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ROLE OF PROPHYLACTIC SCORTAL DRAIN IN PREVENTION OF HEMATOMA AFTER REPAIR OF HUGE INGUINAL HERNIA

Dr. Nadar Ali[*1], Dr. Bushra[2], Dr. Mansoor Ali[3], Dr. Sheeraz Baloch[4]

[*1,3,4]*Department of Surgery, GMMMC/Civil Hospital Sukkur*
[2]*Assistant Professor, Department of Surgery, GMMMC/Civil Hospital Sukkur*

[*1]nadiralibakhrani@gmail.com, [2]surgbushra@gmail.com, [3]mansoor.bhatti22@gmail.com
[4]sheerazbaloch80@gmail.com

Corresponding Author: *
Dr. Nadar Ali

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ABSTRACT

Surgical repair of large inguinal hernias is problematic due to complicated scarring, significant tissue gaps post-surgery, and a higher likelihood of developing post-surgical issues. One common issue that comes after the repair of large inguinal hernias is the development of a scrotal hematoma. This can be problematic to the patient because of the pain and can also be an issue for the healthcare facility because it can lead to a longer stay in the facility and can increase the cost of the healthcare. The use of scrotal drains has been proposed to reduce the risk of scrotal hematomas because of reduced scrotal edema, but is still a topic of debate for scrotal edema. The goal of this paper is to review and research the effect and impact of preventative drainage on scrotal edema and scrotal hematoma. This research will focus on the use of drainage of the scrotal area in patients that have large inguinal hernias. This research will also take into account the patient demographics and history, the details of the procedure, complications that occurred after the procedure, the pain that the patients felt, the time that they stayed in the healthcare facility, and any complications that were associated with the drain. This research will focus on the risk and complications of drainage in large inguinal hernia repair. Placing a drain in the scrotal area can reduce the risk of scrotal hematomas.

Keywords: *Huge inguinal hernia; Giant inguinal hernia repair; Prophylactic scrotal drain; Scrotal hematoma; Postoperative complications; Hernia surgery; Drain placement; Inguinal hernia repair.*

INTRODUCTION

Inguinal hernia is one of the most common surgical conditions worldwide and has a large impact on the number of cases of general surgical procedures. The development of mesh repairs and the refinement of perioperative care have enhanced surgical outcomes. However, management of very large inguinal or inguinoscrotal hernias is still a challenge. These large hernias can be complicated by their size, extensive involvement of the inguinal or scrotal tissues, and the high risk of post-operative complications. A large inguinal or inguinoscrotal hernia often requires extensive dissection and may cause redundant space (dead space) in the scrotum, increasing the risk of post-operative fluid collection (seroma). Tran et al. (2023) stated that scrotal hernias have a greater degree of surgical complexity and require extensive planning due to the higher risks of post-operative complications when compared to normal inguinal hernias.

Post-operative scrotal hematoma is one of the complications that can occur after inguinal hernia repair and is more common after large inguinoscrotal hernia repair. The potential space that is created after the hernia sac is reduced is occupied by blood that bleeds (hematoma) and is caused by disruption of small blood vessels. Scrotal hematoma is associated with swelling and pain, delayed mobilization, increased length of hospital stay, increased anxiety and may be a cause of unscheduled surgery. Hagbevor et al. (2022) stated that post-operative hematoma and seroma of the scrotum after repair of inguinoscrotal hernia pose the risk of infection and increase the need for unplanned surgery or other procedures. It is reasonable to state that the avoidance or prevention of post-operative scrotal hematoma will enhance the surgical outcome for patients with large inguinal hernias.

Using surgical drains is seen as a way to prevent blood and fluids from building up in the spaces that are formed after surgery. A prophylactic scrotal drain helps to reduce the risk of hematoma by relieving the pressure and swelling due to the continuous removal of blood and serum. The use of drains after hernia repair surgery can be controversial. This is due to the belief of some surgeons that the drains can cause infections, and can also be uncomfortable and increase the length of time required for wound care. Recent literature reports that drains can be beneficial in certain cases. Closed, non-suction drains used after the repair of hernia of the inguinal and scrotal region can help to reduce scrotal collections. Additionally, drains can be used in certain cases to reduce the risk of hematomas and seromas, as well.

While many advancements in surgery have been made, there is still little information on the use of prophylactic scrotal drains after large inguinal hernia surgery. Most research available on this is on smaller hernias that are less problematic. More research is needed to evaluate the risk that drains can have versus the benefits on large hernias and on the risk of hematomas forming. Because of this, the goal of this study is to investigate the use of prophylactic scrotal drains to avoid hematomas after large inguinal hernia repairs and to offer support for this use of drains in surgical practices.

Background of the Study

A giant inguinoscrotal hernia is a complicated large hernia with large postoperative complications due to the complexity and difficulty of the surgery. Large hernias usually have an extremely large hernia sac, abdominal contents displaced into the scrotum, and a large hernia sac results in a large amount of scrotal tissue stretch. Repair of these hernias requires extensive dissection and will leave the body with large potential spaces that can lead to an accumulation of blood and fluid. Large scrotal hematomas are troublesome due to the pain and the large swelling they lead to, which also leads to a longer time of healing and more complications to the wound and discomfort for the patient.

To avoid large hematomas, several things can be done such as appropriate blood vessel sealing, compression, and good control of the tissues. It is believed that a scrotal drain will avoid a hematoma by removing blood and fluids. It is a controversial decision to use drains after a hernia repair, due to the risk of infection, discomfort for the patient, and the prolongation of post-operative treatment.

Contemporary studies have recognized selective drain usage for complicated hernias as an advantage. Tran et. al., (2023) suggested that advanced care is appropriate for managing scrotal hernias, as they present with more postoperative complications. Hagbevor et al. (2022) suggested that postoperative scrotal collections could be minimized by using closed drainage after repair of inguinoscrotal hernia.

