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Effect of complete reduction of hernia sac and transection of hernia sac during laparoscopic indirect inguinal hernia repair on seroma

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ABSTRACT

An inguinal hernia is a protrusion of abdominal tissue from a defect in the abdominal wall to the body surface. Every year, more than 20 million cases of hernia occur worldwide.Seventy five percent of abdominal hernias are inguinal hernias (IHs), which have a lifetime risk of 27% in males and 3% in females. Hernias have a complex etiology. The inguinal hernias can only be treated surgically, and this is one of the most often done surgical procedures worldwide. Seroma is the earliest and most common complication of laparoscopic inguinal hernia repair and it can mimic an early recurrence. A prospective study showed that the risk of postoperative seroma after transaction of the inguinal hernia sac during laparoscopic hernia repair was higher than in the patients with complete dissection of the sac.

Results: Out of the 40 surgeries performed, 10 (25%) were transection of sac and 30 (75%) were reduction of sac. The mean duration of reduction of sac was significantly longer than that of transection of sac. The occurrence of seroma formation was significantly higher in transection of sac compared to reduction of sac. All the complications were managed with antibiotics.

Key words: inguinal hernia, seroma, transection of sac, hernioplasty, abdominal hernia

INTRODUCTION:

An inguinal hernia is a protrusion of abdominal tissue from a defect in the abdominal wall to the body surface. Every year, more than 20 million cases of hernia occur worldwide.Seventy five percent of abdominal hernias are inguinal hernias (IHs), which have a lifetime risk of 27% in males and 3% in females. Hernias have a complex etiology. The inguinal hernias can only be treated surgically, and this is one of the most often done surgical procedures worldwide.

Ger (1982) completed the first laparoscopic hernia repairs by using staples to close the peritoneal incision without dissecting ,ligating , or reducing the sac. It was Bogojavlensky who brought the mesh-plug approach back into use in 1989, revitalizing the process (Meyer Gel 1997). Inguinal hernias have been treated traditionally with open methods of herniorrhaphy or hernioplasty. Laparoscopic inguinal hernia repair have been introduced after success of laparoscopic cholecystectomy on the premise that there would be less postoperative pain and

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discomfort, the repair of recurrent hernias would be easier and bilateral hernias could be treated with better cosmesis. Another laparoscopic technique became widely used; the total extra peritoneal(TEP) procedure because TEP repair is still considered to be an advanced laparoscopic procedure because of unfamiliar anatomy and requires considerable training and laparoscopic techniques.**TAPP is one of the most suitable method , learning curve for TAPP surgery is relatively short and it is easier for doctor to learn .** With the continuous application of laparoscopy in the field of hernia surgery, its advantages have been continuously proved ,but the occurrence of postoperative seroma has always puzzled patients and surgeon , especially after laparoscopic indirect hernia repair.

Seroma is the earliest and most common complication of laparoscopic inguinal hernia repair and it can mimic an early recurrence. A prospective study showed that the risk of postoperative seroma after transaction of the inguinal hernia sac during laparoscopic hernia repair was higher than in the patients with complete dissection of the sac. The occurrence of seroma formation was significantly higher in transection of sac compared to reduction of sac. All the complications were managed with antibiotics.

Materials and methods:

This study " Effect of complete reduction of hernia sac and transection of hernia sac during laparoscopic indirect inguinal hernia repair on seroma" was conducted in department of general surgery govt medical college jammu . All the patients who were subjected to laparoscopic transabdominal preperitoneal hernia repair in postgraduate department . The data was collected on factors such as patient age, sex, and medical history, as well as the surgical technique used, the length of hospital stay, and the rate of complications following the procedure.

Preoperative work up consisted of :-

• History and complete physical examination of patients

• Baseline investigations I.e CBC /LFT /KFT / VIRAL MARKERS /ECG.

•Radiology :- X ray chest , ultrasound.

- **STUDY DESIGN** - Prospective Interventional Study
- **Duration of Study:** One Year (1st August 2023 to 31st July 2024)
- **Sample Size:** 40

- **Inclusion criteria :**

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All patients with indirect inguinal hernia above 18 year age and below 70 year age who are willing to participate in this study with primary inguinal hernia and fitness for for anaesthesia.

