ORIGINAL ARTICLE

Comparative evaluation of sublay versus onlay mesh repair for ventral hernia

Anum Naz,[1] Khadijah Abid,[2] Asif Ali Syed,[3] Nabeel Naeem Baig,[4] Muhammad Farooq Umer,[5] Hussain Mehdi[6]

Abstract

Objective: To compare sublay and onlay techniques of ventral hernia repair in terms of postoperative drain removal time and wound infection.

Methods: This randomised controlled study was conducted from June to December 2016 at Jinnah Medical and Dental College Hospital, Karachi, and comprised hernia patients who were divided into two equal groups A and B. The former were subjected to onlay technique while the latter underwent sublay technique. Operative repair was performed at least 1 year after the index surgery, as this time was required for scar maturation. Data was analysed using SPSS 23, and mean drain removal time between the groups was compared.

Results: There were 100 patients, with 50(50%) in each of the two groups. Mean age of patients in group A was 40.30±4.52 years while in group B, it was 39.12±4.58 years. The mean drain removal time in group A was 4.40±1.53 days and in group B it was 3.06±0.23 days (p=0.01).The difference in terms of wound infection was also significant (p=0.04).

Conclusion: Sublay hernia repair was found to be a good alternative to onlay repair for treatment of ventral hernia.

Keywords: Ventral hernia, Sublay, Onlay. (JPMA 68: 705; 2018)

Introduction

Hernia is an abnormal protrusion of viscera or part of viscera through an opening, artificial or natural, with a sac covering it. Thorough anatomical knowledge and skilled expertise is required for hernia repair surgery. Ventral hernias are also known as anterior abdominal wall hernias. It includes umbilical, paraumbilical, epigastric, spigelian and incisional hernias. The estimated incidence of ventral hernia is 15-20%.[1] With the advent of prosthetic meshes being used for incisional ventral hernia repair, the recurrence rate has dropped to approximately 10%. More recently, with the development of prosthetic mesh that is now safe to place intraperitoneally, the recurrence rate has dropped to under 5%.[2]

The location of the reinforcement appears to influence outcomes. The two operative techniques most frequently used in case of ventral hernia are the onlay and sublay repair. However, it remains unclear which technique is superior.[3]

Onlay repair is mesh placement between subcutaneous tissues of abdominal wall and anterior rectus sheath. In sublay repair, preperitonealplane is created between the rectus muscle and the posterior rectus sheath. In the latter technique, mesh lies quite deep so there is less chance of infection transmission.[4] A study conducted by Eker HH, observed post-operative wound infection as 5% in open repair and 4% in laparoscopic repair.[5]

The major reason for seeking surgical care is to improve the health-related quality of life and to get relief from distress.[6] The current study was conducted to compare sublay versus onlay meshplasty in terms of impact on the final outcome in ventral hernia in terms of postoperative drainage time and wound infection.

Patients and Methods

This randomized controlled study was conducted from June to December 2016 at the Surgical Department of Jinnah Medical and Dental College Hospital, Karachi. After approval from the institutional ethics committee, informed and written consent was obtained from all patients undergoing surgery for ventral abdominal hernia. The patients were included using non-probability consecutive sampling technique. The sample size was calculated using "WHO sample size calculator"[7] taking level of significance 5% and power of test 90%. For the purpose of this calculation, mean drainage time in onlay group was taken as 7.47±1.7 days and in sublay group as 4.5±1.1 days.[8] Patients included were of either gender aged 28-52 years who had ventral abdominal hernia, including epigastric, paraumbilical and incisional. Patients who presented with strangulation were excluded from the study.

The sample was divided into two groups. In group A,

[1]Abbasi Shaheed Hospital, Karachi, [2,4]College of Physicians & Surgeons Pakistan, [3,5,6]Jinnah Medical & Dental College Hospital, Karachi.

Correspondence: Anum Naz. Email: dranumnaz09@gmail.com

patients were subjected to sublay repair, whereas in group B, patients were subjected to onlay repair. The division was done using the lottery method. The patients were subjected to detailed clinical examination and relevant investigations. For incisional hernia, data regarding the previous surgery and its associated complications were recorded. Operative repair was performed at least 1 year after the index surgery, as this time was required for scar maturation. Surgeons trained in both the procedures continued performing routine operative technique of sublay and onlay mesh repairs. The co-existing co-morbid conditions and predisposing risk factors were identified and the entire data was tabulated. Patient's waist-hip ratio (WHR) was measured pre-operatively to check fat content on abdominal wall. Obesity was defined as WHR>0.85 in females and >0.90 in males, according to WHO classification.[9]

