

# Frequency of Serous Fluid Output via Drain after Mesh Repair of Para-Umbilical Hernia with or without Dead Space Obliteration

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## ABSTRACT

**Background:** Seroma development is still a substantial issue following mesh Hernioplasty, and the reason for this is multifaceted. Multiple methods have been tried to combat this problem. **Objective:** To compare the volume of serous fluid output via drain after mesh repair of a Para-umbilical hernia with or without dead space obliteration. **Study Design:** Randomized controlled trial. **Settings:** Department of Surgery, Allied Hospital, Faisalabad Pakistan. **Duration:** from 14th March 2020 to 13th March 2021. **Methods:** 194 patients with para-umbilical hernia of size between 4-10cm and of any duration, 25 to 65 years of age of either gender were included. Patients with previous repair of para umbilical hernia, pregnant females, and hematoma formation were excluded. A quilting suturing technique was used in group A patients, while in group B patients, a simple closure technique was used. Drain output was noted on the 5th day of surgery. **Results:** Mean age of patients in group A was  $49.89 \pm 10.03$  years, and in group B was  $47.08 \pm 10.56$  years. Out of these 194 patients, 49 were female, and 145 were male. Serous fluid output  $>50$  ml was seen in 8 (8.25%) patients in group A (quilting suturing technique) and 18 (18.56%) patients in group B (without quilting suturing) with a p-value of 0.035. **Conclusion:** This study concluded that volume of serous fluid formation is less as measured by drain output after dead space obliterations compared to simple closure technique in para umbilical hernia repair.

**Keywords:** Para umbilical hernia, Dead space obliterations, Serous fluid formation.

## INTRODUCTION

Para-umbilical hernia count for 10% of abdominal wall hernias.<sup>1</sup> Increased abdominal pressure and poorer fascia at the umbilicus level are the causes of umbilical hernias.<sup>2</sup> Because umbilical hernias are often small and possess a narrow neck, there is an increased danger of imprisoning and strangling oneself. The sac contains omentum, small bowel, and colon. The most frequent kind of umbilical hernia in adults is an indirect umbilical (paraumbilical) hernia, which protrudes above or below the umbilicus.<sup>3</sup>

The inability of the umbilical ring to seal causes infantile umbilical hernias. Disturbances in the formation of abdominal wall structures, however, are the reason behind anterior abdominal wall deformities such as

Gastroschisis and Omphalocele. Treatment for umbilical hernias involves monitoring; these deformities often go away by the time a child is four or five years old. After this age, any issues that still exist should be surgically fixed. In 44% of cases, soreness in the area around the umbilicus is the most common symptom of umbilical hernias.<sup>4</sup> Para-umbilical hernias are more prone to complications like irreducibility, obstruction, strangulation, ulceration of skin, and rupture than other types of abdominal hernias. The volume of serous fluid noted depends on whether it was determined using clinical radiological techniques.<sup>5,6</sup>

Serous fluid production is common after abdominal wall surgery, particularly ventral hernia repair. Following surgery or trauma, it accumulates in a body cavity or

tissue. Seroma develops after significant tissue plane dissection after procedures such as ventral hernia repair, removal of large subcutaneous lesions, abdominoplasty, and mastectomy. This generates a 'dead space,' or leftover space, filled with fluid. This serous fluid is typically assessed using the drain output.

Several studies have been carried out to evaluate the effectiveness of different methods in decreasing the incidence of postoperative serous fluid collection. Most of these are retroactive, making it impossible to draw useful conclusions.<sup>7,8</sup> Several prospective, randomized, controlled studies have been conducted. Many of these studies had small patient populations and yielded contradictory results.<sup>9,10</sup> In one research, the incidence of serous fluid drain output was considerably lower in the quilting suture group compared to the non-quilting suture group (27.2% versus 44.3%).<sup>11</sup> In another research, the drain output was determined to be 0% in the quilting sutures group against 12% in the non-quilting sutures group.<sup>12</sup>

Although a number of techniques have been adapted to obliterate the dead space to decrease serous fluid after any abdominal hernia repair, no single technique has gained wide acceptance. Quilting suturing technique has good results in this regard but is not practiced widely, possibly because of additional time required per operatively. However, additional time spent is rewarding if it decreases the formation of serous fluids and related complications.