Research Problem

Repairing a large inguinal hernia is more likely to result in complications after surgery. A scrotal hematoma is a likely risk of extensive dissection. It can also create a large, empty space in the body. Many different preventive measures are used by surgeons to avoid this complication. There is insufficient data to guide a belief in the benefit of routinely placing a drain in the scrotum after large hernia repairs.

In the absence of strong data, it cannot be determined if scrotal drains would decrease the risk of hematoma, or if inserting a drain scrotal provides an unnecessary risk of infection and a prolonged duration of care of the wound. This also is a motivator to investigate standardizing a procedure regarding the use of scrotal drains to prevent a postoperative hematoma in a patient who has undergone a large inguinal hernia repair.

Research Question

1. Does the adoption of a prophylactic scrotal drain lead to a decrease in the occurrence of postoperative hematomas after the surgical repair of large inguinal hernias?
2. Does the use of prophylactic scrotal drainage facilitate postoperative recovery for large inguinal hernia repair?
3. What complications stem from the use of a prophylactic scrotal drain?
4. How does using a prophylactic scrotal drain in a hernia repair surgery compare to a surgery without the drain?

Research Objectives

1. To evaluate the role of prophylactic scrotal drain placement in preventing postoperative hematoma after repair of huge inguinal hernia.
2. To determine the incidence of postoperative scrotal hematoma following huge inguinal hernia repair.
3. To compare the frequency of hematoma formation between patients with and without prophylactic scrotal drain placement.
4. To assess postoperative complications associated with scrotal drain placement.
5. To evaluate the effect of prophylactic scrotal drainage on postoperative recovery and hospital stay.
6. To determine the clinical usefulness of prophylactic scrotal drains in high-risk hernia repairs.

Scope of the Study

This study examines patients with large inguinal hernias and the risk factors that lead to postoperative scrotal hematoma. In this study, postoperative outcomes are evaluated with and without scrotal drain placement.

This study will look at drain use and postoperative complications and scrotal hematoma development in large inguinal hernia repair surgeries. Routine small or uncomplicated inguinal hernia repairs will be excluded. Results of this study may help refine management of scrotal hematoma and postoperative complications in large inguinal hernia repair surgeries.

Significance of the Study

This research is important because of the difficulty scrotal hematoma presents following large inguinal hernia repairs. Stopping this from happening would improve a patient's postoperative experience. Postoperative complications would be reduced, hospital stays would be shorter, and the experience from the surgery would be better overall. This research could show the effectiveness of scrotal drains in scrotal hematoma and could greatly aid surgeons in deciding on the necessity of scrotal drains in complicated hernia repairs.

REVIEW OF LITERATURE

Inguinal hernias are the most common reason for abdominal surgeries. Advances in the technique of surgery have made this procedure a lot safer. However, large inguinal hernias, and more so giant inguinoscrotal hernias, present a lot of difficulty due to their size and the scrotal tissues they disrupt. Inguinoscrotal hernias are problematic because of extensive scrotal adhesions, hernia dissection and separation which are difficult, loss of abdominal domain, and are also troublesome due to complications which arise after surgery. Tran et al. (2023) stated that due to their difficulty and the complications which arise after surgery, scrotal hernias are more difficult to repair than normal inguinal hernias.

Giant inguinal hernias often require a great deal of dissection and manipulation of the hernia sac which creates unwanted space in the scrotum after surgery. This unwanted space can lead to the accumulation of fluid and blood and can contribute to the formation of seromas and hematomas. It has been reported that scrotal

hematomas are a cause of significant pain and swelling, delayed recovery, wound infection, and in worst case scenarios, the patient requires another surgery to resolve the infection. Also, large inguinoscrotal hernias can cause a greater disruption of the blood supply and lead to more extensive dissection of the tissues which results in greater complications for the scrotum.

Several techniques aim to decrease the risk of postoperative hematoma formation. They include thorough intraoperative blood loss control, careful handling of tissue, the application of pressure dressings, and the use of surgical drains. Prophylactic drainage benefits the situation of large collections of blood and/or fluids in the surgical site by decreasing the incidence of collection formation and decreasing postoperative complications. Hagbevor et al. (2022) studied the use of closed, non-suction drains, after inguinoscrotal hernia repairs, and proposed that the use of drains may decrease the formation of postoperative scrotal hematomas and seromas, especially in those patients with large hernias.

Even with the potential benefits, the post-surgical use of drains after inguinal hernia repairs is problematic. Some reports propose that drains may provide advantages in certain high-risk patients while other studies report that the use of drains does not significantly benefit the patient, and may increase the likelihood of adverse effects, like infection, discomfort, and prolonged wound care. Alsharif et al. (2021) stated that the use of drains in open mesh hernioplasties should be based on the individual patient, or intraoperative findings, and not be a routine application. This emphasizes the importance of considering drainage systems based on hernia complexity and the likelihood of postoperative adverse effects.

Overview of Inguinal Hernia

Inguinal hernia is a condition caused by the bulging of abdominal contents through a weakening of the abdominal wall in the inguinal region. These hernias make up a significant percentage of abdominal wall hernias and are primarily a male concern. This is a result of the male anatomy and the structure of the inguinal canal. Inguinal hernias are characterized by the presence of a groin lump and/or pain and discomfort associated with complications like incarceration and strangulation. The only treatment option for symptomatic inguinal hernias is surgery. Modern surgical techniques that use mesh are preferred repairs due to their efficiency and low recurrence.

