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ORIGINAL ARTICLE

Comparison of Sublay Vs Onlay Mesh Hernioplasty in terms of operative time, complications and recurrence.

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ABSTRACT… Objective: To compare the efficacy of Sublay vs Onlay for ventral hernias in prevention of complications. **Study Design:** Comparative study. **Setting:** Government Teaching Hospital Shahdara, Lahore. **Period:** December 2021 to March 2023. **Methods:** After approval from ethical committee, total 110 patients of ventral hernias having defect size more than 2 cm were selected and divided equally into Sublay(S group) and Onlay (O group), 55 in each group. The sample size was determined by using WHO sample size calculator. Incisional and recurrent hernias were excluded. Age, sex, seroma, wound infection, operative time, length of stay and recurrence were recorded and analyzed by SPSS version 24 after taking consultation with statistician also. **Results:** Out of 110 patients, 93(84.5%) were female and 17(15.5%) were male. Age range was 25 years to 70 years. Mean age in S group was 46 years and 47years in O Group. Average operative time was 85 minutes in O Group and 123 minutes in S Group with minimum 45 mins in O group and 150 minutes (maximum) in S Group with p-value of 0.00 which was significant. Seroma was formed in 28 patients (25.5%) with 18 in O Group and 10 in S Group, with p-value insignificant. Infection, Length of stay and recurrence were also statistically insignificant. ***Conclusion*:** Both Sublay and Onlay mesh hernioplasty are associated with wound complications equally but operative time is remarkably less in Onlay mesh hernioplasty.

Key words: Infection, Mesh Hernioplasty, Operative Time, Onlay, Recurrence, Sublay, Seroma, Ventral Hernia.

INTRODUCTION

"A hernia is a protrusion of a viscus or part of a viscus through an abnormal opening in the walls of its containing cavity. The external abdominal hernia is the most common form, the most frequent varieties being the inguinal, femoral and umbilical, accounting for 75% of cases".[1] Ventral abdominal wall hernias also include incisional hernias as well as epigastric and Para umbilical hernias.[2] Surgery is the primary treatment option as hernias typically progress over time. This means they can increase in size, cause pain and discomfort, or even result in serious complications such as bowel obstruction, incarceration, or strangulation.[3] There is 27% and 3% risk of mortality in men and women respectively due to inguinal hernia alone. Approximately 20 million hernia surgeries are performed globally every year.[4]

Hernioplasty is the treatment modality which ranks among the most performed surgeries by general and laparoscopic surgeons. Hernioplasty may lead to post-operative complications such as pain, bleeding, infection, or seroma formation.[5] Hernioplasty involves the placement of mesh to cover the gap and strengthen the abdominal wall. It could be done by Onlay technique where mesh is positioned between abdominal wall's subcutaneous fat and anterior rectus sheath or by Sublay technique where mesh is placed within retro-rectus plane, located between the rectus muscle and posterior rectus sheath. There is an ongoing discussion surrounding the positioning of mesh in ventral hernia repair, primarily due to issues such as the development of seromas and the likelihood of recurrence. Some surgeons have proven Onlay mesh hernioplasty for its simplicity and shorter duration of operation.[6-9]

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Numerous trials and even meta-analysis have failed to prove superiority of one technique over the other technique. Most of the studies showing lower complications in Sublay were either based in high or low middle income countries[10-11] or had very low-moderate quality of evidence suggesting that more studies need to be done in different countries including the countries with lower middle economy. Meta-analysis done by L. Beckers Perletti et al indicated that there was high risk of bias with significant publication bias in both the studies included.[8] These studies were also limited by small sample size hinting on the necessity of a precisely planned clinical trial including larger sample size.

In developing countries like Pakistan, with limited healthcare resources, complications impose significant financial burdens on patients and their families, stressing the call for determining a better treatment option. This study aims to shed light on these controversies to inform future recommendations for techniques that reduce the financial, physical, and emotional toll of ventral hernia repair.

METHODS

This comparative study was carried out from December 2021 to March 2023 at Government Teaching Hospital Shahdara, Lahore after approval from ethical committee (ref. GTHS/EC/2021/19). The study included all adult patients who underwent mesh hernioplasty for ventral hernias with defect size ≥ 2 cm, which included Para umbilical hernias and epigastric hernias. However, the study excluded patients who had diabetes mellitus, incisional hernias, recurrent hernia, respiratory compromised, malignancy, on steroids or collagen disorder. WHO sample size calculator was used to get a total of 110 patients. These were divided into two groups comprising 55 patients in each group. Consecutive convenient sampling technique was used. After taking informed consent, Group S (Sublay group) underwent retro rectus mesh hernioplasty (Sublay mesh hernioplasty). Group O (Onlay group) underwent mesh hernioplasty anterior to rectus sheath after closing the defect (Onlay Mesh hernioplasty). Micro porous mesh (ETHICON®) was used in all cases due to availability of this mesh in Government hospital. All procedures were conducted by same surgeon of consultant level with more than 7 years of experience after post-graduation. All patients were given prophylactic antibiotic just before induction of anesthesia. Operative time was calculated from start of skin incision to complete skin closure. Demographic data like age and gender, length of stay and early complications like seroma and wound infection were recorded in a specially designed Performa. Patients were followed up to a maximum of two years for recording recurrence. Minimum follow up was one year in late conducted cases. All data was entered into SPSS version 24. Numerical data like age, operative time and length of stay were presented as mean and standard deviation. P value less than 0.05 was considered significant.

