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**CASE STUDY**

# ONLAY AND SUBLAYTECHNIQUES IN VENTRAL HERNIA REPAIR

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**ABSTRACT**

Ventral hernia repair is among the most common surgical operations performed worldwide and 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.

**Objective: T**o evaluate the repair of ventral hernia by two different methods onlay (Conventional method) and sublay (retromuscular preperitoneal) methods.



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## INTRODUCTION

Hernia is a protrusion of abdominal viscera through a defect in abdominal wall. Successful repair of abdominal hernias requires thorough knowledge of anatomy of anterior abdominal wall and all its layers. Ventral abdominal hernia includes all the hernias occurring through the anterior abdominal wall excluding groin hernias (incisional hernia, epigastrichernia, paraumblical hernia). Initially high density mesh was introduced with onlay mesh hernioplasty techniques. Afterward, mesh in sublay position, was introduced, without suturing the mesh at the edges of the defect (Stoppa, 1989; Rives, 1987; Wantz, 1991; Ahmed and Khan, 1995). The prosthetic mesh can be placed between the subcutaneous tissues of the abdominal wall and anterior rectus sheath (onlay mesh repair) as well as in the preperitoneal plane created between the rectus muscle and posterior rectus sheath (sublay mesh repair). The latter technique has several advantages one of being not transmitting the infection from subcutaneous tissues deep down to mesh as it lies quite deep (Mahabhaleshwar and Santosh, 2007). The mesh also adheres to the posterior rectus sheath and renders it inextensible allowing no further herniation. The technique is considered as the treatment of choice for the open repair of abdominal incisonal hernias (Berry *et al*., 2007; Iqbal *et al*., 2007; Martin Duce *et al*., 2001; Langer *et al*., 2005).

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## PATIENTS AND METHODS

This was performed in Aswan university hospital, on 100 patients from March 2015 to August 2016 who underwent to onlay and sublayherinal repair. Our exclusion criteria for this study were being patients, showing signs of generalized peritonitis, very huge hernia, strangulated hernia. The patient classified blindly into two group, group A for onlay repair and group B for sublay Patients who gave their informed consent were randomized to either onlay or sublay groups. The randomization technique was by having patient openaconcealed envelope from arandomized order of envelops by ablinded technician. All investigation done for patients CBC, LFT KFT and INR. Any patient with chest disease or prostatic enlargement treated first. All surgeries are carried out under General and spinal anaesthesia, and all surgeries were performed by the samesurgeon. All Patients in group A and B received a single dose of intravenous broad spectrum antibiotic (a cephalosporin) at induction and two more doses at 8 and 16 hours later. Skin was prepared with provide iodine solution. Sublay technique involves the placement of a permanent prosthetic mesh (polypropylene) in apreperitoneal plane. After incising the subcutaneous tissue, the sac was dissected and delineated. The defect, most often in the midline, is opened along the lineaalba. A plane is created between the posterior rectus sheath and the peritoneum. The mesh is then apposed to the adhereing layers with continuous 2/ 0 polypropylene

sutures. A polypropylene mesh cut to size is placed in the plane created. The mesh is secured with a few interrupted 2/0 polypropylene suture. A suction drain was placed over the mesh Fig.(1). In group A onlay An anterior rectus sheath is A polypropylene mesh was placed on to the anterior rectus fascia (onlay technique) with continuous or interrupted 2/0. Two suction drains were placed above prolene mesh in all patients. Drains were taken when the daily drainage decreased below to 20 cc and removed after that Fig.(2). Onlay technique the same as above but without creation of plane between posterior rectus sheath and peritoneum and the mesh placed anterior to sheath. Fig.(2). After the operation all of the patients were NPO and received antibiotics for 48hours. The routineanalgesic used for patients was morphine (5 mgintramuscular, every 8hours). Soft diet was started after 24 hours and patients were discharged after normal diet was tolerated. In both group the patients observed for following opertivetime, wound infection, seroma formation, hospital stay and recurrence.

