted among the subjects was 14.19±3.07 days with a minimum stay of 12 days and a maximum of 20 days (Table 11).

Table 11: Mean operating time, blood loss and post-operative stay.

Intra operatively	Means
Operative time	
Component separation	240± 30 Minutes
TAR	180± 30 Minutes
Blood loss	
Component separation	250± 35 ml
TAR	165± 28 ml
Post-operatively	
Hospital stay	14.19±3.07 days

A follow up was done with mean number of months was 6.93±5.78. All the subjects had a routine in person checkup. None needed readmission or reoperation there was no recurrence noted. No complications like seroma, hematoma, cellulitis and UTI's. the quality of life was noted and all the 42 patients lead a quality life.(table 12).

Table 12: Follow up.

Follow up (mean number of months was 6.93±5.78)	
In person	42 subjects
Telephonic	00 subject
Readmission	00 subject
Re-operation	00 subject
Recurrence	00 subject
Complications/SSO/SSOI	No complications
Quality of life (good)	42 subjects

DISCUSSION

The present study was undertaken and conducted among 42 subjects and the results showed all the subjects had hernia which was reducible and had loss of domain. Most of the subjects had incisional etiology. For all the subjects the main mesh plane was sublay retromuscular. The following observations were noted.

The present study findings were similar to a study conducted by Nicolas Q et al and Belyansky I et al in which the mean age of study participants was 59 ± 12 years and 54.9 years respectively.^[1,2] The present study findings were close with a study by Baig SJ et al in which 71.6% of study participants were females.^[3] The present study findings were similar to a study by Baig SJ et al in which the mean BMI corresponded to Overweight BMI i.e. 28.57 kgs/m^2 .^[3]

The present study findings were consistent with findings of Anjana N et al in which clinical presentation of study subjects showed that 63% had swelling, 33% had swelling/pain and 4% had obstruction.^[4] R D Jaykar et al. reported 64% had swelling or bulge in abdomen, 20% had swelling with pain, 12% had swelling which was irreducible and 4% had swelling with intestinal obstruction.^[5]

The present study findings were consistent with a study by Baig SJ et al in which the average defect width was 6.65 cms and defect area was 45.33 cm^2 .^[3] In a study by Cox TC et al the average defect size was as high as 270 cm^2 and size was quite large when compared to the present study.^[6]

As per the EHS classification majority of the subjects had hernia in the M2 region i.e 47.6%, 30.9% had in M3 region, 19.1% had M4 and 2.4% in the L3 region. The present study findings were different when compared to a study by Nicolas Q et al in which majority of subjects had inguinal hernia and in a study by RK Deshpande et al in which majority of study subjects presented with inguinal and para-umbilical hernias.^[1,7] The present study findings were almost similar to a study by Jaykar RD et al in which 32% had umbilical hernia and 42% had infra umbilical hernia.^[5]

A study by A. Jacombs, E. Elstner et al all the subjects received pre-operative abdominal preparation with botox, 18 subjects were prepared with PPP prior to surgery repair. The main indication in their study for

optimization was defect $>15\text{cm}$ and $>20\%$ subjects with loss of domain. They also reported the most common change was bloating and one subject reported pneumomediastinum after pp whereas the present study had no complication or so.^[8]

Hodgkinson, et al found that 7.5% patients undergoing ACST and 3.1% patients undergoing TAR required bridging of the defect whereas Krpata, et al found that 8.9% and 9.1% patients undergoing ACST and TAR, respectively, required bridging. Posterior sheath bridging is done with Vicryl mesh to avoid bowel related complications, with the eventual defect (to be bridged) being sutured to the mesh edge. Anterior sheath can be bridged with a polypropylene mesh.^[9]

The average mesh area used in the B/L TAR procedure was $781.5 \pm 127.64 \text{ cms}$, whereas that used for Unilateral TAR was $1209 \pm 468.37 \text{ cms}$. This was significantly higher in the unilateral TAR subjects with $p < 0.001$, suggesting that unilateral TAR provides a larger space for mesh placement.

A study by Albakiny et al in their study found the operative time was 215 minutes for ACST and 217 minutes for TAR. The blood loss reported by them was 510 ml and 545 ml respectively. Both the intra-operative finding were similar to the present study.^[10]

Another study by Blair et al reported operative time of 224 minutes for ACST and 200 minutes for TAR.^[11] The mean hospital stay noted among the subjects was 14.19 ± 3.07 days. The study done by Hodgkinson showed hospital stay of 9 days and study by Blair reported 7.7 days stay post-surgery.^[9,11]

Blair, et al in their study found no significant difference in wound complication rates.^[12] In their study, 18.6% of patients undergoing ACST and 16.1% of patients undergoing TAR had a seroma requiring intervention. 1.3% and 3.2% of patients undergoing ACST and TAR respectively had a hematoma and 20% and 3.2% of patients undergoing ACST and TAR respectively had wound infections. 3.6% of patients in the ACST group had a mesh infection while none of the patients in the TAR group had meshinfection.^[10]

Albakiny, et al found a significantly higher rate of wound morbidity in their ACST group as compared to the TAR group.^[13] 70% and 35% patients had seromas requiring intervention, 50% and 20% had wound infections, 35% and 10% had wound dehiscence and 10% and 0% had a chronic sinus respectively.^[11] The present study findings were different to a study conducted by P Prasad et al in which 2.9% had recurrence.^[14]

CONCLUSION

The average mesh area used in the B/L TAR procedure was $781.5 \pm 127.64 \text{ cms}$, whereas was Unilateral TAR was

1209±468.37 cms. This was significantly higher in the unilateral TAR subjects with $p < 0.001$, suggesting that unilateral TAR provides a larger space for mesh placement.

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