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ORIGINAL RESEARCH

EFFECTIVENESS OF MESH VS ANATOMIC REPAIR IN MANAGEMENT OF PARAUMBILICAL HERNIAS – A COMPARATIVE STUDY

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ABSTRACT:

Background:The purpose of the study is to determine the appropriate mode of managing paraumbilical hernias in terms of complications and recurrences.
Materials and Methods: In this clinical study, 50 patients with paraumbilical hernia were admitted and underwent surgery subsequently from October 2019 to September 2021. The patients were studied for, clinical features, treatment and postoperative complications. Cases were prepared for surgery after preoperative correction of anemia, hypertension, obesity, diabetes and local skin conditions. All patients underwent surgical procedure after following preoperative preparation.
Results: The present study shows that majority of the patients are in the age group of 40-60years, i.e., between 4th and 6th decades of life (52%). 2 patients are above 70 years. In this study, the patients were categorized into two groups based on the procedure performed in accordance to the size of the defect: Both anatomical and prosthetic mesh repair was performed across all defect sizes and the outcomes compared. Among 28 patients with a defect size of 2-5cms, anatomical repair was performed in 18 patients (64.2%), while mesh repair was performed in 10 patients(35.7%). Among 22 patients with a defect size more than 5cms, anatomical repair was performed in 6 patients (27.2%), while mesh repair was performed in 16 patients (72.7%). Skin necrosis, wound infection, seroma and wound dehiscence were noted in this study group. Skin necrosis was seen in 2 patients (8.3%) in anatomical repair group, while 1 patient (3.8%) developed in prosthetic mesh repair group. Wound infection was seen in 2 patients (8.3%) in anatomical repair group, while 3 patients(11.5%) developed in prosthetic mesh repair group. Seroma was seen in 4

patients (16.6%) in anatomical repair group, while 2 patients(7.6%) developed in prosthetic mesh repair group. In two years of regular follow up, 2 recurrences (8.3%) were noted in the anatomical repair group while no recurrences were noted in the prosthetic mesh repair group. The subjects who underwent anatomical repair were followed up for a mean period of 14.63 months with a standard deviation of 6.67 and those who underwent prosthetic mesh repair were followed up for a mean period of 13.45 months with a standard deviation of 5.8.

Conclusion: To conclude, it can be said that in the treatment of paraumbilical hernias, prosthetic mesh repair seems superior to anatomical repair, although significant difference could not be demonstrated. Statistical significance between the two procedures probably could be obtained if the sample size and follow up period is increased.

Keywords: Paraumblical Hernia, Anatomical Repair, Mesh Repair, Seroma, Skin Necrosis.

INTRODUCTION:

Midline hernia occuring through linea alba abutting superiorly or inferiorly at the umbilicus is called as paraumbilical hernia. Para-umbilical hernias are one of the common hernias in adults, the management of which remains one of the common surgical problems. Infant umbilical defects if not too large tend to close spontaneously. Infant and children umbilical/paraumbilical hernias are rarely the sites of obstruction and strangulation. It is useful to consider the subject of paraumbilical hernia in adults as obstruction and strangulation are common. These patients are usually obese, diabetic and patients with COPD. Therefore, urgency of repair of paraumbilical hernia is much greater for adults than infants.[1,2]

The incidence of paraumbilical hernia in the adult is unknown.[3,4] It is more common in the female, with a female to male ratio of 3:1. Middle aged, obese, multiparous females are more prone to develop significant paraumbilical hernias, as are individuals with ascites, usually secondary to cirrhosis of the liver. In addition, as Mayo suggested in 1899, the old, cachectic and feeble are prone to develop umbilical hernia and likely to develop complications. It is more common in people of African origin.[3]

Paraumbilical hernias generally are acquired. If the defect is small it can be repaired surgically without undue tension and recurrence rate is very low. But large paraumbilical hernias with wide openings are difficult to manage by anatomical repair, which if done will result in early recurrence due to undue tension resulting in tissue necrosis. Such hernias should be treated with prosthetic mesh repair, when large defects are bridged by the prosthetic mesh that would add strength, while avoiding excessive tension. A number of operations are presently employed in the management of paraumbilical hernia with an aim to effect a permanent cure. If the defect is small (<2cms) it is usually repaired by anatomic repair without undue tension. If the defect is of medium size (2-5cms) or more (>5cms), it can be repaired by anatomic &/or prosthetic mesh repair and the current study includes this type of patients. Various studies have been conducted on different methods of surgical procedures showing variable results.

