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(RESEARCH ARTICLE)

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Role of post operative compression in preventing seroma after laparoscopic inguinal hernia repair

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Abstract

Background: Seroma formation is a frequent and sometimes distressing complication following laparoscopic inguinal hernia repair. Seromas can cause pain, anxiety, delayed recovery, and may require additional interventions. While postoperative compression is widely practiced to prevent seroma, the evidence supporting its effectiveness is still evolving.

Aim: To evaluate and interpret the effectiveness of postoperative compression in preventing seroma formation after laparoscopic groin hernia repair.

Methods: A prospective observational study was conducted at the Department of General Surgery, GMC Srinagar, over a period of two years. Forty-eight patients undergoing laparoscopic inguinal hernia repair were included. Postoperative compression was applied using either a Dynaplast dressing or a truss. The incidence of seroma and other complications was recorded and analyzed.

Results: Postoperative compression was associated with a reduced incidence of seroma formation (8.3%). Most seromas occurred in patients with risk factors such as obesity, COPD, diabetes, and direct hernias.

Conclusion: Postoperative compression is an effective, simple, and low-cost intervention to minimize seroma formation after laparoscopic inguinal hernia repair, especially in high-risk patients.

Keywords: Laparoscopic inguinal hernia repair; Postoperative compression; Seroma prevention; Dynaplast dressing; truss; Surgical complications; Risk factors; Direct hernia

1. Introduction

Laparoscopic inguinal hernia repair is considered the gold standard for treating groin hernias due to its minimally invasive approach, reduced post-operative pain, and faster recovery. However, seroma formation remains a common postoperative issue, particularly in cases involving large hernia sacs or direct hernias. Seromas are collections of serous fluid in the dead space created during surgery. While most seromas resolve spontaneously, they can cause discomfort, anxiety, and, in rare cases, infection or delayed wound healing. The use of postoperative compression aims to reduce dead space, promote tissue apposition, and thereby prevent seroma formation. This study aims to systematically evaluate the role of postoperative compression in preventing seroma after laparoscopic inguinal hernia repair.

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Aims and Objectives

- To assess the incidence of seroma formation following laparoscopic inguinal hernia repair.
- To evaluate the effectiveness of postoperative compression (using Dynaplast dressing or truss) in preventing seroma formation.
- To analyze patient and procedural factors that influence the development of seroma.

2. Materials and Methods

2.1. Study Design

- **Type:** Prospective Observational Study
- **Location:** Department of General Surgery, GMC Srinagar
- **Duration:** 2 years
- **Sample Size:** 48 patients

2.2. Inclusion Criteria

- Age >16 years
- Diagnosed with direct or indirect inguinal hernia
- Suitable for laparoscopic repair

2.3. Exclusion Criteria

- Obstructed or strangulated hernias
- Age <16 years
- Unfit for general anesthesia
- Recurrent hernias
- Cases requiring open repair

2.4. Data Collection

- **Demographics:** Age, sex
- **Risk Factors:** Obesity, COPD, diabetes
- Clinical Presentation and Surgical History
- Preoperative Investigations: CBC, LFT, KFT, ECG, USG, selective CT scan

2.5. Procedure

- Written informed consent obtained
- Pre-anesthetic check performed
- Laparoscopic hernia repair conducted
- Broad-spectrum antibiotics administered at induction
- Postoperative compression (Dynaplast or truss) applied for 48 hours, continued up to 7 days based on clinical assessment

2.6. Postoperative Evaluation

- Monitoring for seroma and other complications
- Regular follow-up and clinical assessment

3. Results

Table 1 Patient Demographics and Risk Factors

Parameter	Number (n=48)	Percentage (%)
Gender		
Male	42	87.5

Female	6	12.5
Mean Age (years)	45.3 ± 12.2	-
Risk Factors		
Obesity (BMI >30)	10	20.8
COPD	6	12.5
Diabetes	5	10.4
Type of Hernia		
Direct	28	58.3
Indirect	20	41.7

Table 2 Postoperative Outcomes

Outcome	Compression Group (n=48)	Percentage (%)
Seroma Formation	4	8.3
No Seroma	44	91.7
Wound Infection	1	2.1
Recurrence (3 months)	0	0
Other Complications	2	4.2

Table 3 Seroma and Risk Factors

Risk Factor	Patients with Seroma (n=4)	Percentage among Seroma Cases (%)
Obesity	2	50
COPD	1	25
Diabetes	1	25
Direct Hernia	3	75
Indirect Hernia	1	25

4. Interpretation and Discussion

4.1. Incidence and Impact of Seroma

In this study, the incidence of seroma formation after laparoscopic inguinal hernia repair with postoperative compression was 8.3%. This is notably lower than the rates reported in literature for patients not receiving compression, which can range from 10% to 20%. This finding suggests that postoperative compression is effective in reducing the incidence of seroma.

4.2. Influence of Risk Factors

A closer look at the patients who developed seroma reveals that most had significant risk factors:

- **Obesity** was present in 50% of seroma cases, likely due to increased dead space and impaired lymphatic drainage.
- **COPD and diabetes** were also associated with higher seroma rates, possibly due to poor tissue healing and chronic inflammation.

- **Direct hernias** accounted for 75% of seroma cases, supporting the notion that larger hernia sacs and more extensive dissection increase seroma risk.