- **Exclusion criteria :**

1. Patient with a recurrent hernia, large scrotal hernia , femoral hernia,strangulated Hernia , prostatism and chronic cough were excluded

2. Patients with multiple comorbidities not fit for general anesthesia

3. Pateints not given consent.

- **STATISTICAL ANALYSIS: -**

The recorded data was compiled and entered in a spreadsheet .(Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed .As Mean±SD and categorical variables were summarized as frequenciesand percentages. Chi-square test was employed to determine the .Association of most common allergens with different parameters. Graphically the data was presented by bar and pie diagrams.

Results:

DEMOGRAPHIC CHARACTERISTICS

Table 1: Age Distribution

Age Group	N (%)
21-30 years	11(27.5%)
31-40 years	11(27.5%)
41-50 years	8(20.0%)
51-60 years	5(12.5%)
61-70 years	4(10.0%)
>70 years	1(2.5%)

There were 40 participants in the study with a mean age of 40.92±13.63 years (Range=21-73 years)

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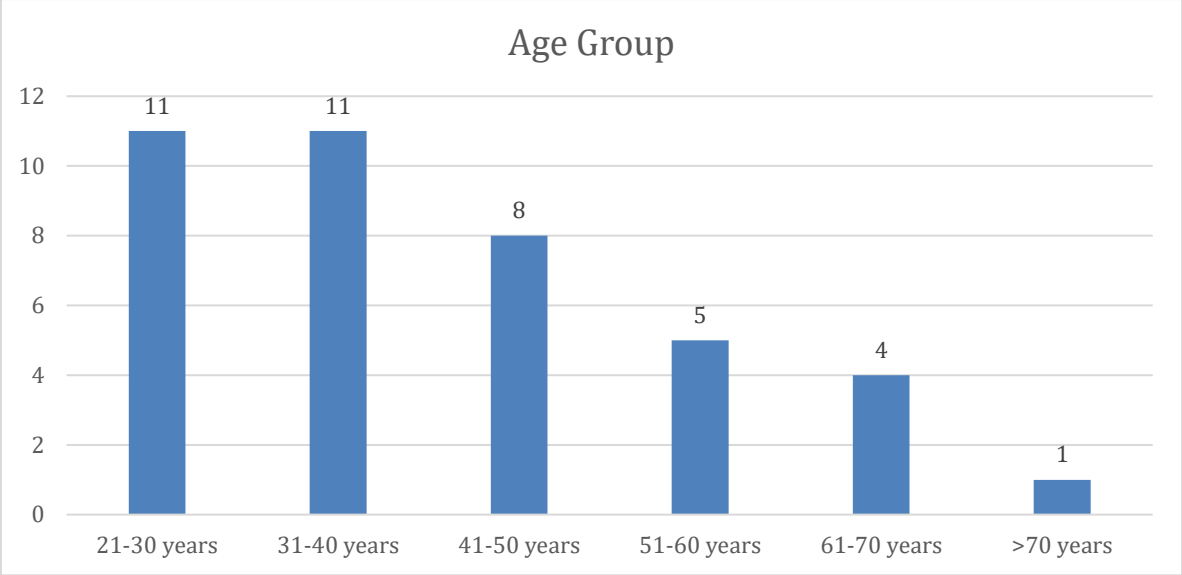
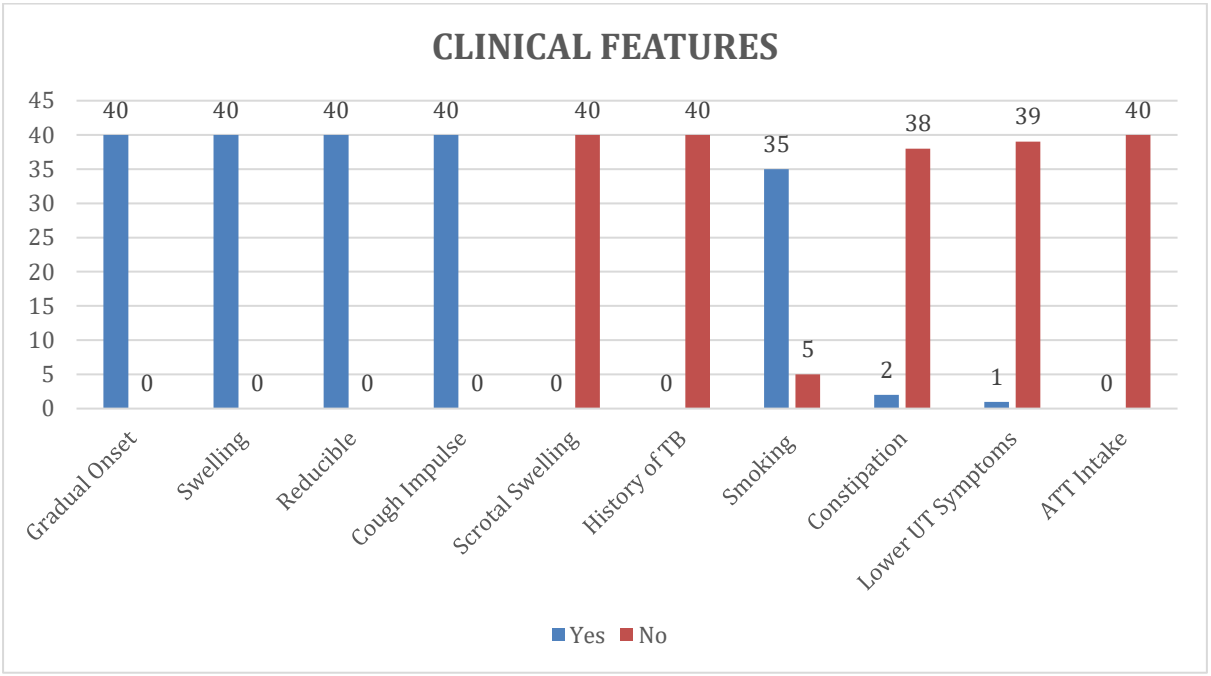