The purpose of the study is to determine the appropriate mode of managing paraumbilical hernias in terms of complications and recurrences. Study includes 50 cases paraumbilical hernias admitted and treated in Kamineni Institute of Medical Sciences, Narketpally from October 2019 to September 2021.

Aim & Objective

- To study the clinical presentation of paraumbilical hernias and their complications.
- To compare the postoperative outcome of patients of paraumbilical hernia treated with mesh vs anatomic repair.

MATERIALS & METHODS:

- Place of Study - Department of General Surgery, Kamineni Institute of Medical Sciences, Narketpally
- Duration of study - October 2019 to September 2021.
- Type of study - Prospective comparative
- Sample size - 50 cases of paraumbilical hernias divided into 2 groups based on the procedure performed – with/without prosthetic mesh.

Inclusion criteria

- All adult patients (18–75 years of age) with paraumbilical hernias.
- Size of the defect more than 2cms on USG abdomen.
- Patients willing for surgery are included.

Exclusion criteria

- Size of the defect less than 2cms on USG abdomen.
- Patients with paraumbilical hernia associated with severe comorbid conditions and uncontrolled ascites are excluded.
- Patients requiring emergency surgery (obstructed hernia) are excluded.
- Paediatric age group(less than 18yrs) is excluded.
- Recurrent paraumbilical hernias excluded.

Methods

- Approval from ethical committee of Kamineni Institute of Medical Sciences, Narketpally was obtained.
- All patients requiring surgery for paraumbilical hernias are included for the study.
- Detailed clinical history taken.
- Detailed general and local examination performed.
- Cases are studied as per proforma attached and master chart is made for the cases studied to make the report brief

Investigations and Diagnosis

- All cases were diagnosed clinically.
- Investigations:

- Routine investigations
- USG abdomen

Cases were prepared for surgery after preoperative correction of anemia, hypertension, obesity, diabetes and local skin conditions. All patients underwent surgical procedure after following preoperative preparation.

Vertical anatomical repair:

Under anaesthesia patient is laid on his back, parts painted and drapes are applied to allow access to the umbilical area and the abdomen of extended access is required. A transverse elliptical incision is made enclosing the umbilicus and the skin covering the hernia. It should extend laterally on each side for atleast 5 cm beyond the protuberance. It is deepened through subcutaneous fat until the glistening surface of the aponeurosis is exposed. The neck of the sac is generally free from adhesions and is opened first. Before doing so, the aponeurosis is cleared centrally from all directions, until the neck of the hernia is exposed of the level where it emerges through linea alba. A small incision is made in the fibrous coverings of the neck of any convenient point on its circumference, and is carefully deepened until the sac itself has been opened. A finger is introduced and is passed round the inside of the sac to determine the presence of any adhesions. The remaining circumference of the neck of the sac is then divided with scissors, the finger being used to protect the contents from injury. The central island comprising the sac together with attached ellipse of skin and fat is now joined to the abdomen only by contents which are carefully examined. If they consist of omentum, which is ischaemic, it can be ligated and excised, if it is healthy, it can be reduced into peritoneal cavity. If bowel is the content, sac is opened up as far as possible. The sac is now gradually turned inside out and contents gently peeled off its interior. Adherent omentum removed along with the sac. Adhesions between adjacent coils of intestine are separated as far as possible and the hernia contents are returned to the abdominal cavity. Defect cleared of all fatty tissue and adhesions, and it is closed vertically using strong non-absorbable material - polypropylene (No. 1) on a round body needle. Suction drain kept, subcutaneous tissue closed and skin sutured.