4.3. Effectiveness of Compression

Postoperative compression, whether with Dynaplast dressing or a truss, appears to:

- Minimize dead space where fluid can accumulate
- Promote tissue apposition and healing
- Reduce patient discomfort and anxiety associated with seroma formation

4.4. Safety and Other Outcomes

No major wound infections or recurrences were observed in the early postoperative period, indicating that compression is a safe adjunct to standard postoperative care. Only one minor wound infection was noted, and there were no recurrences at three months.

4.5. Comparison with Literature

The findings of this study are consistent with previous research, which has shown that compression can reduce seroma formation after hernia repair. However, the evidence base remains limited, and larger randomized controlled trials are needed to confirm these results and establish best practices.

5. Discussion

5.1. Seroma Formation: Clinical Significance

Seroma formation is a well-documented complication following laparoscopic inguinal hernia repair, with reported incidences ranging from 10% to 20% in the absence of preventive measures. Seromas, defined as collections of serous fluid in the tissue planes created by surgical dissection, are generally benign and self-limiting. However, they can cause significant patient discomfort, anxiety, and occasionally lead to infection, delayed wound healing, or the need for aspiration. In the context of hernia surgery, seroma can also be mistakenly interpreted as recurrence, further complicating postoperative management.

5.2. Mechanism of Compression in Seroma Prevention

The rationale for using postoperative compression revolves around the principle of obliterating dead space and enhancing tissue apposition. The application of external pressure (via Dynaplast dressing or a truss) is thought to:

- Prevent accumulation of serous fluid by reducing the potential space between tissue planes.
- Encourage adherence of tissue layers, which promotes faster healing and reduces the risk of fluid collection.
- Provide support to the surgical site, minimizing movement and mechanical disruption that could facilitate seroma formation.

5.3. Study Findings in Context

In this prospective observational study, the incidence of seroma in patients receiving postoperative compression was 8.3%, which is lower than the historical rates reported in the literature for patients not receiving compression. This supports the hypothesis that compression is effective in reducing seroma formation.

5.4. Risk Factor Analysis

A detailed analysis of the four patients who developed seroma revealed the following:

- **Obesity:** Two patients (50%) with seroma were obese (BMI >30). Obesity is a recognized risk factor due to increased subcutaneous tissue and dead space, as well as impaired lymphatic drainage.
- **COPD and Diabetes:** One patient each with COPD and diabetes developed seroma. Both conditions are associated with poor tissue healing and chronic inflammation, which can contribute to seroma formation.
- **Type of Hernia:** Three out of four seroma cases (75%) occurred in patients with direct hernias. Direct hernias often involve larger defects and more extensive dissection, leading to greater dead space.

These findings are consistent with the broader surgical literature, which identifies obesity, comorbidities, and the type of hernia as important risk factors for postoperative seroma.

5.5. Safety and Tolerability

The use of compression was well tolerated in all patients, with no significant adverse effects reported. Only one minor wound infection was observed, and there were no recurrences at three months' follow-up. This suggests that compression does not increase the risk of other complications and is a safe adjunct to standard postoperative care.

5.6. Comparison with Other Studies

Several studies have evaluated the efficacy of compression in preventing seroma after various types of hernia repair. For example, Belyansky et al. (2013) demonstrated a significant reduction in seroma rates with the use of compression garments after laparoscopic ventral hernia repair. Similarly, guidelines from the European Hernia Society recommend consideration of compression in high-risk cases.

However, it is important to note that most available studies, including the present one, are observational or limited by small sample sizes. There is a need for larger, randomized controlled trials to establish definitive recommendations regarding the type, duration, and intensity of compression.

5.7. Limitations of the Study

- **Sample Size:** The study included only 48 patients, which limits the statistical power and generalizability of the findings.
- **Study Design:** As an observational study, there is potential for selection bias and confounding factors.
- **Follow-Up:** The follow-up period was limited to three months, which may not capture late complications or recurrences.
- **Lack of Control Group:** The absence of a non-compression control group precludes direct comparison.

Despite these limitations, the study provides valuable real-world data supporting the use of compression as a simple and effective measure to reduce seroma formation.

6. Conclusion

This prospective observational study demonstrates that postoperative compression, applied with Dynaplast dressing or a truss, is associated with a reduced incidence of seroma formation following laparoscopic inguinal hernia repair. The intervention is safe, well-tolerated, and particularly beneficial in patients with known risk factors such as obesity, COPD, diabetes, and direct hernias.

The findings suggest that routine use of postoperative compression should be considered as part of standard care for patients undergoing laparoscopic inguinal hernia repair, especially those at increased risk for seroma. While the results are promising, further research—preferably in the form of multicenter, randomized controlled trials—is needed to optimize compression protocols and confirm these benefits.

Recommendations

- **Routine Application:** Postoperative compression should be routinely considered for all patients undergoing laparoscopic inguinal hernia repair, especially those with risk factors for seroma.
- **Individualized Care:** The type (Dynaplast vs. truss) and duration of compression should be tailored to the patient's risk profile and clinical response.
- **Patient Education:** Patients should be counseled on the purpose and importance of compression, and instructed on how to maintain the dressing or truss.
- **Further Research:** Larger, randomized studies are needed to determine the optimal compression strategy and to validate these findings across broader populations.

6.1. Clinical Implications

- **For Surgeons:** Incorporating postoperative compression into routine practice may reduce seroma rates and improve patient outcomes.
- **For Patients:** Compression is a simple, non-invasive measure that can enhance comfort and speed recovery.

- **For Healthcare Systems:** Reducing postoperative complications like seroma can decrease the need for additional interventions, follow-up visits, and healthcare costs.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that there is no conflict of interest to disclose.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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