This study was conducted to compare the volume of drain output after the repair of para-umbilical hernia via "simple closure" and "dead space obliteration with quilting sutures." The results show that the "dead space obliteration" technique is superior to simple closure regarding drain output. This technique will help in the early removal of the drain and return to normal routine.

## METHODS

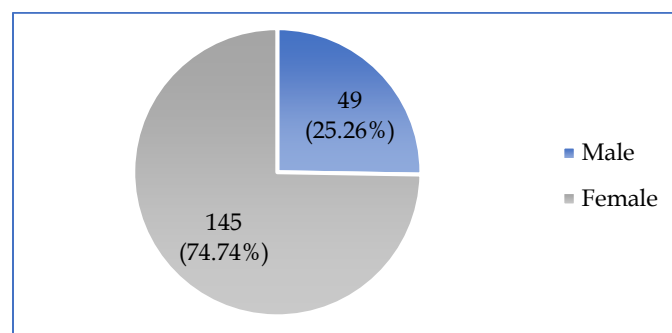
This randomized controlled trial was conducted after approval by members of the ethical review committee, Faisalabad Medical University, letter number F.No.48-ERC/2020-21/PHRC/FMU/26. It was conducted from 4th March 2020 to 13th March 2021 in the Department of Surgery at Allied Hospital, Faisalabad. Patients from both genders, between the ages of 25 to 65 years, with para-umbilical hernias of sizes between 4 to 10cm, were included in the study. Any pregnant female patients with a previous history of par-umbilical hernia repair and hepatoma formation were excluded. The sample size was 194 (97 cases in each group), calculated by the WHO sample size calculator at a 5% level of significance, and taking drain output after quilting suturing as 27.2% versus 44.3% after simple

closure technique in para umbilical hernia repair.<sup>7</sup> After approval from ERC, letter number F.No.48-ERC/2020-21/PHRC/FMU/26 total of 194 patients meeting inclusion criteria were selected. Patients were placed into two groups. A consultant surgeon did hernia repair in both groups. A dose of in. Ceftriaxone (1g) was given prior to anesthesia. Two more doses of Inj. ceftriaxone was given after the patients were shifted to the ward following surgery at the interval of 12 hours each. A quilting suturing technique was used in group A patients, while in group B patients, the wound was closed via a simple closure technique. Dissection was done with minimal use of diathermy, and hemostasis was secured. Prolene light weighted, non-absorbable, microporous, single-layer mesh was applied and fixed with the help of proline sutures. A Redivac drain was placed in all patients. Patients from both groups were followed up for five days, and the total amount of serous fluid from the drain was noted on the 5th postoperative day. The collected information was analyzed using the computer software SPSS version 25.

## RESULTS

As shown in Figure 1, the mean age range was  $48.33 \pm 10.33$  years ( $49.89 \pm 10.03$  in group A and  $47.08 \pm 10.56$  in group B), the youngest patient was 35 years, while the oldest aged 70 years. Of 135 patients, 69.59% were from 46–65 years. Among these 194 patients, the female-to-male ratio was 1:3, with 49 (25.26%) and 145 (74.74%) being female and male, respectively.

**Table 1: Gender distribution**



Serous fluid output >50 ml was seen in 08 (8.25%) patients in group A (quilting suturing technique) and 18 (18.56%) patients in group B (without quilting suturing) with p-value of 0.035, shown in table 1.

**Table 1: Comparison of serous fluid output in both groups (n=250)**

	Group A (quilting suturing technique)	Group B (simple closure)	P Value
Patients with serous fluid output >50ml	08 (8.25%)	18 (18.56%)	0.035

## DISCUSSION

Seroma formation is more common in individuals with a high BMI, those who have lost a substantial amount of weight, and those who have had previous incisions in the supra-umbilical region. Large abdominal flap separation is another factor contributing to dead space between the dermal fat flap and the abdominal muscle aponeurosis postoperatively. This occurs because a larger detached area results in greater devascularization of the flap, causing damage to lymphatic vessels and resulting in more serous fluid collection. Active drains have been shown to reduce the incidence of seroma. The work of Baroudi and Ferreira in 1998 extensively described one of the solutions put forth in the literature. It is predicated on applying the quilting sutures and decreasing dead space in dissected tissues, leading to the total removal of drains and the absence of seroma in their sample of 130 patients.<sup>13</sup>