Mesh repair

Steps for surgery are similar to anatomical repair till the hernial sac and its contents are managed. Polypropylene mesh is used for repair. Most commonly used size of mesh is 6” x 3”. If defect is larger, larger sized mesh is used. After managing hernial sac and its contents as described in anatomical repair, aponeurosis is approximated using polypropylene suture and prosthetic mesh is placed over the aponeurosis and fixed with polypropylene suture material. Suction drain placed, subcutaneous tissue and skin sutured. Patients allowed to take oral liquids after 24-36 hrs and allowed to take soft diet subsequently. Quantity and nature of suction drain noted down. Suction drain removed after 48 hrs in all patients.

Figure 1: Supraumbilical Hernia – in male

Figure 2: Elliptical Incision

Figure 3: SAC exposed

Figure 4: SAC opened

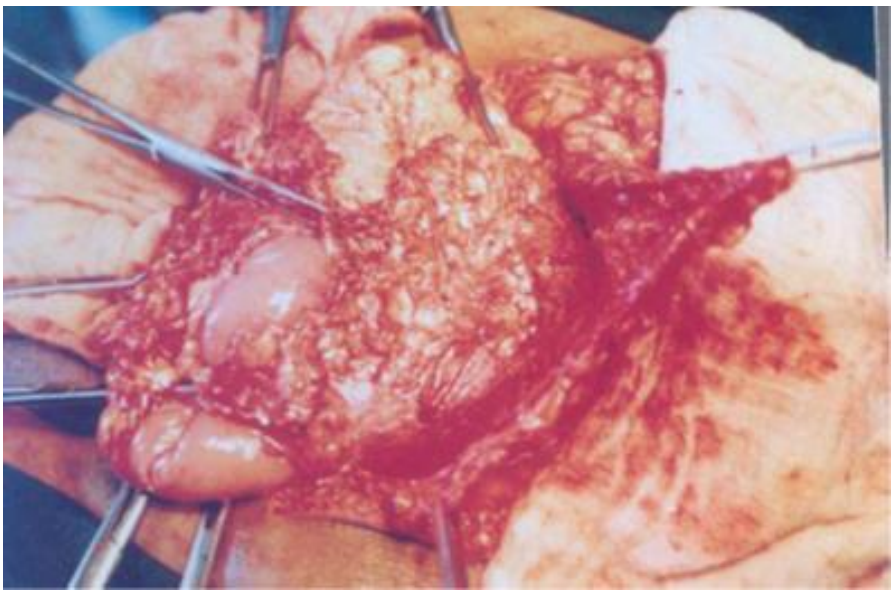

Figure 5: Peritoneum being closed

Figure 6: Prolene Mesh

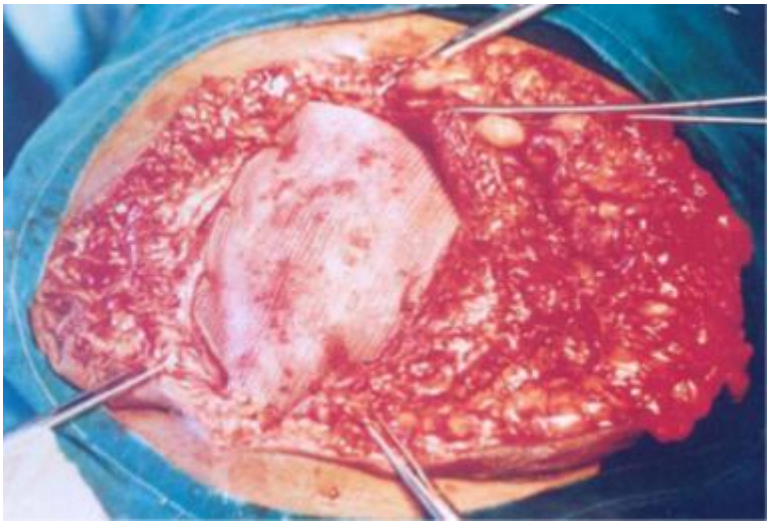

Figure 7: Onlay mesh in place

Figure 8: Mesh repair completed

Follow up measurement

- The patients are followed up every 3 months for a period of two years or as and when complications occurred.
- The outcomes of the various modalities of management are measured and compared based on the following parameters:
- Seroma
- Haematoma
- Wound infection
- Abdominal wall sinuses
- Wound induration and tenderness
- Skin necrosis
- Wound disruption
- Recurrence
- Duration of hospital stay