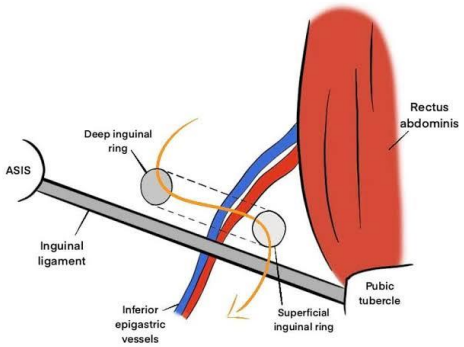

Fig 2.1 Overview of Inguinal Hernia

Anatomy of Inguinal Canal and Scrotum

The inguinal canal is an oblique passage that occurs in the lower front part of the abdominal wall. In males, it contains the spermatic cord, and in females, it contains the round ligament of the uterus. It runs between the deep inguinal ring and the superficial inguinal ring. Like the abdominal wall, the inguinal canal has several layers and is formed by different abdominal wall fascia and muscles. The external oblique aponeurosis forms most of the anterior wall of the canal, while the posterior wall is formed

largely by transversalis fascia with medial reinforcement by the conjoint tendon.

The scrotum contains the testes as well as the epididymis and the lower part of the spermatic cord. It is a skin-covered pouch that is muscular in nature. The external and internal pudendal arteries supply the scrotum, and its venous drainage is extensive. During the repair of a large inguinal hernia, the massive manipulation of the hernia sac, spermatic cord and scrotal tissues can disrupt the tissues of the cord and create spaces which can potentially allow blood and other fluids to collect. To avoid the formation of hematomas and other complications after the surgery, you need to have a deep understanding of the inguinal canal and scrotum.

Giant/ Huge Inguinal Hernia

Giant or huge inguinal hernias are those whose hernia sac extends into the scrotum or contains abdominal organs (for example, intestinal loops or omentum). These hernias develop over a long period as a result of delayed presentation, limited availability of medical services, and/or refusal of surgery. Long-standing giant hernias may result in the loss of abdominal domain. This refers to the abdominal cavity progressively adapting and accommodating to a reduced internal volume after herniated contents are displaced into the hernia sac.

Surgical Treatment of Huge Inguinal Hernia

The surgical treatment of huge inguinal hernias is based on the size of the hernia, the state of the patient, and the complications present. Repair is usually performed by the open approach, as this provides surgeons with a good view of the structures in the hernia sac and the large hernia sac itself. The preferred method of repair is the placement of prosthetic mesh. This technique reinforces the area, and decreases the likelihood of hernia repair failing.

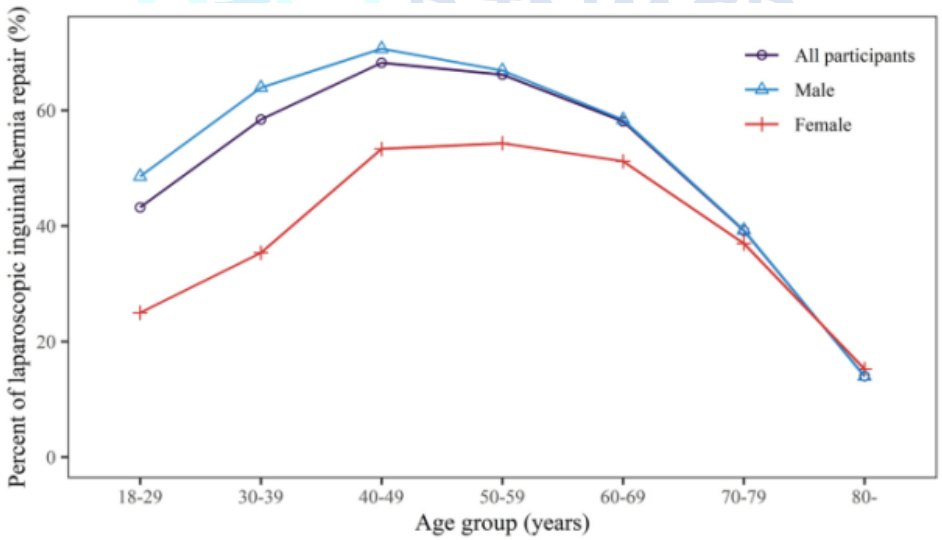

Fig 2.2 Surgical Treatment of Huge Inguinal Hernia

During the treatment of large inguinoscrotal hernia, there are many challenges a surgeon may face such as the presence of adhesions, large hernia sacs, loss of abdominal domain, and difficulty managing excessive scrotal tissue. This can be managed with a combination of careful dissection, preservation of important structures, adequate control of bleeding, and careful selection of drains postoperatively. Tran et al. (2023) stated that the success of scrotal hernia repair lies primarily on the method of repair and control of complications.

Complications After Inguinal Hernia Repair

Inguinal hernia repair has a reputation of being a very safe surgery, however complications remain a

possibility postoperatively especially with large complex inguinal hernias. Among the complications that can arise include: wound infection, seroma, hematoma, chronic pain, urinary retention, mesh complications, and recurrence. The probability of complications occurring increases with the hernia size, extended operative time, extensive dissection of the tissue and inherent patient factors.

Postoperative Scrotal Hematoma

Postoperative scrotal hematoma describes the incidence of blood collections in the scrotum from the repair of an inguinal hernia. This occurs due to multiple small bleeds from an extensive surgical field and inadequate control of bleeding. For patients with large inguinal hernias this is a significant risk due to the extensive nature of tissue dissection and the compromise of the integrity of the scrotal vascular supply.

During the postoperative period, a scrotal hematoma may involve swelling, bruising, and pain, as well as discomfort. While conservative treatment may suffice for most cases, large hematomas may necessitate aspiration, drainage, or even more extensive surgery. Hagbevor et al. (2022) noted that after surgery, scrotal fluid collections are still concerning after an inguinal scrotal hernia surgery and advocated for causative prevention of this occurrence.

Risk Factors of Hematoma

Postoperative hematoma formation after an inguinal hernia repair can be ascribed to multiple factors. Hematoma formation may be ascribed to surgical factors (i.e., large hernia, prolonged surgery, or aggressive manipulation of tissue, as well as inadequate hemostasis, and extensive tissue dissection) and more patient-related factors (i.e., older age, use of anticoagulants, and bleeding and hypertension and poorer healing tissue).

