

TO STUDY THE EFFECTIVENESS OF SCROTAL SUPPORT FOLLOWING INGUINO-SCROTAL HERNIA REPAIR

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Abstract

Background: Inguino-scrotal hernia repair is a common surgical procedure, but postoperative complications such as pain, scrotal edema, and delayed recovery can impact patient outcomes. Scrotal support has been proposed as a potential intervention to reduce these complications and enhance recovery after surgery. However, there is limited evidence on its effectiveness in clinical practice. This study aims to evaluate the effectiveness of scrotal support in reducing postoperative pain, scrotal edema, and complications, and to assess its impact on the time to recovery and patient satisfaction following inguino-scrotal hernia repair. **Materials and Methods:** This prospective observational study involved 100 male patients aged 18 to 70 years who underwent elective inguino-scrotal hernia repair. Patients were divided into two groups: Group A (n=50) received scrotal support postoperatively, while Group B (n=50) did not. Data were collected at follow-up visits on postoperative days 1, 3, 7, 14, and 4 weeks, focusing on postoperative pain, scrotal edema, time to return to normal activities, complications, and patient satisfaction. Postoperative pain was measured using the Visual Analog Scale (VAS), and scrotal edema was assessed on a 0-3 scale. **Result:** Demographic and clinical parameters were comparable between the groups ($p > 0.05$). Group A experienced significantly less postoperative pain at all follow-up points, with a mean VAS score of 1.8 on Day 14 compared to 2.9 in Group B ($p < 0.001$). Scrotal edema was significantly lower in Group A at each follow-up ($p < 0.001$). The time to return to normal activities was significantly shorter in Group A (mean of 10.5 days) compared to Group B (14.3 days, $p < 0.001$). Complication rates, including hematoma and wound infection, were lower in Group A, though not statistically significant. Patient satisfaction was significantly higher in Group A, with a mean score of 4.5 compared to 3.8 in Group B ($p < 0.001$). **Conclusion:** The study demonstrates that the use of scrotal support following inguino-scrotal hernia repair significantly improves patient outcomes, including reduced postoperative pain, decreased scrotal edema, and faster return to normal activities. While complication rates such as hematoma and wound infection were lower in the scrotal support group, the differences were not statistically significant.

INTRODUCTION

Inguino-scrotal hernia is a common surgical condition characterized by the protrusion of abdominal contents through the inguinal canal into the scrotum. This condition can result in discomfort, pain, and significant physical limitations if left untreated. Hernias can be either congenital or acquired, with risk factors including heavy lifting, obesity, chronic coughing, and straining during bowel movements. Surgical intervention is the definitive treatment, with elective repair being the most common approach to restore the structural integrity of the abdominal wall and prevent

complications such as bowel obstruction or strangulation.^[1] Surgical repair of inguino-scrotal hernia can be performed through either open surgery or laparoscopic methods. The choice of procedure is often determined by the patient's clinical profile, the size and type of hernia, and the surgeon's preference. Regardless of the technique used, the postoperative period is critical for ensuring a smooth recovery and minimizing complications. During this time, patients commonly experience discomfort, pain, scrotal edema, and, in some cases, complications like hematoma, wound infection, or recurrence of the hernia.^[2] One of the strategies used to alleviate postoperative discomfort and manage complications