RESULTS

Variable	O Group (n=55)	S Group (n=55)	P-Value
Gender	M: 6 F: 49	M:11 F: 44	0.187
Mean age±SD	47 years±8.05	46 years±7.78	0.07

Table-I. Demographic data of study population

The difference in age was insignificant. Most of the patients (84.5%) were female and 15.5% were male. There was no statistically significant difference in gender in both groups. There was significant difference in mean operative time which was less in O group. Average length of stay had no statistically significant difference. Out of 110 patients, 25.5% (n=28) patients developed seroma formation and 11% (n=10) developed infection. Recurrence rate was 2.7% (n=3). Group wise distribution of complications and recurrence is presented in table2 and operative time and length of stay in Table-III.

DISCUSSION

Mesh hernioplasty has widely accepted as the standard of care for ventral hernias due to proven low incidence of recurrence associated with the use of mesh. But the controversy still persists whether mesh should be placed in Sublay plane or Onlay plane.

Variable		O Group (n=55)	S Group (n=55)	P-Value
Complications	Seroma	Occurred: 18(32.7%) Not Occurred: 37(67.3%)	Occurred: 10(18.2%) Not Occurred: 45(81.8%)	0.08
	Infection	Yes: 06(10.9%) No: 49(89.1%)	Yes: 05(9.1%) No: 50(90.9%)	0.75
Recurrence		Yes: 2(3.6%) No: 53(96.4%)	Yes: 01(1.8%) No: 54(98.2%)	0.558

Table-II. Comparison of Sublay Vs Onlay Mesh Hernioplasty in terms of complications and recurrence. Chi square test was applied and p= <0.05 was considered significant

Variable	O Group (n=55)	S Group (n=55)	P-Value
Mean Length of stay in hospital (day)	3.4±1.47	3.6±1.48	0.28
Operative time (minutes)	85±15.47	123±19.14	0.00

Table-III. Comparison of Sublay Vs Onlay Mesh Hernioplasty in terms of operative time and length of stay Independent sample t-test was applied and p=<0.05 was considered significant

Sublay procedure takes a little longer time than Onlay procedure. Our results show similar findings of reduced operative time which is 85 mins on average in Onlay technique. Benefit of reduced recurrence associated with use of mesh is not without risk especially wound complications. Most surgeons now prefer Sublay mesh hernioplasty to reduce the risk of seroma formation and wound infection[8-11] associated with Onlay mesh hernioplasty. However results of our study have shown that there is no significant benefit of Sublay over Onlay technique in terms of seroma and wound infection. This contradicts previous findings. Some studies show no significant difference in time to operate, complications and recurrence.[12-15] In more developed countries where laparoscopic facilities are easily affordable, surgeons now opt Extended Totally Extra Peritoneal (eTEP) and Intra Peritoneal Onlay Mesh (IPOM).[16] But these are not affordable in resource poor countries like Pakistan. Some authors have shown significant decrease in number of days for removal of suction drain and shorter hospital stay[2,9] in Sublay and more wound infection and flap necrosis in Onlay[15] with no difference in hematoma formation.[5] In our study there is no difference in length of stay in both groups. Nevertheless, it has been argued that Sublay mesh hernioplasty demands a higher level of expertise when compared to Onlay mesh hernioplasty. A systematic review of 6 RCT's on repair of incisional hernias only concluded that seroma formation is higher in Onlay group however, no difference in recurrence and length of stay.[17] However Ibrahim R 2020 could not prove Sublay technique superior to Onlay in term of wound infection.[18,19] These findings are similar to our study.

Recently a study in Karachi on 69 patients is unable to prove any benefit of one over the other procedure in terms of infection, recurrence, and operative time.[20]

So, despite the widespread concept that Sublay is superior to Onlay in terms of seroma, infection and recurrence, still most of the literature available is not supporting this belief.

However one thing is evident that operative time is significantly increased in Sublay procedure which is technically more demanding. Onlay procedure may be relatively easy to perform even in hands of junior surgeons with good results. Further it is found that the wound complications of mesh repair have not reduced despite better technique or use of different varieties of mesh. We conclude that further research is required in this field to reduce the seroma formation and wound infection rate in using mesh repair techniques. Our study was had limitation that we did not use randomization.

CONCLUSION

Sublay mesh hernioplasty is not superior to Onlay mesh hernioplasty in terms of complications instead it takes more time to operate.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Mudassar Murtaza:** Concept, design, whole supervision, final manuscript.
2	**Mumtaz Ali:** Data collection, critical review.
3	**Javeria Afzal:** Critical review, references.
4	**Maria Younus:** Data collection, study process.
5	**Aslam Javed:** Critical review, data analysis, discussion
6	**Saira Aleem:** Introduction, references, statistical analysis.