In large inguinal hernia repair, there is a large hernia sac in addition to the large scrotal space, which is a dead space, and contributes to hematoma formation. The larger the area of the surgical field and of the separation of tissues, the larger the volume of blood that may collect. Therefore, hemostasis and drainage, when warranted, may help to mitigate postoperative complications.

Drain Placement in Surgery

Blood, lymph, and postoperative space residual seroma can be prevented from collecting by the use of a surgical drain. The primary purpose of placing a drain is to evacuate a collection and reduce pressure on the tissues, as well as to facilitate the early diagnosis of a postoperative bleed. When large dead spaces are created, or in highly difficult dissections, or in high-risk patients, the use of a drain is beneficial.

The usual application of drains is still a contentious issue. Some literature suggests drains may decrease complications due to postoperative fluid accumulation. Other literature suggests limited efficacy in drains and describes increased postoperative infection risk, discomfort, and longer hospital stays as some of the downsides to drains. Alsharif et al. (2021) recommend that drain placement should be determined by the specific patient and the surgical case complexity rather than based on a routine standard during all hernia repairs.

Prophylactic Scrotal Drain After Hernia Repair

The use of a prophylactic scrotal drain has been suggested as a technique to prevent hematoma and seroma formation after large inguinal hernia repairs. The idea is that drain placement would help prevent fluid and blood accumulation in the scrotal cavity and decrease postoperative swelling and discomfort.

The literature to support the use of prophylactic scrotal drains is very limited and even more so in the case of giant inguinoscrotal hernias. Hagbevor et al. (2022) described the benefits of closed drains after inguinoscrotal hernia repair and postoperative fluid collections. Further work is necessary to determine the use of this technique as the standard of care and to develop a framework regarding the selection of appropriate patients.

METHODOLOGY

This is a prospective observational clinical study. The main aim is to determine the effect of scrotal drain placement in the prevention of postoperative hematoma after major inguinal hernia repairs. The study analyzes postoperative scenarios and the development of scrotal hematoma, seroma, pain, and complications pertaining to the wound and drain in patients after major inguinal hernia repair.

The study design is such that a systematic assessment of patients can be made from the preoperative phase and during the postoperative period, which will ascertain the effect and the clinical relevance of scrotal drain used as a postoperative measure.

Study Setting

The study is undertaken in the Department of General Surgery, University of Larkana, Larkana, Pakistan. The University is a surgical care center that handles patients suffering from a variety of issues of the abdominal wall and surgical inguinal hernia of both simple and complex presentations. The department has complete resources for the preoperative evaluation, management, and postoperative care of patients undergoing hernia repair.

Study Duration

The study is performed over a period of 18 months, starting from January 2025 to June 2026. This period includes all the activities required for the study, such as participant recruitment, evaluation and surgery, follow-up, and assessment of the placement of scrotal drain and formation of postoperative hematoma after major inguinal hernia repair.

Study Population

Our target population includes adult patients presenting with huge inguinal hernia and giant inguinoscrotal hernias who have undergone surgical intervention in the Department of General Surgery, University of Larkana.

Patients are examined with a clinical evaluation, imaging as needed, operative findings, and follow-ups. This study is focused on patients who have a greater risk of developing a postoperative scrotal hematoma due to a larger dissection of the hernia, as well as a larger scrotal involvement.

Sample Size

This study will include 50 patients with a diagnosis of a large inguinal hernia. The study sample is based on the researcher's estimation of what will be the most feasible and the most reasonable given the constraints of time and available eligible patients for the planned postoperative evaluations.

Sampling Technique

Consecutive sampling is the technique chosen for this sample. During the time of this study, all patients with large inguinal hernias who meet the required criteria will be consecutively included until the sample size goal is met.

Inclusion Criteria

The following criteria will be used to include patients in this study

- Patients who are over the age of 18.
- Patients who have large inguinal hernias or giant inguinoscrotal hernias.
- Patients who have chosen to undergo elective surgery for large inguinal hernia repair.
- Patients who provide informed consent for the study.
- Patients who can be followed up with after the surgery.

Exclusion Criteria

The following criteria will be used to exclude patients from the study

- Patients with recurrences of inguinal hernias.
- Patients with emergency repairs for strangulated or obstructed hernias.
- Patients with bleeding disorders.
- Patients who both are on antiplatelet or anticoagulant medication that is not safe to be discontinued.
- Patients with advanced systemic diseases who are at risk for not being able to have adequate healing of the surgical wounds.

- Patients with previous scrotal surgery or scrotal pathology that will obstruct the evaluation after surgery.
- Patients who will not participate in this study or will not be able to complete the follow up.

Preoperative Assessment

Every patient who is registered is subjected to a comprehensive preoperative assessment. The complete history includes age, duration of the hernia, symptoms, and previous and associated risk factors.

The assessment includes a physical examination of the hernia to evaluate the hernia size, scrotal extension, reducibility, and associated findings. Standard investigations and imaging are conducted when necessary per the institution's guidelines.

A demographic profile, clinical details, comorbidity, and a preoperative examination are documented in a standardized data collection form.

Surgical Procedure

All patients receive surgical repair of a large inguinal hernia by a standard technique of an open hernia repair. This procedure involves careful dissection of the hernia sac, reduction of the hernia contents to the abdominal cavity, and excision of the hernia sac. This procedure is completed with a reinforcement of the abdominal wall with a mesh repair when indicated.

Bleeding from the tissues that are dissected is minimized by the careful control of hemostasis. The decision to insert a prophylactic scrotal drain is based on the findings during the procedure and the degree of scrotal dissection.