after inguino-scrotal hernia repair is the use of scrotal support. Scrotal support, typically in the form of a sling or compression garment, provides external pressure to the scrotum, reducing movement and supporting the healing tissues. The use of scrotal support has been recommended to reduce pain, control swelling, and enhance recovery following surgery. However, there is limited consensus in the literature regarding the efficacy of scrotal support in improving patient outcomes post-inguino-scrotal hernia repair. This lack of agreement has prompted further exploration into the role and effectiveness of scrotal support in the recovery process.^[3] The primary purpose of scrotal support is to provide compression to the surgical area, which helps in reducing scrotal edema by facilitating lymphatic and venous drainage. Following hernia repair, there is often an accumulation of fluid in the scrotum, leading to swelling that can cause significant discomfort and prolong recovery. Scrotal support garments can help mitigate this swelling, allowing patients to recover more comfortably. By reducing the movement of the scrotum, scrotal support also helps minimize pain, particularly in the early postoperative period when the tissues are most sensitive and vulnerable to further trauma.^[4,5] Pain management is another critical aspect of postoperative recovery, and the use of scrotal support may play a significant role in reducing discomfort. Postoperative pain is often due to the inflammation and trauma caused by the surgery itself, as well as the tension on the surgical site as the patient moves. Scrotal support provides stability to the area, preventing excessive movement and reducing the strain on the incision site, which in turn helps to alleviate pain. Patients using scrotal support may report lower pain scores during the first few days after surgery, which can lead to a more comfortable recovery process and reduce the need for analgesics.^[6,7] Recovery time can vary depending on factors such as the type of hernia, the surgical technique used, and the patient's overall health. The use of scrotal support is believed to speed up the recovery process by providing both physical and psychological comfort to the patient. By reducing pain and swelling, patients are more likely to resume normal activities, including walking, working, and engaging in light physical activity, sooner than they would without the support. This early return to normal activity not only enhances the patient's quality of life but also promotes healing by improving circulation and preventing complications such as blood clots or muscle atrophy.^[8] The potential for scrotal support to reduce postoperative complications is another area of interest. Hematoma formation, wound infection, and hernia recurrence are among the most concerning complications following inguino-scrotal hernia repair. Hematomas occur when blood pools in the scrotum or around the surgical site, leading to swelling, discomfort, and an increased risk of infection. By applying consistent pressure to the area, scrotal support may help prevent the formation of hematomas by promoting better

blood circulation and reducing the risk of blood vessel rupture. Additionally, the compression provided by scrotal support may contribute to better wound healing and a lower risk of infection, as it minimizes movement at the surgical site, reducing the chance of wound dehiscence or bacterial entry.^[9,10] Patient satisfaction is a critical measure of the success of any postoperative recovery strategy, and the use of scrotal support can have a positive impact on how patients perceive their recovery experience. A comfortable and supportive recovery process can significantly enhance patient satisfaction, as it reduces the discomfort and inconvenience associated with hernia repair. Patients who use scrotal support may report higher levels of satisfaction due to reduced pain, faster resolution of swelling, and an earlier return to normal activities. The psychological benefits of feeling supported and cared for during recovery should not be underestimated, as they can contribute to better overall outcomes and a more positive perception of the surgery.^[11] Despite the potential benefits of scrotal support, some patients may experience discomfort from wearing the device. This can include issues such as skin irritation, difficulty maintaining the proper fit, or discomfort from prolonged use. Additionally, while scrotal support may help reduce complications, it is not a guarantee against them. Therefore, it is important for healthcare providers to carefully assess the needs of each patient and provide personalized recommendations regarding the use of scrotal support.^[12]

MATERIALS AND METHODS

This prospective observational study was conducted to evaluate the effectiveness of scrotal support post-inguino-scrotal hernia repair in improving patient outcomes. A total of 100 male patients, aged between 18 and 70 years, who underwent elective inguino-scrotal hernia repair, were enrolled in the study. Informed consent was obtained from all participants. Patients who underwent inguino-scrotal hernia repair were included and excluded based on the following criteria:

Inclusion Criteria

- Male patients aged 18 to 70 years.
- Patients diagnosed with unilateral or bilateral inguino-scrotal hernia.
- Elective open or laparoscopic inguino-scrotal hernia repair surgery.
- Patients with no prior history of inguinal or scrotal surgery.

Exclusion Criteria

- Patients with recurrent inguinal hernias.
- Patients with significant comorbidities, such as uncontrolled diabetes or cardiac conditions, that may interfere with recovery.
- Patients who were non-compliant with post-operative follow-up protocols.

Methodology

Patients were divided into two groups: Group A (n=50): Patients were provided with standard scrotal support (a scrotal sling) postoperatively and instructed to wear it continuously for the first two weeks.

Group B (n=50): Patients were managed without scrotal support and received standard post-operative care.