Statistical Methods

- The Chi square and Fisher Exact test has been used to find the significance of proportions of postoperative complications and recurrence in different procedures.
- Student t test and Mann Whitney U test has been used to find the significance of mean postoperative hospital stay, mean Size of defect and mean follow-up period between the different surgical procedures.

Statistical software

- The Statistical software namely SPPS 10.0 and Systat 8.0 were used for the analysis of the data and Microsoft Word and Excel have been used to generate graphs, tables etc.

RESULTS:

Table 1: Age wise distribution of paraumbilical hernia cases (n=50)

Age in years	Number	Percentage %
18 to less than 20	1	2.0
20-29	9	18.0
30-39	8	16.0
40-49	11	22.0
50-59	15	30.0
60-69	5	10.0
>70 years	2	4.0
Total	50	100.0

The present study shows that 26 cases (52.0%) presented in the age group of 40-60years, i.e, between 4thand 6thdecades of life.

Table 2: Sex wise distribution of Paraumbilical hernia cases (n = 50)

Sex	Number	Percentage %	Mean age with SD
Male	18	36.0	44 ± 13.61
Female	32	64.0	45.05 ± 13.54
Total	50	100	

In this study, 32 cases(64%) are females.

Table 3. Distribution of study subjects according to the presentation of symptoms (n = 50)

Symptoms	Number	Percentage %
Swelling around umbilicus	50	100.0
Swelling and Pain in the swelling	19	38.0

Swelling around the umbilicus was present in all 50 patients(100%), while pain in the swelling was present in 19 patients(38.0%).

Table 4: Distribution of study subjects according to the duration of swelling (n=50)

Duration	Number	Percentage %
Since childhood	3	6.0
0-5 months	6	12.0
6-11 months	9	18.0
1-3 years	23	46.0
3-6 years	6	12.0
6-10 years	3	6.0
>10 years	0	0.0
Total	50	100

23 patients (46%) had swelling around the umbilicus for 1-3 years before presenting to the hospital, 9 patients (18%) had for 6-11 months & 6 patients (12%) had swelling for 0 -5 months.

Table 5: Distribution of study subjects according to the signs (n=50)

Signs	Number	Percentage %
Supraumbilical swelling	15	30.0
Infraumbilical swelling	35	70.0
Cough impulse	48	96.0
Reducibility	48	96.0
Weak abdominal muscle tone	5	10.0

Cough impulse and reducibility was present in 96%(48 patients) of the study subjects, infraumbilical swelling in 70% (35 patients), supraumbilical swelling in 30%(15 patients) & weak abdominal muscle tone in 10% (5 patients) of the study subjects.

Table 6: Distribution of study subjects according to the precipitating factors in males (n = 18)

Factors	Number (N = 18)	Percentage %
Smoking	13	72.2
Manual work	7	38.8
Chronic cough	6	33.3
Obesity	6	33.3
Constipation	2	11.1
Difficulty in micturition	0	0.0

In this study, among males, smoking was present in 13 patients (72.2%) and manual work in 7 patients (38.8%)