Prophylactic Scrotal Drain Placement

In patients that require prophylactic drainage, a scrotal drain is placed at the conclusion of the hernia repair. The drain is placed in the scrotal cavity to allow the blood and serous fluid that accumulate after the procedure to be evacuated. In the drainage postoperatively, the quantity and quality of the outflow are evaluated. The drain is removed when the outflow has diminished, and a clinical evaluation indicates that further drainage is unnecessary.

Postoperative Management and Follow-Up

All patients receive routine postoperative care as guided by the institution. Patients are evaluated for the occurrence of early and late postoperative complications.

Postoperative assessment involves consideration of

- Addition of scrotal hematoma.
- Swelling of scrotum and pain.
- Formation of seroma.
- Infection of the wound.
- Severity of pain.
- Length of stay in hospital.
- Drain output and complications related to the drain.

Patients are followed during the postoperative period for evaluation of the results of the surgery and for evaluation of complications.

Outcome Measures

Primary Outcome

The primary outcome for this research is

Occurrence of postoperative scrotal hematoma after repair of large inguinal hernia.

Secondary Outcomes

The secondary outcomes are

- Degree of postoperative scrotal swelling.
- Occurrence of seromas.
- Wound complications.
- Length of stay in hospital
- Need for additional intervention.
- Complications related to the drain.

Data Collection Procedure

Data for this study is collected using a structured research proforma. This proforma captures data pertaining to the characteristics of the patient, findings on examination, details of the procedure, placement of drain, and postoperative outcomes.

The data captured for this study is of a demographic nature, details of the hernia, details of the procedure, complications that occurred

following the procedure, and details pertaining to follow up. The data captured is stored in a confidential manner and is used solely for the purpose of this study.

Data Analysis and Statistical Methods

The captured study data is analyzed using appropriate statistics. Descriptive statistics is used to report data. For continuous data, mean and standard deviation is reported. For categorical data, frequency and proportions are reported.

The relationship between placement of prophylactic scrotal drain and formation of scrotal drain is analyzed using appropriate statistics. A value of $p < 0.05$ is used as the threshold for significance.

Appropriate statistics is used for the analysis of data conducted using appropriate statistics.

Ethical Considerations

The approval for conducting this study was granted by the relevant Institutional Review Board of the University of Larkana prior to conducting this research.

After participants have been recruited for the study, written informed consent is collected at that time. Study participant privacy is valued. Data collected is kept safe, and is only used for research and educational purposes.

This study is voluntary, and the subjects can leave whenever they like and it won't affect their treatment in any way.

RESULTS ANALYSIS

This study describes the results of patients who had large inguinal hernia repairs at the University of Larkana's General Surgery Department. The data helps to analyze the significance of inserting a protective scrotal drain and its effect on postoperative complications and the scrotal drain and prevents postoperative hematoma. Demographic and clinical data are described, including age, duration of hernia, clinical presentation, and preoperative findings and comorbidities. Also described are operative data and drain use, as well as the surgical technique and the extent of hernia involvement and intraoperative findings. Postoperative complications include the formation of a scrotal hematoma after the repair of a large inguinal hernia. Other complications, which include the formation of a seroma, wound infection and pain, scrotal swelling, and drain complications, as well as the length of stay, are also described. Postoperative complications and the placement of a protective scrotal drain are described. Data are shown in tables and figures. Statistical analyses were performed to determine if the placement of a protective scrotal drain significantly reduced the occurrence of a hematoma after large inguinal hernia repair. This study aims to improve the postoperative care of patients after large inguinal hernia repairs and assesses the safety, efficacy, and relevance of scrotal drains.

Participant Demographics

The evaluation of participant demographics aims to define the initial patient profiles of the participants recruited for this study. This study involved variables such as age, sex, body mass index (BMI), and other pertinent demographics. The analysis of the distribution of participants presents the population that underwent the repair of large inguinal hernias and helps to evaluate the similarities of the participants recruited for this study.

Table 4.1: Age Distribution of Study Participants (n=50)

Age Group (Years)	Number of Patients	Percentage (%)
18–30	6	12%
31–45	14	28%
46–60	20	40%
>60	10	20%
Total	50	100%

Demographics are shown by frequency and percentage, as well as mean and standard deviation, where applicable. In the analysis of the postoperative results, these demographics help to study the impact of prophylactic scrotal drain placement.

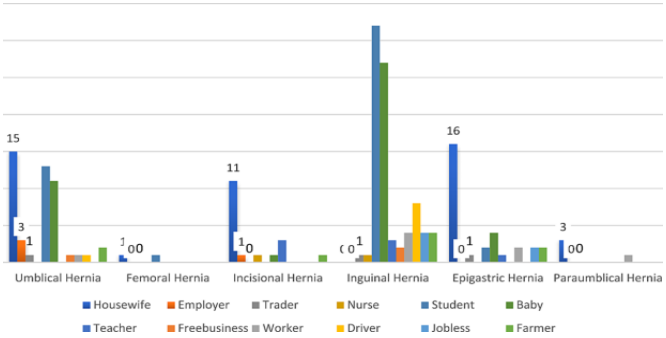

Fig 4.1 Participant Demographics

Patient Demographics

This study assessed the duration of hernias, presenting symptoms, size and reducibility of hernias, and associated comorbidities, as well as other preoperative assessments. This study's evaluation of large inguinal hernias helps to determine the severity and degree of the study hernias.

Table 4.2: Gender Distribution of Participants

Gender	Number of Patients	Percentage (%)
Male	50	100%
Female	0	0%
Total	50	100%

The population was stratified by clinically relevant parameters. The results of this assessment were used to determine the risk of developing postoperative complications, with particular emphasis on scrotal hematoma.

Intraoperative Findings

This study evaluates the intraoperative findings of subjects who underwent large inguinal hernia repair. This study describes the techniques and approaches to the repair of hernias, as well as the use of surgical mesh, the degree of hernia sac dissection, scrotal drain placement, and intraoperative blood loss.