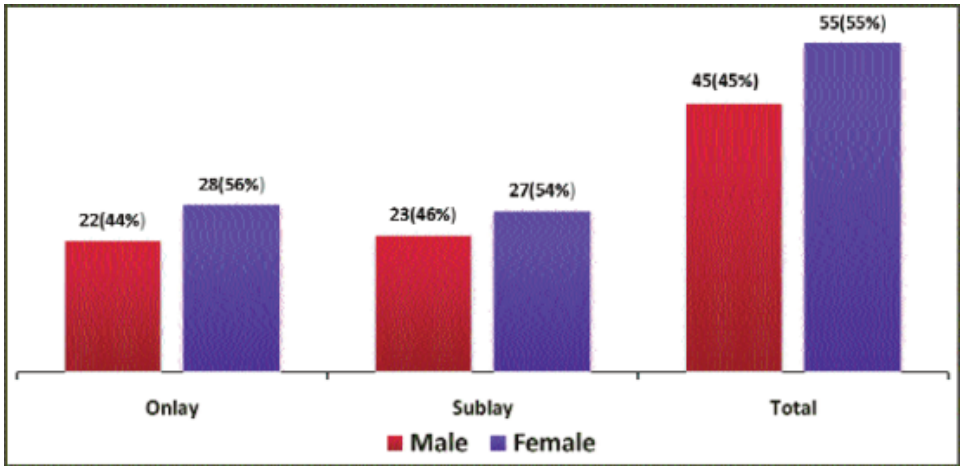

Figure: Gender Distribution.

Data was analysed using SPSS 23. Mean ± standard deviation (SD) was used for quantitative data like age, WH ratio and drain removal time, while frequency and percentage were calculated for qualitative data like hypertension, diabetes mellitus, obesity, gender & wound infection. Chi-square test was used to compare the frequency of wound infection and t-test was used to compare mean drainage time between the groups. P<0.05 was taken as significant.

Results

There were 100 patients, with 50(50%) in each of the two groups. The mean age of patients in group A was 40.30±4.52 years, and 39.12±4.58years in group B. Mean WHR at presentation was 0.84±0.06 and 0.78±0.05 in groups A and B respectively. Overall, 18(18%) patients had hypertension, 8(8%) had diabetes mellitus and 18(18%) were obese (Table-1). Besides, there were 28(56%) females in group A, and 27(54%) in group B (Figure).

Table-1: Characteristics of study variables (n=100).

	Onlay (n=50)	Sublay (n=50)	Total (n=100)
Age	40.30±4.52	39.12±4.58	39.71±4.57
WH Ratio	0.84±0.06	0.78±0.05	0.81±0.06
Hypertension			
Yes	11(22%)	7(14%)	18(18%)
No	39(78%)	43(86%)	82(82%)
Diabetes Mellitus			
Yes	6(12%)	2(4%)	8(8%)
No	44(88%)	48(96%)	92(92%)
Obesity			
Yes	5(10%)	13(26%)	18(18%)
No	45(90%)	37(74%)	82(82%)

WH: Waist-Hip.

Wound infection hit 14(28%) patients in group A and 6(12%) in group B (p=0.04). The mean drain removal time in group A was 4.40±1.53 days and 3.06±0.23 days in

Table-2: Comparison of Wound Infection & Mean drain removal time between both groups.

Technique	Wound Infection		P-value	Technique	Drain Removal Time (Mean±SD)	P-value
	Yes	No				
Onlay	14	36	0.04*	Onlay	4.40±1.53	0.01*
Sublay	6	44		Sublay	3.06±0.23	
Total	20	80				

group B (p=0.01) (Table-2).

Discussion

Ventral hernia in the anterior abdominal wall includes both spontaneous and, most commonly, incisional hernias after an abdominal operation. It is estimated that 2-11% of all abdominal operations result in an incisional hernia.[10] Nowadays tension-free repair using prosthetic mesh has decreased recurrence to negligible levels. Despite outstanding outcome of mesh repair, the risk of infection still exists and the cost factor also has objective reality. However, current state-of-the-art approach has resulted in decreased infection rate, short operating time and hospital stay with the lowest possible recurrence rate and rapid return to normal activities. Primary repair is associated with highly unacceptable recurrence rates.[10]

Small hernias less than 2.5cm in diameter are often successfully closed with primary tissue repairs. However, larger ones have a recurrence rate of upto 30-50% when a tissue repair alone is performed.[10] Hernia recurrence is distressing to the patient as it adversely affects the patient's perception of outcome, quality of life as well as causing financial burden.

This has led to the widespread acceptance of mesh repair. One study documented that the use of mesh has increased from 34.2% in 1987 to 65.5% in 1999.[11] Mesh placement in the preperitoneal, retro-muscular sublay position overlapping the hernia defect in all directions was introduced in the late 1980s.[12] The refinement of sublay technique decreased the recurrence rates and gave better outcome, making it the standard of care of ventral hernias.[12,13]

A study[14] found differing infection rates among various mesh materials, but not between onlay and sublay repairs. It is known that bacteria are difficult targets for the immune system once they have reached alloplastic materials. This holds true especially for microporous meshes, but to a lesser extent also for meshes with large pores that allow immune cells to enter. One randomised clinical trial[15] recently revealed that low-weight mesh materials can possibly prevent specific complications at the implantation site. They also noted a tendency towards less pain and mesh awareness in patients who received the new mesh material.