Serous fluid production >50 ml in our study was found in 8 (8.25%) patients in group A (quilting suturing technique) and 18 (18.56%) patients in group B (without quilting suturing), while in another research, the incidence of serous fluid drain output was considerably lower in quilting group compared to non-quilting group (27.2% versus 44.3%). Interestingly in one of the studies, the drain output was determined to be 0% in the quilting sutures group against 12.0% in the non-quilting sutures group.<sup>12</sup>

168 patients were included in single-center prospective cohort research; 54 patients were assigned to the quilting group (group 1) and 114 patients to the non-quilting group (group 2). In the non-quilting group, 69% of patients (n = 79) had seroma that required aspiration, whereas in the quilting group, 29% of patients (n = 15) experienced this condition (p<0.001) that confirming the superiority of the quilting technique also proved by our study. Furthermore, the non-quilting group's total volume of seroma was 427 mL (standard error (SE)=69), whereas the quilting group's total volume was 63 mL (SE=21) (p=0.0008). There were 152 seroma aspirations in the non-quilting group, compared to 23 in the quilting group (p=0.0001). Smokers had a higher incidence of seroma (p=0.003), and drains had no effect on this. Our study however does not take into account other factors like smoking or obesity.<sup>14</sup>

Research conducted by a Chinese RCT including 201 patients shows the quilting group had lower volume, duration, and drainage rates of post-operative seroma (p<0.01), along with decreased seroma generation (p<0.01), hence further supporting our study.<sup>15</sup>

In patients undergoing only hernia surgery linked to abdominoplasty, Eltantawy *et al.* employed non-suction tube drains of 24F. The mean daily and total volume of

fluid effluent that was observed to be greater in all cases had a delayed mean time of drain clearance of  $20.5 \pm 4.2$  days. This might be explained by the significant dead space formed in each instance.<sup>16</sup>

It was challenging to determine if ligating lymphatics, decreasing dead space, or a combination of the two was the cause of the decrease in seroma production in an RCT. Eradication of dead space appears to be crucial in patients having para-umbilical hernia repair because the extent of the dissection plane appears to have a significant role in seroma development. The use of compression bandages or pressure garments is ineffective in the treatment of seroma. Instead, skin flap fixation or quilting appears to be far more successful. In another trial, 180 patients underwent a mastectomy, of which 92 patients had flap fixation (FF) while 88 patients were in the historical control (HC) group. In the group that had flap fixation, a total of 33/92 (35.9%) patients had seroma; in the HC group, 52/88 (59.1%) patients developed seroma (p = 0.002). In the FF group, 14/92 patients (15.2%) underwent seroma aspiration, but in the HC group, 38/88 patients (43.2%) underwent the procedure (p < 0.001). Although the procedures are different, the quilting technique is effective in reducing serum fluid formation wherever a dead space is produced under the skin flap.<sup>17</sup> In a retrospective study comparing repair of concomitant ventral hernia repair and diastasis recti, the percentage of serum formation in group A (operated before the introduction of the quilting suturing technique) was higher than in group B patients (operated after the introduction of the quilting suturing technique), thus further solidifying our study.<sup>18</sup>

## CONCLUSION

This study concluded that the frequency of serous fluid formation is less as measured by drain output after dead space obliterations compared to the simple closure technique in para-umbilical hernia repair, so we recommend adopting the quilting suturing technique for a para-umbilical hernia as first-line treatment. For future studies, other factors could be considered, along with different quilting suturing techniques.

## LIMITATIONS

Our study had a few limitations as multiple other factors like smoking and obesity that also contribute to seroma formation were not considered.

## SUGGESTIONS / RECOMMENDATIONS

Quilting suturing technique has been proven to reduce seroma formation via multiple studies including ours as discussed. It is safe to recommend, that surgeons repair the para-umbilical hernia using quilting sutures for

quicker recovery as that would help reduce chances of serous fluid accumulation.

### CONFLICT OF INTEREST / DISCLOSURE

There was no conflict of interest.

### FUNDING SOURCE

The study was conducted at Allied hospital, Faisalabad, in department of surgery, so patients and doctors did not have to bear any extra expenses.

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