CLINICAL FEATURES

The mean duration of onset was 7.45±3.82 months (Range=2-14 months). All the participants reported gradual onset, inguino scrotal swelling, reducible and cough impulse. Out of the 40 participants, 35 (87.5%) were smokers, 2 (5%) reported constipation and 1 (2.5%) reported lower UT symptoms. There was no history of ATT intake in any participant.



DIAGNOSIS

There were 35 (87.5%) cases of right sided indirect inguinal hernia and 5 (12.5%) cases of left sided indirect inguinal hernia. The mean intra-operative size of the hernia was 1.81±0.31 cm (Range=1.2-2 cm).

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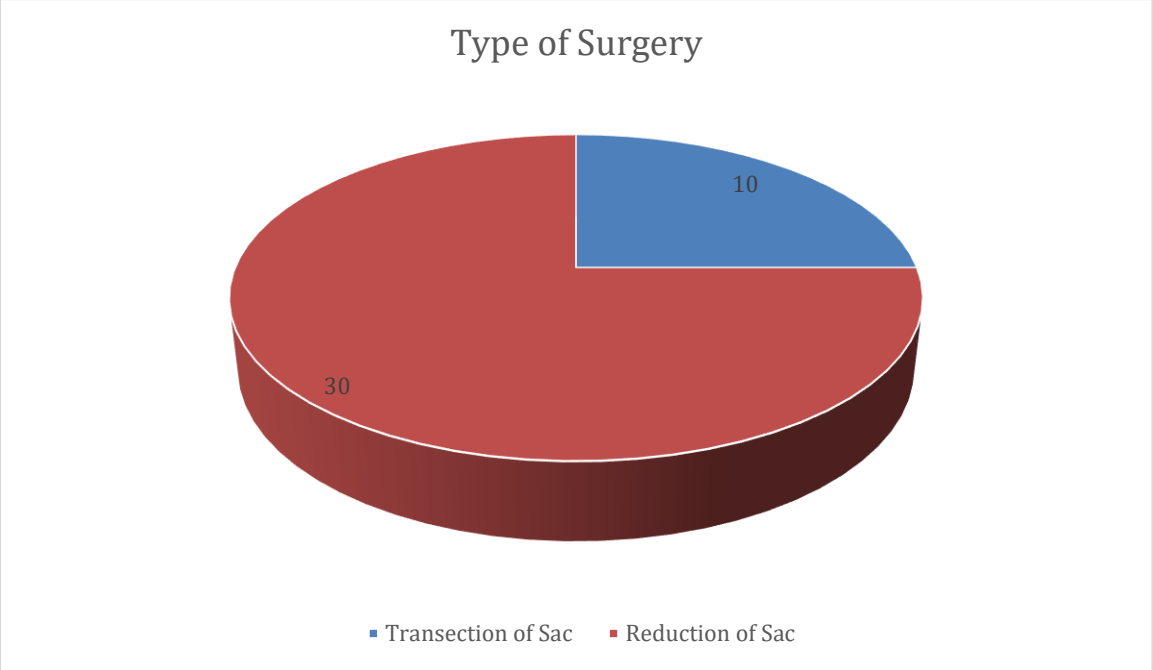
	Frequency
Right Sided Indirect Inguinal Hernia	35 (87.5%)
Left Sided Indirect Inguinal Hernia	5 (12.5%)
Total	40