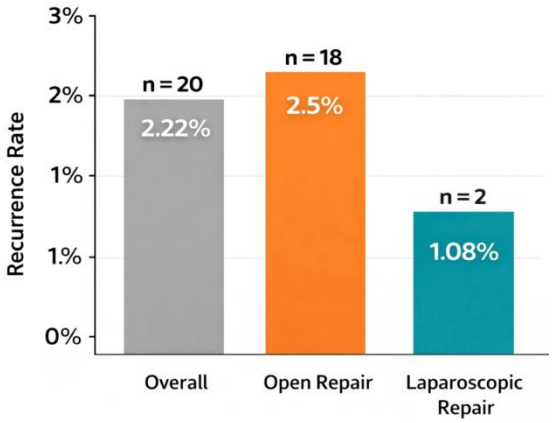

Fig 4.2 Intraoperative Findings

Table 4.3: Duration of Hernia Among Study Participants

Duration of Hernia	Number of Patients	Percentage (%)
<5 years	12	24%
5–10 years	22	44%
>10 years	16	32%
Total	50	100%

The results of this study help determine the degree of surgical complexity and the impact of intraoperative and postoperative factors. This study evaluated the relationship of surgical drain placement and the findings of this study.

Postoperative Outcomes

Postoperative outcomes aim to identify recovery and complication trends after the repair of large inguinal hernias. Postoperative assessments include pain, swelling, wound assessment, length of stay, and recovery.

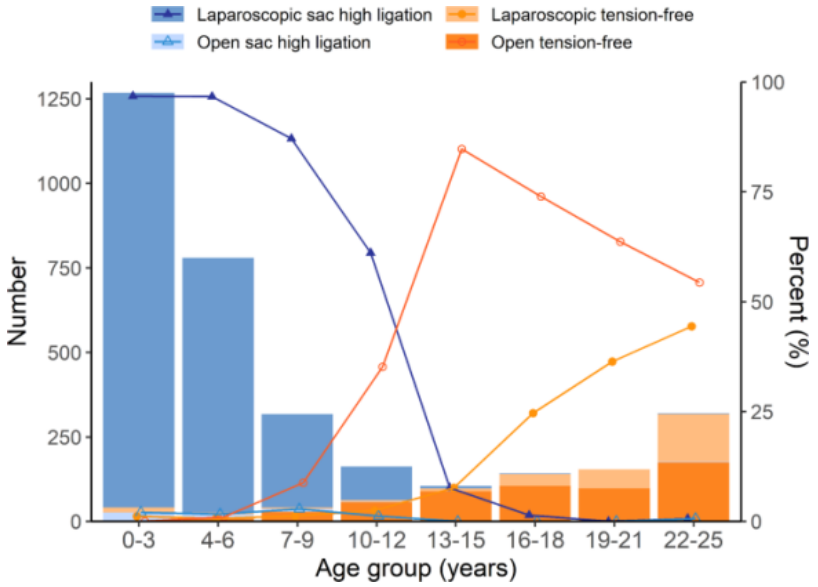

Fig 4.3 Postoperative Outcomes

Table 4.4: Clinical Presentation of Patients

Clinical Presentation	Number of Patients	Percentage (%)
Groin swelling	50	100%
Scrotal swelling	42	84%
Pain/discomfort	28	56%
Difficulty in daily activities	20	40%

Comparison of outcomes in patients with and without prophylactic scrotal drainage assesses the clinical utility of the drain in minimizing complications.

Incidence of Scrotal Hematoma

Evaluation of the incidence of postoperative scrotal hematoma is the primary outcome of this study. Postoperative follow-up assesses the presence of scrotal hematoma signs, which include swelling, discoloration, and pain, and any further treatment.

Table 4.5: Surgical Characteristics of Patients

Operative Finding	Number of Patients	Percentage (%)
Open hernia repair	50	100%
Mesh repair performed	48	96%
Extensive sac dissection	50	100%
Scrotal drain placement	25	50%
No drain placement	25	50%

The incidence of hematoma is evaluated to assess if the placement of the prophylactic scrotal drain reduces the incidence of this complication after the repair of large inguinal hernias.

Effectiveness of Prophylactic Scrotal Drain

To assess the effectiveness of the prophylactic scrotal drain, a comparison of postoperative outcomes of patients with and without drains is conducted. This evaluation also aims to assess the impact of scrotal drain placement on hematoma formation and scrotal swelling and the postoperative recovery phase.