Wound infection is invasion by and multiplication of pathogenic microorganisms at wound site which may produce subsequent tissue injury and progress to overt disease through a variety of cellular or toxic mechanisms. In mesh hernioplasty, it is a terrifying complication, which sometimes can be severe enough to necessitate removal of mesh[16] but fortunately superficial, relatively minor wound infections are more commonly observed in studies that reported a figure of 10% and 14%.[17,18] While most of the local studies recorded a comparatively lower value of wound infection ranging from 5% to 10%.[19] One study reported an infection rate of 12%[20] while another reported an incidence of 6%.[21] In our study the corresponding results for wound infection in sublay was 12% and in onlay was 28%.

Sublay mesh repair has been described as a good alternative to onlay mesh repair that may be applicable to all forms of ventral hernia.[8]

Conclusion

Sublay mesh repair in ventral hernia was found to be a better and effective technique. The overall postoperative complication rate was low in terms of drainage time and wound infection.

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Conflict of Interest: None.

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References

1. Godara R, Garg P, Singla S. Comparative evaluation of "sublay" versus "onlay" meshplasty in ventral hernias.Int J surg. 2005;8:1-4.
2. Millikan KW. Incisional hernia repair.SurgClin North Am. 2003;83:1223-34.
3. Timmermans L, Goede BD, Dijk SMV, Kleinrensink GJ, Jeekel J, Lange JF. Meta-analysis of sublay versus onlay mesh repair in incisional hernia surgery. Am J Surg. 2014;207:980-8.
4. Bhat MG, Somasundaram SK. Preoperational mesh repair of incisional hernias: A seven years retrospective study. Indian J Surg. 2007;69:95-8.
5. Eker HH, Hansson BM, Buunen M, Janssen IM, Pierik RE, Hop WC, et. al. Laparoscopic vs. open incisional hernia repair: a randomized clinical trial. JAMA Surg. 2013; 148: 259-63.
6. Poelman MM, Langenhorst BLAM, Schellekens JF, Schreurs WH. Modified onlay technique for the repair of the more complicated incisional hernias: single-centre evaluation of a large cohort. Hernia. 2010;14:369-74.
7. Lwanga SK, Lemeshow S. Sample size determination in health studies: A practical manual. Geneva:WHO, 1991.
8. Saber A, Bayumi EK. Onlay versus sublay mesh repair for ventral hernia. J Surg. 2015;4:1-4.
9. Waist Circumference and Waist-Hip Ratio: report of a WHO expert consultation. Geneva: WHO, 2008.
10. Leithy M, Loulah M, Greida HA, Baker FA, Hayes AM. Sublayhernioplasty versus onlayhernioplasty in incisional hernia in diabetic patients. Menoufia Med J. 2014; 27: 353-8.
11. Shell DH, Torre JDL, Andrades P, Vasconez LO. Open repair of ventral hernia incisions. SurgClin North Am. 2008;88:61-83.
12. El-Santawy HMG, El-Sisy El-Azeem AA, El-Gammal AS, El-Kased AF,

Sultan HM. Evaluation of retromuscular mesh repair technique for treatment of ventral incisional hernia. Menoufia Med J. 2014;27:226-9.

13. Oh T, Hollands MJ, Langcake ME, Parasyn AD. Incisional hernia repair: a Retrospective review and early experience of laparoscopic repair. Surgery 2004;74:50-6.
14. Leber GE, Garb JL, Alexander AI, Reed WP. Long-term complications associated with prosthetic repair of incisional hernias. Arch Surg. 1998;133:378-82.
15. Schumpelick V, Klinge U, Rosch R, Junge K. Light weight meshes in incisional hernia repair. J Min Access Surg. 2006;2:117-23.
16. Kingsnorth A. The management of incisional hernia. Ann R CollSurg Engl. 2006;88:252-60.
17. Pillay Y, Naidoo NM &Madiba TE. Incisional hernia: Experience in a single surgical unit. East Central African J Surg. 2007;12:42-6.
18. Zarin M, Afridi MR, Saeed T, Muqim R, Aurangzeb M, Wazir MA. Outcome of mesh repair for incisional hernia. Pak J Med Sci. 2008;24:213-16.
19. Waqar T, Aslam HS. Complications of repair of incisional hernia using polypropylene mesh. ANNALS. 2005;11:319-22.
20. Stoppa RE. The treatment of complicated groin and incisional hernias. World J Surg.1989;13:545-54.
21. White TJ, Santos MC, Thompson JS. Factors affecting wound complications in repair of ventral hernias. Am Surg. 1998;64:276-80.