SURGERY

Out of the 40 surgeries performed, 10 (25%) were transection of sac and 30 (75%) were reduction of sac.

	Frequency
Transection of Sac	10 (25%)
Reduction of Sac	30 (75%)
Total	40



DURATION OF SURGERY

The mean duration of reduction of sac was significantly longer than that of transection of sac.

Comparison of duration of surgery

	Surgery Performed	N	Mean	Std. Deviation	P Value
Duration of Surgery (minutes)	Transection of Sac	10	21.5000	3.37474	<0.001*
	Reduction of Sac	30	28.0000	3.10728	

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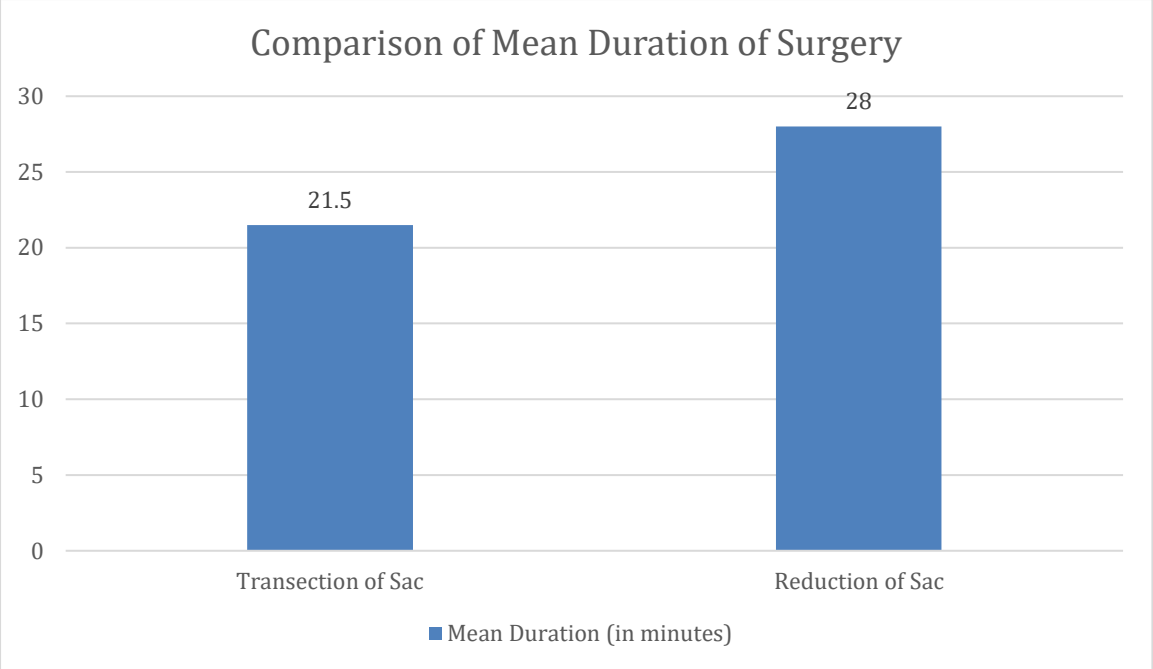

POST-OPERATIVE COMPLICATIONS

There were 5 (50%) cases of seroma formation in transection of sac surgery and 3 (10%) cases of seroma formation in reduction of sac surgery. Statistical analysis using chi-square test showed that there was a statistically significant difference in occurrence of seroma formation between two types of surgeries (Chi-square=7.500, P-value=0.015). The occurrence of seroma formation was significantly higher in transection of sac compared to reduction of sac. All the complications were managed with antibiotics.