## RESULTS

In this series of 100 patients in two groups, the mean age for group A was 24 years and for group was 25 years fig.(3). In the group A the male were 13 patient (26%) and female was37patients (74%) compared to group B were the male 20 patients(40%)and female was 30 patients (60%) fig.(4,5). In the most cases predisposing factors like relative multiparty obesity and heavy weight lifting were the commonest. The paraumbilical swelling in both groups (A&B) reveled 50 patients (about 50% of patients) while umbilical swelling found in both groups was 25patients (about 25%) and incisional hernia in both groups was 25 patients (about 25%of all cases) Table (1). In group A operative findings showed 3 - 5 cm defect of linea alba and 5 –7cm defect in groupB. **A**ll cases of both group A&B were operated in general and spinal anesthesia the operative time was longer in group A Onlay (about 75 minutes) compared to Group B (60 minutes) Fig(6). Hospital stay was 6 days in group A and 4 days in group B.

**Table 1. Patients of group A and group B**

| | | Group A (On lay group) | Group B (Sublay group) |
|---|---|---|---|
| Number of patients | | 50 | 50 |
| sex | Male | 13 | 20 |
| | female | 37 | 30 |
| Hernial site | Incisional hernia | 12 | 13 |
| | Paraumblical | 30 | 20 |
| | Umbilical | 8 | 17 |

**Fig.1. Sublay mesh technique**

Post operative complications in both groups were encountered in 18 cases of group A and in 6 cases of group B. In group A wound infection in 5 cases (10%) and in group B it was in 2 cases (4%). All these patient treated by antibiotic and local wound care as per pus culture sensitivity reports. Haematoma and seroma developed in 9 cases (18%) in group A and 3 case (6%) in group B. recurrence rate for group A was 4patients (8%) and one patient for group B (2%), Table (2).

**Fig.2. On lay mesh repair**

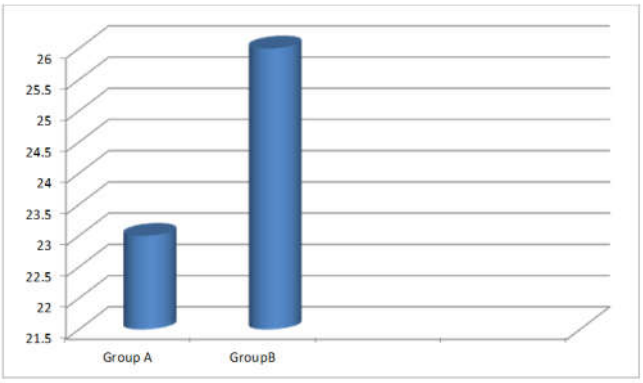
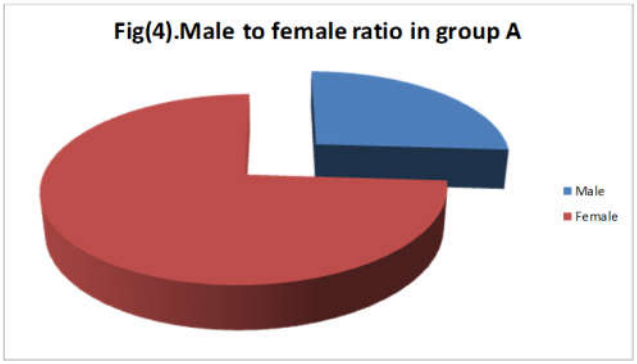
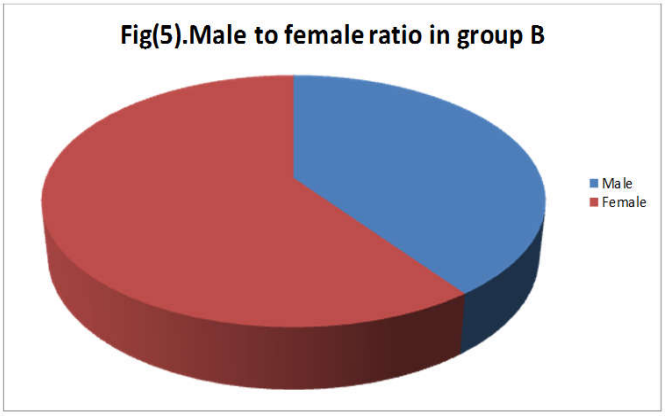