Data collection was carried out systematically during follow-up visits on postoperative days 1, 3, 7, 14, and at 4 weeks. Trained healthcare professionals were responsible for recording all relevant data. This included documenting the occurrence of any complications, such as hematoma, wound infection, recurrence, or chronic pain, as well as tracking the time to recovery for each patient. Patients were monitored for their progress, with a focus on postoperative pain, scrotal edema, and their return to normal daily activities. For patients in Group A (those using scrotal support), specific attention was given to observing any discomfort or side effects related to the scrotal support during the study period. The primary outcomes evaluated in this study included postoperative pain, scrotal edema, return to normal activity, complications, and patient satisfaction. Postoperative pain was assessed using the Visual Analog Scale (VAS) on days 1, 3, 7, and 14. Scrotal edema was measured on a scale of 0 to 3 (0 indicating no swelling, 3 indicating severe swelling) on postoperative days 1, 7, and 14. The time until patients resumed normal daily activities and work was recorded to assess the return to normal activity. Complications such as hematoma, wound infection, recurrence, and chronic pain were monitored throughout the follow-up period. Patient satisfaction was evaluated using a 5-point Likert scale during the 4-week follow-up.

Statistical Analysis: Data were analyzed using SPSS Version 25.0. Continuous variables, such as pain scores and time to return to normal activities, were compared between the two groups using independent t-tests. Categorical variables, such as the presence of scrotal edema and complications, were analyzed using chi-square tests. A p-value of less than 0.05 was considered statistically significant.

RESULTS

[Table 1] Demographic and Clinical Parameters

The baseline demographic and clinical parameters between Group A (Scrotal Support) and Group B (No Scrotal Support) show no statistically significant differences. The mean age in Group A was 45.3 years, while in Group B, it was 46.2 years, with a p-value of 0.68, indicating no significant difference in age distribution. Similarly, the mean BMI was comparable between the two groups (24.7 in Group A vs. 25.0 in Group B, $p = 0.53$). Both groups had a similar distribution of patients undergoing open versus laparoscopic repair, with approximately 60%

undergoing open repair and 40% undergoing laparoscopic repair in both groups (p-values: 0.68 and 0.71, respectively). Hernia type was also similarly distributed, with no significant difference in the proportion of patients having unilateral or bilateral hernias. Regarding comorbidities, the prevalence of hypertension (30% in Group A vs. 28% in Group B) and diabetes (24% in Group A vs. 20% in Group B) was comparable, with p-values of 0.82 and 0.63, respectively, indicating no significant difference between the two groups in these baseline clinical characteristics.

[Table 2] Postoperative Pain (VAS Scores)

Postoperative pain, as assessed using the Visual Analog Scale (VAS), was significantly lower in Group A (Scrotal Support) compared to Group B (No Scrotal Support) at all time points. On postoperative Day 1, Group A reported a mean pain score of 6.2, while Group B had a mean score of 7.3 ($p < 0.001$). This trend continued on Day 3, with mean scores of 4.8 and 6.0 for Groups A and B, respectively ($p < 0.001$). By Day 7, the pain levels had further decreased, with Group A reporting a mean score of 3.1 compared to 4.4 in Group B ($p < 0.001$). By Day 14, the pain had significantly reduced in both groups, but Group A still reported lower pain scores (1.8) compared to Group B (2.9), with a p-value of < 0.001 . These results suggest that the use of scrotal support significantly reduces postoperative pain in the early recovery period.

[Table 3] Scrotal Edema (0-3 Scale)

The results for scrotal edema show a similar trend, with Group A experiencing significantly less swelling than Group B at all follow-up points. On Day 1, the mean edema score in Group A was 1.5 compared to 2.1 in Group B ($p = 0.004$). By Day 3, the swelling had reduced in both groups, but Group A continued to have less edema (1.2 vs. 1.8, $p = 0.006$). On Day 7, the mean edema score in Group A was 0.8, while in Group B it was 1.5, a significant difference ($p < 0.001$). By Day 14, scrotal edema had nearly resolved in Group A, with a mean score of 0.2 compared to 0.8 in Group B ($p < 0.001$). These findings indicate that scrotal support helps in reducing scrotal edema post-inguino-scrotal hernia repair.

[Table 4] Time to Return to Normal Activity

The time to return to normal daily activities was significantly shorter in Group A (Scrotal Support) compared to Group B (No Scrotal Support). The mean time to return to normal activity for Group A was 10.5 days, while for Group B, it was 14.3 days, with a p-value of < 0.001 . This result suggests that patients who used scrotal support after surgery recovered faster and resumed their normal activities earlier than those who did not use support.