		Transection/Reduction		
		Transection of Sac	Reduction of Sac	Total
Post-operative Complication	Seroma Formation Present	5 50.0%	3 10.0%	8 20.0%
	Seroma Formation Absent	5 50.0%	27 90.0%	32 80.0%
Total		10 100.0%	30 100.0%	40 100.0%

Chi-square=7.500, P-value=0.015

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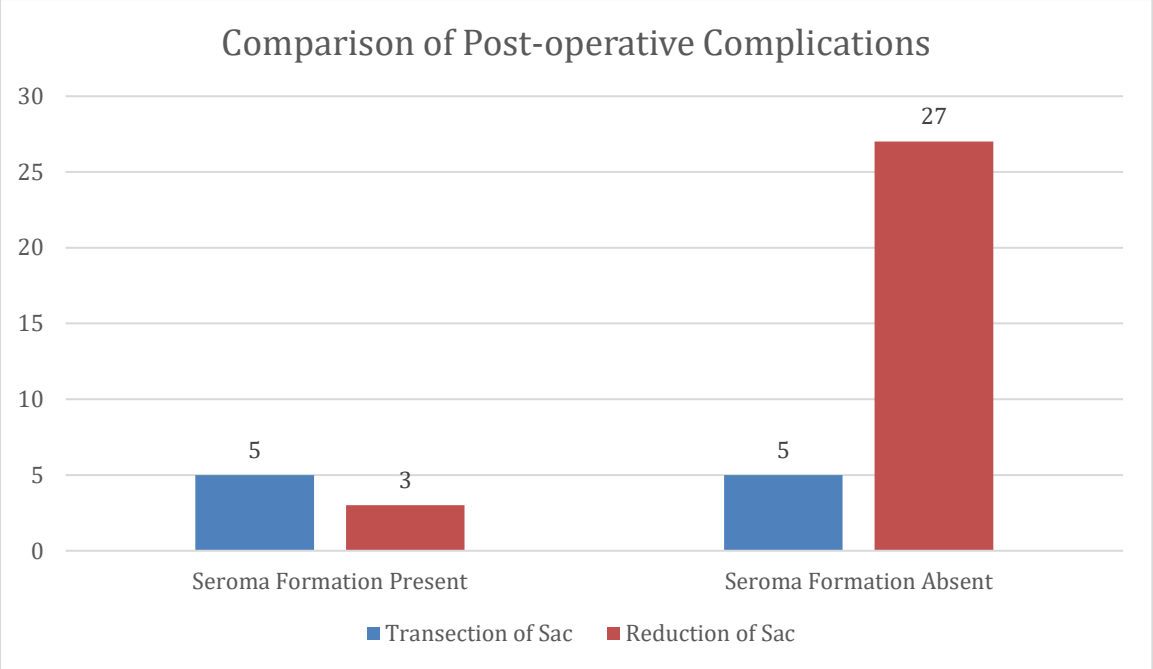

HOSPITAL STAY

The mean duration of hospital stay in both types of surgery was 1 day.

COMPLICATIONS AT FOLLOW-UP

The follow-up was done at 2 weeks and 1 month. At 1 month, no complication was seen among the participants. At 2 weeks follow-up, there were 5 (50%) cases of seroma formation in transection of sac surgery and 3 (10%) cases of seroma formation in reduction of sac surgery. Statistical analysis using the chi-square test showed that there was a statistically significant difference in the occurrence of seroma formation between two types of surgeries at 2 weeks follow-up (Chi-square=7.500, P-value=0.015). The occurrence of seroma formation was significantly higher in the transection of sac compared to reduction of sac at 2 weeks

		Type of Surgery		
		Transection of Sac	Reduction of Sac	Total
Complications at 1 month Follow-up 2 weeks	Nil	5 50.0%	27 90.0%	32 80.0%
	Seroma Formation	5 50.0%	3 10.0%	8 20.0%
Total		10	30	40