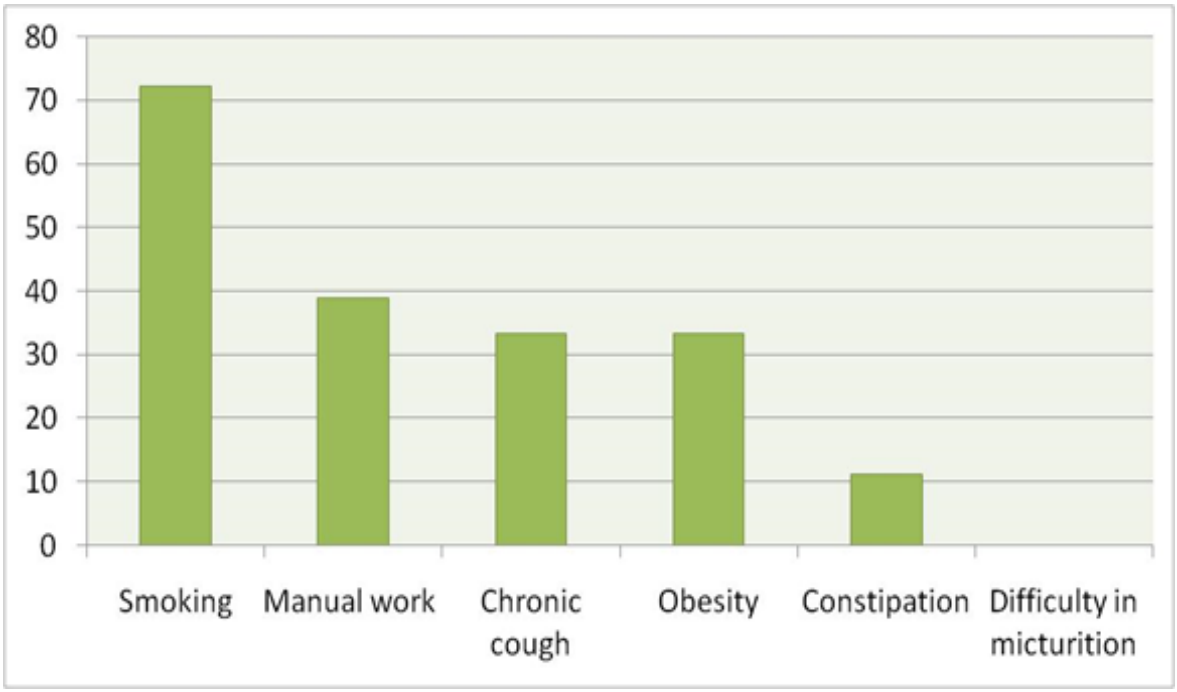

Figure 1: Distribution of study subjects according to the precipitating factors in females (n = 32)

In this study, among females, multiparity was seen in 25 patients(78.1%) and obesity in 16 patients (50.0%).

Table 7: Distribution of cases according to the associated diseases (n=50)

Associated diseases	Number (N=50)	Percentage %
Hypertension	14	28.0
Diabetes Mellitus	10	20.0
Anemia	8	16.0
Others	3	6.0

In this study, hypertension was seen in 14 patients(28.0%) and diabetes mellitus in 10 patients (20.0%).

Table 8: Distribution of cases according to the size of the defect & the procedure performed

Size of the defect on USG abdomen	Anatomical repair	Prosthetic mesh repair
	Number (%)	Number (%)
2-5cms (n = 28)	18 (64.2)	10 (35.7)
>5cms (n = 22)	6 (27.2)	16 (72.7)
TOTAL: 50	**24 (48.0)**	**26 (52.0)**

Among 28 patients with a defect size of 2-5cms, anatomical repair was performed in 18 patients(64.2%), while mesh repair was performed in 10 patients(35.7%).
Among 22 patients with a defect size more than 5cms, anatomical repair was performed in 6 patients(27.2%), while mesh repair was performed in 16 patients(72.7%).

Table 9: Distribution of cases according to the postoperative complications

Postoperative complications	Anatomical repair (N = 24) (%)	Prosthetic mesh repair (N = 26) (%)	Significance
Seroma	4 (16.6)	2 (7.6)	p>0.05, NS
Haematoma	1 (4.1)	1 (3.8)	p>0.05, NS
Wound infection	2 (8.3)	3 (11.5)	p>0.05, NS
Wound dehiscence	0	1 (3.8)	p>0.05, NS
Skin necrosis	2 (8.3)	1 (3.8)	p>0.05, NS
Sinus	0	0	-
Total complications	9 (41.6)	8 (30.7)	p=0.61

- Seroma was seen in 4 patients(16.6%) in anatomical repair group, while 2 patients(7.6%) developed in prosthetic mesh repair group.
- Wound infection was seen in 2 patients(8.3%) in anatomical repair group, while 3 patients(11.5%) developed in prosthetic mesh repair group.
- Wound dehisence was seen in 1 patient(3.8%) in prosthetic mesh repair group.
- Skin necrosis was seen in 2 patients(8.3%) in anatomical repair group, while 1 patient(3.8%) developed in prosthetic mesh repair group.