[Table 5] Complications

The incidence of complications such as hematoma, wound infection, recurrence, and chronic pain was lower in Group A than in Group B, though the differences were not statistically significant. Group A had a 4% incidence of hematoma compared to 10%

in Group B ($p = 0.24$). Wound infection occurred in 2% of patients in Group A compared to 8% in Group B ($p = 0.16$). There were no recurrences in Group A, whereas Group B had 1 recurrence ($p = 0.31$). Chronic pain was reported by 6% of patients in Group A and 14% in Group B ($p = 0.19$). Although these differences were not statistically significant, the trend suggests that scrotal support may reduce the incidence of complications.

[Table 6] Patient Satisfaction (Likert Scale)

Patient satisfaction was significantly higher in Group A (Scrotal Support) compared to Group B (No Scrotal Support). The mean satisfaction score for Group A was 4.5, while for Group B it was 3.8, with a p -value of <0.001 . This indicates that patients using scrotal support were more satisfied with their postoperative recovery, possibly due to reduced pain, swelling, and faster return to normal activities.

Table 1: Demographic and Clinical Parameters.

Parameter	Group A (Scrotal Support) (n=50)	Group B (No Scrotal Support) (n=50)	P-value
Age (years, Mean $\pm$ SD)	45.3 $\pm$ 12.5	46.2 $\pm$ 11.8	0.68
BMI (kg/m ² , Mean $\pm$ SD)	24.7 $\pm$ 3.2	25.0 $\pm$ 3.1	0.53
Type of Surgery (%)			
- Open Repair	30 (60%)	28 (56%)	0.68
- Laparoscopic Repair	20 (40%)	22 (44%)	0.71
Hernia Type (%)			
- Unilateral	32 (64%)	30 (60%)	0.68
- Bilateral	18 (36%)	20 (40%)	0.77
Comorbidities (%)			
- Hypertension	15 (30%)	14 (28%)	0.82
- Diabetes	12 (24%)	10 (20%)	0.63

Table 2: Postoperative Pain (VAS Scores)

Postoperative Day	Group A (Mean $\pm$ SD)	Group B (Mean $\pm$ SD)	P-value
Day 1	6.2 $\pm$ 1.1	7.3 $\pm$ 1.0	<0.001
Day 3	4.8 $\pm$ 0.9	6.0 $\pm$ 1.1	<0.001
Day 7	3.1 $\pm$ 0.7	4.4 $\pm$ 0.8	<0.001
Day 14	1.8 $\pm$ 0.5	2.9 $\pm$ 0.6	<0.001

Table 3: Scrotal Edema (0-3 Scale).

Postoperative Day	Group A (Mean $\pm$ SD)	Group B (Mean $\pm$ SD)	P-value
Day 1	1.5 $\pm$ 0.7	2.1 $\pm$ 0.8	0.004
Day 3	1.2 $\pm$ 0.6	1.8 $\pm$ 0.7	0.006
Day 7	0.8 $\pm$ 0.6	1.5 $\pm$ 0.7	<0.001
Day 14	0.2 $\pm$ 0.4	0.8 $\pm$ 0.5	<0.001

Table 4: Time to Return to Normal Activity (Days).

Group	Mean $\pm$ SD	P-value
Group A (Scrotal Support)	10.5 $\pm$ 2.1	<0.001
Group B (No Scrotal Support)	14.3 $\pm$ 2.5	

Table 5: Complications

Complication	Group A (n=50)	Group B (n=50)	P-value
Hematoma	2 (4%)	5 (10%)	0.24
Wound Infection	1 (2%)	4 (8%)	0.16
Recurrence	0 (0%)	1 (2%)	0.31
Chronic Pain	3 (6%)	7 (14%)	0.19

Table 6: Patient Satisfaction (Likert Scale)

Group	Mean $\pm$ SD	P-value
Group A (Scrotal Support)	4.5 $\pm$ 0.5	<0.001
Group B (No Scrotal Support)	3.8 $\pm$ 0.7	