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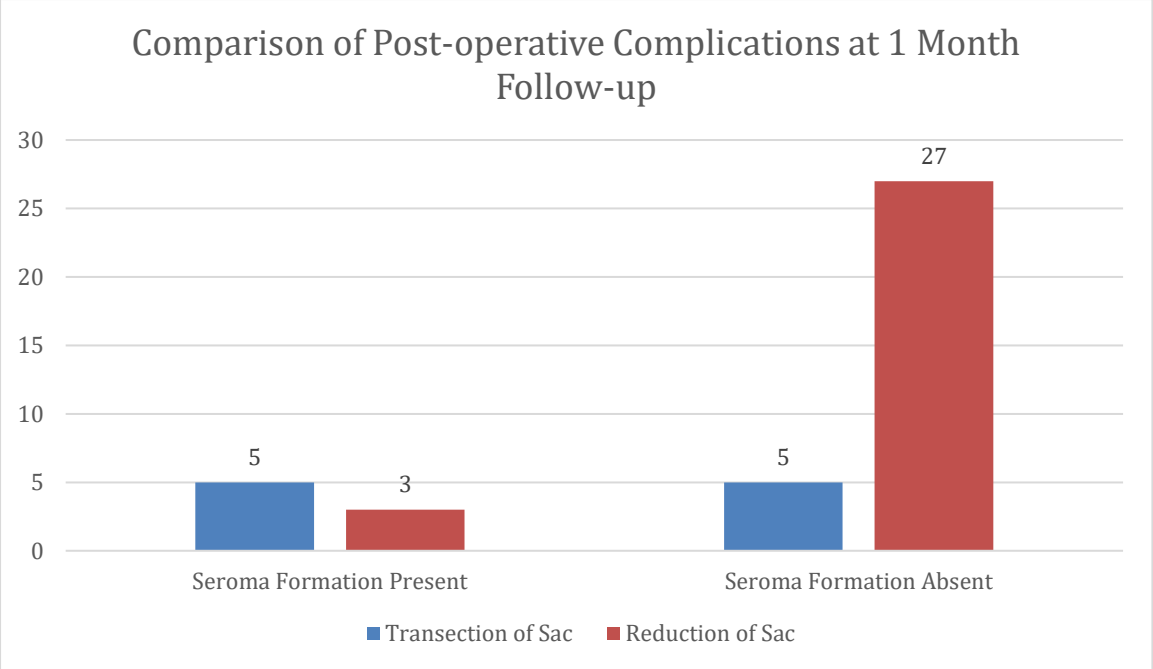

POST-OPERATIVE USG FINDINGS

Post-operative USG findings were normal in 5 (50%) cases of transection of the sac and in 27 (90%) cases of reduction of the sac. Seroma formation was observed in 5 (30%) cases of transection of sac surgery and 3 (10%) cases of reduction of sac surgery. Statistical analysis using chi-square test showed that there was no statistically significant difference in post-operative USG findings between transection of sac and reduction of sac (Chi-square=3.953, P-value=0.139).

		Type of Surgery		
		Transection of Sac	Reduction of Sac	Total
Post-operative USG Finding	Normal	5 50.0%	27 90.0%	32 80.0%
	Seroma Formation	5 50.0%	3 10.0%	8 20.0%
Total		10 100.0%	30 100.0%	40 100.0%