Table 10: Distribution of cases according to the postoperative hospital stay

Procedures	Mean hospital stay (days)	SD
Anatomical repair	11.70	4.10
Prosthetic mesh repair	9.5	4.28

The mean postoperative hospital stay following anatomical repair is 11.7 days, while following prosthetic mesh repair is 9.5days.

Table 11: Distribution of study subjects according to the recurrence of paraumbilical hernia.

Procedures	Number of recurrences	Percentage %
Anatomical repair	2	8.3
Prosthetic mesh repair	0	0

2 recurrences were noted in the anatomical repair group while no recurrences were noted in the prosthetic mesh repair group.

Table 12: Period of follow up

Procedures	Mean Follow-up in months	SD
Anatomical repair	14.63	6.67
Mesh repair	13.45	5.80

The subjects who underwent anatomical repair were followed up for a mean period of 14.63 months and those who underwent prosthetic mesh repair were followed up for a mean period of 13.45 months.

DISCUSSION

Various studies have been conducted comparing mesh repair with anatomical repair in the management of paraumbilical hernias.

Table 13: Comparision with Sanjay et al.[4]

STUDY	Median age (years)	Seroma		Wound infection		Recurrence	
		Anat	Prosth	Anat	Prosth	Anat	Prosth
Sanjay, et al (Wales) n =61(A) 39(P)	56	1 (1.6%)	Nil	7 (11.4%)	Nil	7 (11.4%)	Nil
Current study n= 24 (A) 26 (P)	43	4 (16.6%)	2 (7.6%)	2 (8.3%)	3 (11.5%)	2 (8.3%)	Nil

- Sanjay P, Reid TD, Davies EL, Arumugam PJ, Woodward A. from Wales(U.K) made a retrospective comparison of mesh and sutured repair for adult paraumbilical hernias in 2005.
- The study suggested that prosthetic mesh repair is ideal for managing primary and recurrent paraumbilical hernias.
- A total of 100 patients were studied, of which 61 patients had suture repair and 39 patients had prosthetic mesh repair.
- Median age of presentation was 56 years (range 19-90 years)
- Recurrence rates for the suture and mesh repair groups were 11.5 and 0%, respectively (P=0.007)
- Seroma was noticed in 1.6% in anatomical repair group while none were present in prosthetic mesh repair group.
- Infection rates for the suture and mesh repair groups were 11.5 and 0%, respectively (P=0.007).

Table 14: Comparision with Ahmed M.Kensarah.[5]

STUDY	Median age (years)	Seroma		Hematoma		Wound infection		Recurrence	
		Anat	Prosth	Anat	Prosth	Anat	Prosth	Anat	Prosth
Ahmed M.Kensarah (Saudi Arabia) n= 32(A) 30(P)	55	3.1%	7%	Nil	3.2%	4.3%	7%	6 (18.75)	3 (10%)
Current study n= 24 (A) 26 (P)	43	16.6%	7.6%	4.1%	3.8%	8.3%	11.5%	2 (8.3%)	Nil

- Another single center prospective study conducted by Ahmed M. Kensarah in Saudi Arabia in 2011 concluded that despite higher complication rate, mesh repair is superior to suture repair due to lower recurrence rate.
- A total of 62 patients were studied, of which 32 patients had suture repair and 30 patients had prosthetic mesh repair.
- Median age was 55 years (range 17-76 years).
- There were more males than females with a female to male sex ratio of 0.3:1 while the urrent study has more number of females than males.
- The low number of female cases could possibly be explained by the conservative attitude of women in Middle Eastern countries.