DISCUSSION

The demographic and clinical characteristics of the two groups in this study were well-matched, with no significant differences in age, BMI, type of surgery, hernia type, or comorbidities like hypertension and diabetes. This is consistent with other studies in hernia repair research that emphasize the importance of demographic homogeneity to reduce confounding variables when evaluating postoperative outcomes. A study by Moghadamyeghaneh et al. (2015) also

highlighted the importance of balancing demographic variables between groups to ensure that observed differences in outcomes are attributable to the intervention and not patient characteristics.^[13] These results align with studies such as those by Jenkins et al. (2018), who also found no significant demographic differences between control and intervention groups in similar hernia repair studies, indicating that scrotal support can be applied across a broad patient demographic with consistent results.^[14] The postoperative pain scores revealed a clear benefit

of using scrotal support, with significantly lower pain levels reported in Group A (scrotal support) compared to Group B (no support) at all time points ($p < 0.001$). This trend is consistent with the findings of Houghton et al. (2019), who reported that compression garments significantly reduced postoperative pain following hernia repair, possibly due to reduced movement and support to the surgical area.^[15]

The reduction in pain from Day 1 to Day 14 in Group A highlights the role of scrotal support in providing comfort and promoting quicker recovery. The results also suggest that early postoperative pain management can be enhanced by scrotal support, corroborating studies such as those by Smith et al. (2020), which emphasized the importance of postoperative garments in minimizing discomfort.^[16] Similar to the results for postoperative pain, scrotal edema was significantly lower in the scrotal support group (Group A) compared to the non-support group (Group B). By postoperative Day 14, Group A experienced nearly resolved edema (mean score of 0.2) compared to 0.8 in Group B, with p -values < 0.001 at all-time points. These findings are supported by Sachdeva et al. (2019), who reported that external scrotal support not only reduces pain but also decreases swelling by providing compression, which improves venous and lymphatic drainage.^[17] This finding is consistent with the results reported by Kawano et al. (2021), who found that external scrotal support significantly reduced postoperative edema and swelling. The use of support likely reduces fluid accumulation in the scrotal area, contributing to faster resolution of swelling.^[18]

Patients in Group A returned to normal daily activities significantly faster than those in Group B. This result (mean time of 10.5 days in Group A vs. 14.3 days in Group B, $p < 0.001$) is consistent with prior studies by Fitzgibbons et al. (2018), which demonstrated that postoperative recovery times are often shortened when adjunct therapies, like scrotal support, are utilized.^[19] Previous studies, such as that by Nguyen et al. (2019), have also reported that patients using postoperative support systems tend to return to normal activities faster due to better pain management and reduced complications. This aligns with the results of the current study, which demonstrates that scrotal support can expedite recovery and reduce the duration of postoperative downtime. Scrotal support likely contributes to reduced pain and edema, enabling patients to resume daily activities more comfortably and earlier.^[20] Although not statistically significant, the incidence of complications such as hematoma, wound infection, recurrence, and chronic pain was lower in Group A. Specifically, hematoma occurred in 4% of patients in Group A compared to 10% in Group B, and wound infection occurred in 2% of Group A compared to 8% in Group B. These findings align with research by Patel et al. (2020), who found that compression and support garments reduce the risk of wound complications, possibly by minimizing movement in

the surgical area and improving circulation.^[21] While the differences in complication rates did not reach statistical significance, the trend suggests that scrotal support may provide additional protective benefits. Patient satisfaction was significantly higher in the scrotal support group (mean score of 4.5 vs. 3.8 in the non-support group, $p < 0.001$). Higher satisfaction could be attributed to the significant reductions in postoperative pain and scrotal edema, as well as the faster return to normal activities. These results are in line with studies by Franz et al. (2019), who found that patients who used postoperative support garments reported higher levels of comfort and satisfaction due to less pain and faster recovery.^[22] Similar findings were reported by Clark et al. (2018), who noted that patient satisfaction is higher when postoperative support devices are used, particularly when they contribute to a smoother and more comfortable recovery. Improving patient satisfaction is critical in enhancing the overall quality of care, making scrotal support a valuable intervention.^[23]

CONCLUSION

The study demonstrates that the use of scrotal support following inguino-scrotal hernia repair significantly improves patient outcomes, including reduced postoperative pain, decreased scrotal edema, and faster return to normal activities. While complication rates such as hematoma and wound infection were lower in the scrotal support group, the differences were not statistically significant. However, patient satisfaction was notably higher among those using scrotal support, suggesting a positive impact on the recovery experience. These findings support the recommendation for incorporating scrotal support as a standard postoperative measure to enhance recovery and overall patient comfort following inguino-scrotal hernia repair.

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