Chi-square=3.953, P=0.139

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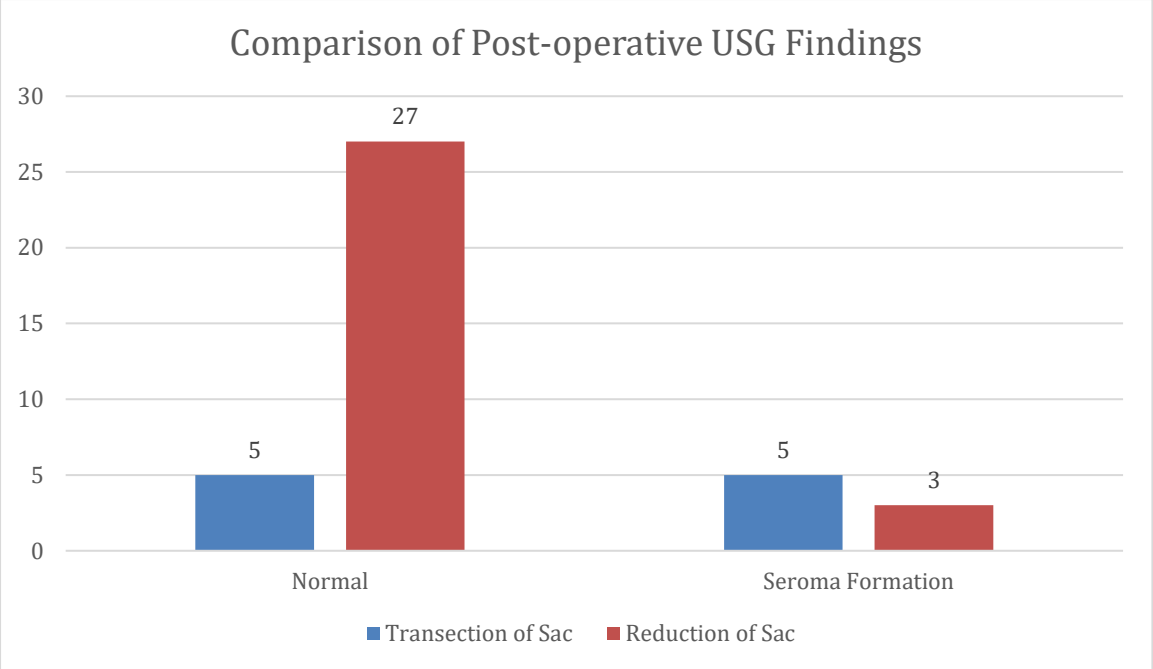

Discussion:

Inguinal hernias are a common condition that often requires surgical intervention to prevent complications and restore normal anatomy (**MacFadyen & Mathis, 1994**). The introduction of laparoscopic techniques has brought new approaches to inguinal hernia repair, including the management of the hernia sac. Two key techniques in laparoscopic indirect inguinal hernia repair are the complete reduction of the hernia sac and the transection of the hernia sac. In the context of laparoscopic indirect inguinal hernia repair, the management of the hernia sac is a critical step. One approach is the complete reduction of the hernia sac, where the entire sac is returned to the preperitoneal space. This technique aims to eliminate the dead space that can lead to seroma formation. Alternatively, the transection of the hernia sac involves cutting the sac at the level of the internal inguinal ring, leaving a portion of the sac behind.

Several studies have compared the outcomes of these two techniques, specifically focusing on seroma formation. A retrospective analysis of 200 laparoscopic inguinal hernia repairs found that the complete reduction of the hernia sac resulted in a lower incidence of seroma formation compared to the transection of the sac (2.9% vs. 7.7%, respectively) (**Kingsnorth, 2006**).

In our study there were 40 participants with a mean age of 40.92±13.63 years (Range=21-73 years). There were 22 (55%) Hindu and 18 (45%) Muslim participants in the study. In a similar study by **MacFadyen & Mathis, 1994**, the mean age was 46.4 ± 8.7 years among the study participants. In another similar study, the mean age of the participants was 39.7±9.4 years (**Pan et al., 2022**).

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Out of the 40 surgeries performed, 10 (25%) were transection of sac and 30 (75%) were reduction of sac. Transection of the hernia sac is associated with a higher risk of seroma formation compared to complete reduction of the sac (**Melich et al., 2014**) (**Cobb et al., 2005**) (**MacFadyen & Mathis, 1994**) (**Das, 1944**). The higher incidence of seroma with sac transection is likely due to the increased tissue dissection and disruption of the natural anatomical planes resulting from the transection procedure (**Pan et al., 2022**).

In our study, there were 5 (50%) cases of seroma formation in transection of sac surgery and 3 (10%) cases of seroma formation in reduction of sac surgery. Statistical analysis using chi-square test showed that there was a statistically significant difference in occurrence of seroma formation between two types of surgeries (Chi-square=7.500, P-value=0.015). The occurrence of seroma formation was significantly higher in transection of sac compared to reduction of sac.

Conclusion:

In our study, the incidence of seroma formation was significantly higher in the transection group compared to the reduction group both at 1 month and 3 months follow-up. Our study demonstrates that complete reduction of the hernia sac during laparoscopic inguinal hernia repair is associated with lower rates of seroma formation compared to the transection of the sac. The findings suggest that complete sac reduction should be the preferred approach to minimize the risk of this common postoperative complication. Further large-scale prospective studies are needed to corroborate our findings and strengthen the evidence on the optimal management of the hernia sac during laparoscopic inguinal hernia repair.

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