- The average hospital stay in anatomical repair group is 4.6 days while it is 5.6 days in prosthetic mesh repair group.
- The post operative complication rate in anatomical repair group is 8% while it is 17% in prosthetic mesh repair group.
- In the anatomical repair group, seroma was noted in 3.1%, wound infection in 4.3% while in the prosthetic mesh repair group seroma was noted in 7%, haematoma in 3.2% and wound infection in 7%.
- Wound infection rates were higher in prosthetic mesh repair group (7%) than the anatomical repair group (4.3%)
- Recurrence was noted in 18.75% in the anatomical repair group while 10% of the patients had recurrence in the prosthetic mesh repair group.
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Table 15: Comparision with Malik et al.[6]

STUDY	Median age (years)	Wound infection		Recurrence	
		Anat	Prosth	Anat	Prosth
Malik et al n= 101 (A) 135 (P)	51.79	Nil	11 (8.14%)	23 (22.7%)	10 (7.4%)
Current study n= 24 (A) 26 (P)	43	2 (8.3%)	3 (11.5%)	2 (8.3%)	Nil

- Malik et al conducted similar study in 2008 and concluded that mesh repair is much superior to non-mesh suture repair in terms of recurrence and overall outcome.
- A total of 236 patients were operated of which 101 patients were randomly assigned to the anatomical repair group and 135 were assigned to the prosthetic mesh repair group.
- The median age of presentation was 51.79 years (range 22-81 years)
- The wound infection rates in prosthetic mesh repair group are higher (8.14%) than the anatomical repair group.
- The recurrence rates are higher in the anatomical repair group (22.7%) than the prosthetic mesh repair group (7.4%).

Table 16: Comparision with Eryilmaz et al.[7]

STUDY	Median age (years)	Seroma		Wound infection		Recurrence	
		Anat	Prosth	Anat	Prosth	Anat	Prosth
Eryilmaz et al n= 63 (A) 48 (P)	46.5	4 (6%)	4 (8%)	2 (3%)	3 (6%)	9 (14%)	1 (2%)
Current study n= 24 (A) 26 (P)	43	4 (16.6)	2 (7.6)	2 (8.3%)	3 (11.5%)	2 (8.3%)	Nil

- Eryilmaz et al published a study in Turkey in the year 2006 which concluded that polypropylene mesh should be used regardless of the size of the defect.
- Out of 111 patients, 63 of them underwent anatomical repair and 48 underwent prosthetic mesh repair.
- The median age of presentation was 46.5 years.
- The wound infection rates in prosthetic mesh repair group are higher (6%) than the anatomical repair group (3%).
- The recurrence rates are higher in the anatomical repair group (14%) than the prosthetic mesh repair group (2%).

Table 17: Comparision with Stabilini et al.[8]

STUDY	Median age (years)	Seroma		Hematoma		Wound infection		Recurrence	
		Anat	Prosth	Anat	Prosth	Anat	Prosth	Anat	Prosth
Stabillini et al (Italy) n= 34 (A) 64 (P)	56	Nil	3 (4.8%)	Nil	1 (1.5%)	Nil	1 (1.5%)	5 (14.7%)	2 (3.3%)
Current study n= 24 (A) 26 (P)	43	4 (16.6%)	2 (7.6%)	1 (4.1%)	1 (3.8%)	2 (8.3%)	3 (11.5%)	2 (8.3%)	Nil

- Stabilini et al published similar study in the year 2009 in Italy which concluded that a slightly increased risk of postoperative local complications following mesh repair is offset by a reduced rate of recurrence in comparison to suture repair.