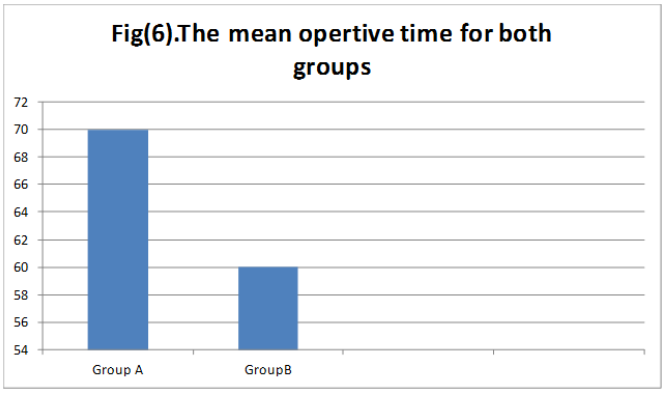

**Fig.3.The mean age for group A and group B**



| | Group A | % | Group B | % |
|---|---|---|---|---|
| Hosptilization | 6days | - | 4days | - |
| Wound infection | 5 patients | 10% | 2patients | 4% |
| Seroma | 6 patients | 12% | 3 patients | 6% |
| Heamatoma | 3 patients | 6% | no | - |
| Recurrance | 4 patients | 8% | One patient | 2% |
| Follow up | One year | - | One year | - |

Table.(2).post operative follow up of patients




## DISCUSSION

Abdominal surgical interventions have increased in number in last decades. Approximately two million abdominal operations were performed in USA and about 100 000 incisional hernias were detected annually (Ammar and Ismail, 2008). The pain is more common in small defects with narrow hernia orifice. The pain was most common symptom in our patients. The defect increases in size with time and serious complications like intestinal strangulation and perforation may occur (Rutkow, 1998; Venclauskas *et al*., 2007; Luijendijk *et al*., 1997). Although placement of the prosthetic mesh in the subcutaneous plane (onlay technique) is the most popular and most commonly used technique, it is associated with many disadvantages, especially wound infection, seroma formation, and prolonged time of drainage and therefore prolonged hospital stay (Awad *et al*., 2005). Infection remains one of the most common complications of this technique. Stoppa reported an infection rate of 12% (Dumanian and Denham, 2003) while White *et al* reported an incidence of 6 % (Stoppa, 1989). In this study the onlay technique was associated with an incidence of 10% of wound infection, but sublay technique the incidence of infection was less and about 4%. Were mild superficial infection, treated conservatively without any surgical intervention. There is no clear explanation to this relatively high incidence of wound infection in a procedure categorized as clean surgery. However, the presence of the mesh in the subcutaneous plane, the fact that those patients are commonly obese, the prolonged subcutaneous drainage and the accumulation of seroma may represent reasonable explanations (White *et al*., 1998). While sublay technique this complication is comparatively less. The second most common problem of this technique is seroma formation. The incidence of seroma formation in the onlay technique is high. In this study, postoperative seroma collection occurred in 12% of patients, which is close to the incidence reported by White *et al* in 1998 (Stoppa, 1989). The third problem is excessive effluent drainage and the need to leave the drain in situ for a long time, resulting into prolonging the hospital stay. Putting into consideration all these disadvantages of the onlay repair, placement of the mesh in the retromuscular plain seems to be a reasonable alternative. First, this plane is highly vascular, hence, it prevents infection, and if any infection occurs in the subcutaneous plane, it will not affect the mesh, as the mesh is retromuscular in a deeper plane (Milad *et al*., 2009). Second, the prosthesis in this plane cannot be dislodged or ruptured by intra-abdominal pressure, but instead is held in place by the same force that caused the hernia. Third, the prosthesis adheres early to the posterior rectus sheath and renders it inextensible, permitting no further herniation. Finally, the retromuscular space is an already existing anatomical plane, requiring no dissection, and the bare posterior surface of the of the rectus muscles is rich in lymphatics capable to absorb any collecting seroma. The onlay technique, which need more dissection of big subcutaneous flaps, haemostatis after dissection and mesh fixation (Leithy *et al*., 2014). All those benefits were clear in this study; since the incidence of wound infection, seroma, and recurrence in the patients where the mesh was placed in the retromuscular plane was lower.

### Conclusion

Sublay repair of hernias, placing mesh in the submuscular plane, is highly effective with a low recurrence rate and low complication rates.

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