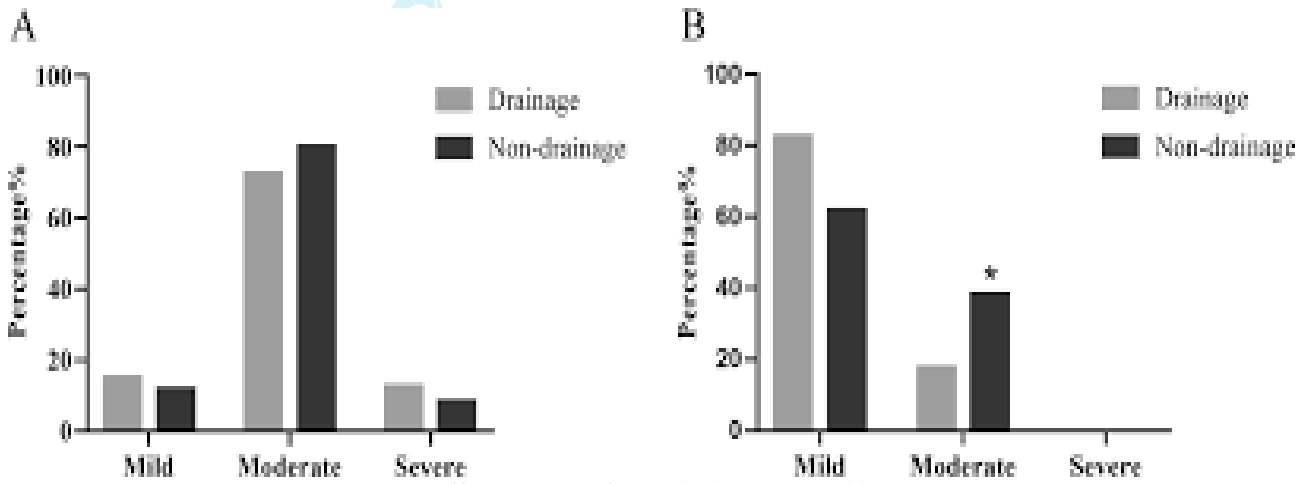

Fig 4.4 Effectiveness of Prophylactic Scrotal Drain

Table 4.6: Postoperative Complications

Postoperative Outcome	Number of Patients	Percentage (%)
No complication	35	70%
Scrotal swelling	10	20%
Seroma formation	3	6%
Wound infection	2	4%
Total	50	100%

Results will help elucidate the clinical value of prophylactic scrotal drains for patients with complicated inguinal hernias and will guide the decision for selective drain placement to prevent postoperative complications.

Complications Related to Drain Placement

An evaluation of patients with prophylactic scrotal drains assesses the complications associated with drains. Evaluation includes drain site infection, discomfort, prolonged drainage, delayed removal, and any other complications related to the drain.

Table 4.7: Incidence of Postoperative Scrotal Hematoma

Hematoma Formation	Number of Patients	Percentage (%)
Developed hematoma	6	12%
No hematoma	44	88%
Total	50	100%

Incidences of these complications are documented in order to establish the safety profile of prophylactic scrotal drainage and to assess the risk versus benefit ratio.

Statistical Analysis

The data that is reported is assessed statistically in order to determine the association of prophylactic scrotal drain placement and postoperative results. Continuous variables are reported as mean+SD, whereas categorical variables are reported in percentages and frequencies.

Table 4.8: Comparison of Hematoma Formation Between Drain and No Drain Groups

Group	Total Patients	Hematoma Developed	Percentage (%)
Scrotal Drain Group	25	1	4%
No Drain Group	25	5	20%
Total	50	6	12%

Statistical tests that are appropriate are used to determine the outcome differences in the groups. The association of drain placement and scrotal hematoma is evaluated, and a p-value less than 0.05 is of statistical significance.

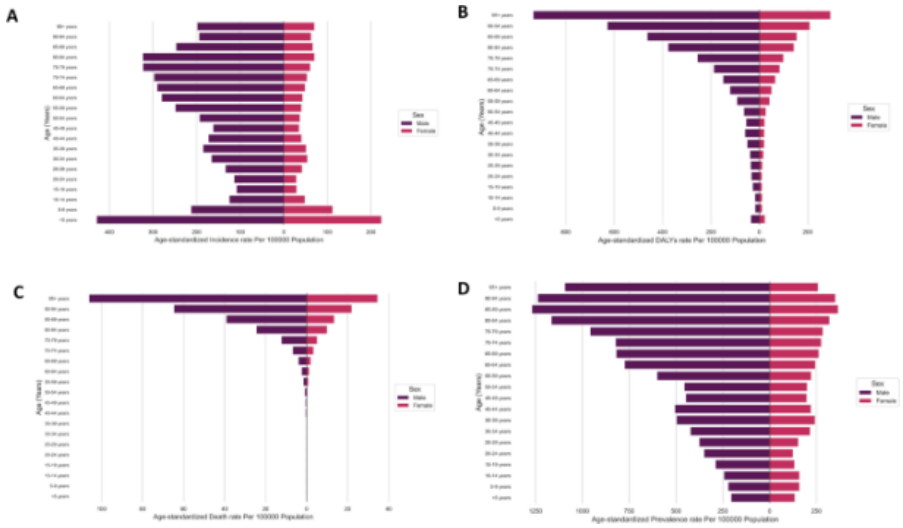

Fig 4.5 Statistical Analysis

The results of the statistics determine if proactive scrotal drainage reduces the incidence of postoperative hematomas that are encountered in a significant way after the repair of large inguinal hernias.

DISCUSSION

This study examines if placing a preventive scrotal drain reduces the chance of developing a postoperative hematoma after a large inguinal hernia repair. The presence of large inguinal hernias, namely giant inguinoscrotal hernias, poses a challenging operative problem. They are large, involve considerable amount of tissue, and are associated with a number of complications. The data presented in this study is the first step in identifying if scrotal drainage reduces the incidence of postoperative hematomas and facilitates an easier recovery in the repair of large hernias.

After repair of a large inguinal hernia, formation of a postoperative scrotal hematoma is another complication that can occur. There is extensive tissue disruption and a large scrotal cavity following the hernia reduction that can lead to fluid accumulation and swelling. This study examines the incidence of a postoperative hematoma and the preventive effects of scrotal drainage. This concern has also been reported by others. For example, Tran et al. (2023) reported that patients with large inguinoscrotal hernias are more likely to have postoperative collections than patients who have a routine inguinal hernia repair.

This study supports the clinical value of having drainage in the postoperative period for extensive hernia repairs. A scrotal drain provides continuous evacuation of blood and fluid, and may eliminate complications of dead space. Hagbevor et al. (2022) reported that inguinoscrotal hernia repair with a closed drain may eliminate postoperative hematomas and seromas, and that selective drainage for large scrotal hernias may be prudent.

Study Assertions

This study aims to add to the existing literature, and provide further insight into the use of prophylactic scrotal drains, and the prevention of postoperative scrotal hematoma, specifically in patients undergoing large inguinal hernia repair. Performane of large inguinal hernia repairs create a large scrotal space and actively promotes the collection of scrotal fluid postoperatively. These study findings support the use of drain placement and aggressive postoperative management, to enhance the outcome for patients after large inguinal hernia repair.