- A total of 98 patients underwent repair, among which anatomical repair of the defect was performed in 34 cases while prosthetic mesh repair was performed in 64 cases.
- The median age of presentation was 56 years.
- The wound infection rates in prosthetic mesh repair group are higher (1.5%) than the anatomical repair group.
- Seroma rates were higher in prosthetic mesh repair group (4.8%) than the anatomical repair group (Nil)
- The recurrence rates are higher in the anatomical repair group (14.7%) than the prosthetic mesh repair group (3.3%)

Table 18: Comparision with Arroyo et al.[9]

STUDY	Median age (years)	Seroma		Wound infection		Recurrence	
		Anat	Prosth	Anat	Prosth	Anat	Prosth
Arroyo et al (Spain) n =100(A) 100(P)	57	5 (5%)	6 (6%)	3 (3%)	2 (2%)	11 (11%)	1 (1%)
Current study n= 24 (A) 26 (P)	43	4 (16.6%)	2 (7.6%)	2 (8.3%)	3 (11.5%)	2 (8.3%)	Nil

- Arroyo et al published similar studies in the year 2002 in Spain which concluded that prosthetic mesh repair could become the standard treatment.
- 200 patients were included in the study, of which 118 were women and 82 were men.
- 100 patients each underwent anatomical repair and prosthetic mesh repair.
- The mean age at presentation was 57 years.
- Rates of early complications such as seroma, haematoma or wound infection were similar both anatomic and prosthetic mesh repair groups.
- The hernia recurrence rate was higher after anatomical repair (11 %) than after mesh repair (1%) (P =0.0015).
- Berger et al conducted similar studies in 411 patients.
- 281 patients each underwent anatomical repair and 130 of them underwent prosthetic mesh repair.
- The mean age at presentation was 56.35 years.
- The wound infection rates are higher in prosthetic mesh repair group (19.2%) than the anatomical repair group (7.5%).
- Seroma rates were higher in prosthetic mesh repair group (13.8%) than the anatomical repair group (3.9%)
- The recurrence rates are higher in the anatomical repair group (8.2%) than the prosthetic mesh repair group (5.4%)

Table 20: Comparision with Polat et al.[10]

STUDY	Median age (years)	Seroma		Wound infection		Recurrence	
		Anat	Prosth	Anat	Prosth	Anat	Prosth
Polat et al n =18(A) 32(P)	49.7	Nil	1 (3.1%)	1 (5.6%)	Nil	2 (11.1%)	Nil
Current study n= 24 (A) 26 (P)	43	4 (16.6%)	2 (7.6%)	2 (8.3%)	3 (11.5%)	2 (8.3%)	Nil

- Polat et al published similar study in the year 2005 in Turkey which concluded that prosthetic mesh repair seemed to be useful in selected patients as it caused minimal postoperative pain and less analgesic necessity.
- A total of 50 patients underwent repair, among which anatomical repair of the defect was performed in 18 cases while prosthetic mesh repair was performed in 32 cases.
- The median age of presentation was 49.7 years.
- The wound infection rates are higher in anatomical repair group (5.6%) while no surgical site infections were noted in prosthetic mesh repair group.
- Seroma rates were higher in prosthetic mesh repair group (3.1%) than the anatomical repair group (Nil)
- The recurrence rates are higher in the anatomical repair group (11.1%) than the prosthetic mesh repair group (Nil)

Table 21: Comparing the mean age of presentation across various studies

Parameter	Sanjay et al[4] (Wales)	Ahmed M.Kensarah[5] (Saudi Arabia)	Malik et al[6] (Pakistan)	Eryilmaz et al[11] (Turkey)	Stabilini et al[14] (Italy)	Arroyo et al[32] (Spain)	Arroyo Sebastian et al[18] (Spain)	Berger et al[20]	Polat et al[24] (Turkey)	Current study
Mean age of presentation (years)	56	55	51.79	46.5	56	57	57.1	56.35	49.7	43

- The mean age of presentation in this study is in the 4th decade which is comparable to studies by Eryilmaz et al and Polat et al while it is in the 5th decade in all other studies.
- This early presentation could be due to early detection and motivation by the regular clinical and surgical camps organized by the institute.

CONCLUSION:

To conclude, it can be said that in the treatment of paraumbilical hernias, prosthetic mesh repair seems superior to anatomical repair, although significant difference could not be demonstrated. Statistical significance between the two procedures probably could be obtained if the sample size and follow up period is increased.

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