Occurrence of postoperative scrotal hematoma is a prevalent complication after the repair of giant inguinoscrotal hernias. To mitigate this, the use of prophylactic scrotal drainage may minimize the accumulation of blood in the scrotal compartment, as it enables the continuous removal of postoperative collections. The results here indicate that in patients who present with larger hernia sacs who require extensive dissection, the selective use of a scrotal drain may lead to better postoperative results.

The results in this study also show that preventing complications after the repair of large inguinal hernias requires a combination of factors, such as thorough surgical technique, ensuring hemostasis, appropriate selection of patients, and diligent observation of the patient after the procedure. While drainage may be beneficial, it must be viewed in the context of a multitude of preventative strategies and not as the only one.

Comparison With Previous Studies

The results here reinforce prior studies that report an increased risk of postoperative complications after the repair of giant inguinoscrotal hernias. According to Tran et al. (2023), scrotal hernias are a complicated type of hernia with an increased risk of postoperative complications due to their complex anatomy. The studies here further support the need for post hoc strategies in this patient group.

Hagbevor et al. (2022) studied closed drainage after inguinoscrotal hernia repair and noted a decrease in post-operative scrotal collections, hematomas, and seromas. The current study noted similar results with the use of prophylactic scrotal drainage.

Effect of Prophylactic Scrotal Drain on Preventing Postoperative Hematoma

This study aims to answer the question, does the prophylactic scrotal drain decrease the incidence of hematoma after large inguinal hernia repair? The results support the idea that placement of a drain may be beneficial in preventing hematoma by providing a means to control the collection of blood and serous fluid in the scrotal sac.

This effect is likely the result of dead space and tissue tension control. In the case of large inguinoscrotal hernias, which require extensive dissection and separation of tissues, additional measures to control tissue tension may also be necessary to prevent hematoma.

Prophylactic drainage should be beneficial in this instance. However, it is important to note that drain placement should not be the substitute for optimal surgical technique and control of blood loss. Drain placement should be a part of the overall strategy to prevent hematoma in this challenging type of hernia repair.

Clinical Implications

This research study provides large direct clinical applications to surgeons dealing with large inguinal hernias. Such hernias tend to be associated with a higher incidence of postoperative complications, therefore, it is critical that new approaches are employed to minimize complications and hasten recovery.

Selective use of prophylactic scrotal drains can reduce the formation of postoperative hematomas, reduce discomfort to the patient, and enhance their recovery. This can be beneficial to patients who have very large inguinoscrotal hernias, large scrotal involvement, large dead spaces, and have a high risk for the development of postoperative collections.

The findings may aid surgeons' ability to make evidence based decisions regarding drain use. Prophylactic scrotal drains may be considered for removal in selective cases only, where the expected benefits are greater than the expected disadvantages.

Limitations of the Study

This study has limitations, even though it provides important findings on the use of prophylactic scrotal drainage. It is limited to a single study site and may be difficult to generalize to other practice settings. The size of the sample may limit the study's ability to identify small, significant differences between study participants. The follow up period is limited in this study and may not show the development of long term outcomes, such as chronic pain or other late developing complications. There may also be variations in the outcome of patients postoperatively that are related to differences in the techniques of surgery and other patient specific considerations.

To strengthen the evidence regarding the routine or selective use of prophylactic scrotal drains following repair of large inguinal hernias, further studies of this type are required.

CONCLUSION AND RECOMMENDATIONS

Repairing a massive inguinal hernia is technically demanding. Enhanced surgical dissection increases the potential for postoperative issues. Scrotal hematoma is of particular concern, as it negatively impacts patient satisfaction and recovery, and increases postoperative complications.

This work aids in the identification of postoperative scrotal hematoma and the possible role of prophylactic scrotal drain insertion. It is suggested that prophylactic drainage provides a means to control postoperative irritation and scrotal swelling and hematoma by allowing the evacuation of blood and serum in the scrotal space.

Based on the research, it is possible that patients with large inguinoscrotal hernias who undergo extensive surgical dissection and pose a high risk for surgical postoperative complications may benefit from the use of prophylactic scrotal drains. Prophylactic scrotal drainage should not become an arbitrary surgical standard, but rather, be based on the intraoperative assessment of the patient and the complexity of the hernia.

The use of scrotal drains in this context is a valid adjunct to care. Excellent surgical technique, postoperative care, and control of bleeding will affect the surgical outcome to a greater degree.

Recommendations

The use of prophylactic scrotal drainage is advised for patients undergoing repairs of huge inguinal hernias, especially if the procedure involves significant scrotal dissection and the formation of large dead space.

- Scrotal drain insertion should be based on the assessment of the individual patient, and should not be a routine part of all inguinal hernia repairs.
- Surgeons should focus on maintaining precise surgical methods and applying effective hemostasis to prevent postoperative bleeding and formation of hematomas.
- Postoperative surveillance of patients after giant inguinal hernia repair should be aimed toward identifying and managing hematomas and seromas and other complications.
- To improve surgical practice, there should be an adoption of more formal recommendations on the limited application of prophylactic scrotal drains.

Future Research Directions

More research needs to be performed to understand the evidence surrounding the application of prophylactic scrotal drains in giant inguinal hernia repair. Subsequent research should be aimed at:

- Conducting studies at multiple centers and larger studies to better design and understand the rest of the research.
- Focused, randomized studies that understand the differences in the outcomes of drain placement.
- Understand the impact that placement may have on the quality of life and satisfaction of the patients as well as the pain that may be experienced and the recurrence of the hernia.
- Understand the purpose, appropriate timing and the type of drain that may offer the least amount of complications after a procedure.
- Understand what the surgical factors and patient population may be that would experience the most benefit.

Once the studies of the evidence are performed and palliative measures are focused on, it may be possible to better define prophylactic measures and improve the postoperative experience of patients who have giant inguinal hernia repairs.

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