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A modified Lichtenstein technique in the management of female groin hernia: A pilot study

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Abstract

AIM: Femoral hernia is associated with a higher complication risk compared to inguinal hernia. Most groin hernia research studies today are performed on men. The Lichtenstein technique is a well-studied, safe, and widely used method in men, but not recommended in women, where the recommended approach is either endoscopic or an open preperitoneal technique.

MATERIALS AND METHODS: A case–control pilot study was performed on adult women with groin hernia repaired using a modified Lichtenstein (ML) technique. The technique is the same as the original Lichtenstein method, with the addition of an incision in the posterior wall of the inguinal canal. If a femoral hernia or weakening is found, a mesh flap is applied to cover the femoral orifice. The primary outcome was perioperative complications, and the secondary outcome was long-term complications.

RESULTS: In this pilot study, 48 women were operated with the ML technique. Only minor perioperative complications were seen, and no serious adverse events occurred. The complications were transient, and no unplanned hospital admission was necessary. No recurrent hernias occurred during the follow-up period, only a few women were dissatisfied with the procedure, and even less reported persisting pain.

CONCLUSION: This ML technique could be an alternative method for female groin hernia repair. This pilot study paves the way for further research and development of this method, which eventually could be used in resource-limited settings or where the surgeon is not specialized in hernia repair.

Keywords:

Female groin hernia, mesh repair, modified Lichtenstein technique

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Introduction

A case–control pilot study was conducted on adult women with groin hernia repaired using a modified Lichtenstein (ML) technique. The technique is the same as the original Lichtenstein method, with the addition of an incision in the posterior wall of the inguinal canal. If a femoral hernia or weakening is found, a mesh flap is applied to cover the femoral orifice. No recurrent hernias occurred during the follow-up period, and only a few women were dissatisfied with the procedure. The technique could be an alternative method for female groin hernia repair.

Background

Groin hernia is a common disorder worldwide, with more than 20 million repairs performed each year.[1] Anatomical differences are probably the reason why men are affected by groin hernias at a rate 8–10 times higher compared to women.[2-4] However, femoral hernias are more common in women and are associated with a substantial higher risk for incarceration and bowel strangulation. Therefore, emergency hernia repair in women is 17% compared to 5% in men.[5-7]

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Past and present research on groin hernia surgery has mostly focused on men, and there is a paucity of scientific evidence regarding best practices in women.[3,7,8] The risk for recurrent femoral hernia after open anterior groin hernia repair (with or without mesh) is greater in women than in men.[3] Since the open anterior approach does not always reveal a femoral hernia, it is likely that a femoral hernia is overlooked at the primary operation, leading to the recurrence.[7,9-11] The reason why a femoral hernia is easily missed is because there is no access to the preperitoneal space with the usual approach, and exploration of the femoral canal cannot be performed.[3,8] For this reason, an endoscopic or, in some cases, an open preperitoneal method is recommended for female groin hernia repair.[3,8,11]

The open anterior mesh repair (Lichtenstein) is the most studied and commonly used technique and has a short learning curve.[3,11] Open posterior and endoscopic methods have long learning curves and require a higher level of surgical skill. Approximately 100 teaching procedures are needed for an inexperienced surgeon to achieve recurrence rates as low as with the open anterior approach.[3,12-14]

Compared to the above-mentioned methods, an ML technique approach that provides access to all potential hernia sites could be a simpler alternative with a shorter learning curve, even for surgeons who are not specialized in hernia surgery. The modified method was developed at the Lichtenstein clinic but, to our knowledge, no study has ever been presented or published on its application.[15] The technique is simple and inexpensive and could be a valuable alternative in resource-limited settings, and endoscopic equipment is not available.

This pilot study is based on the results of a local quality assessment project in which the ML repair technique was used in women with groin hernia between May 2018 and May 2023. The outcomes studied were occurrence of any serious adverse events; perioperative complications; persisting groin pain; patient satisfaction; and reoperation for recurrence. The hypothesis was that ML repair is a safe and easy-to-perform alternative to endoscopic or open preperitoneal techniques in the management of female groin hernia.

Materials and Methods

In this case-descriptive controlled pilot study, adult women with groin hernia were operated on using the ML technique and included in the study. The patients were followed-up with a retrospective review of medical records and answers to a questionnaire sent to the patients based on the inguinal pain questionnaire (IPQ), a validated tool for postoperative follow-up of patients after groin hernia repair.[16]

The modified Lichtenstein technique

The repair is the same as the original Lichtenstein method[15] but with the following modifications:

After careful resection of the posterior wall (transversalis fascia) of the inguinal canal, an approximately 3-cm incision is made from the pubic tubercle laterally along the tractus ileopubicus parallel to the inguinal ligament [Figure 1].

This gives access to the preperitoneal space and the femoral canal. If there is a femoral hernia or weakening, it can be inspected and palpated above Cooper's ligament. If found, the hernia can be reduced and invaginated under direct vision [Figure 2].

The mesh is then fashioned at the lower edge to create a flap that can be extended to cover the femoral canal. The size of the flap is approximately 4 cm long and 3 cm

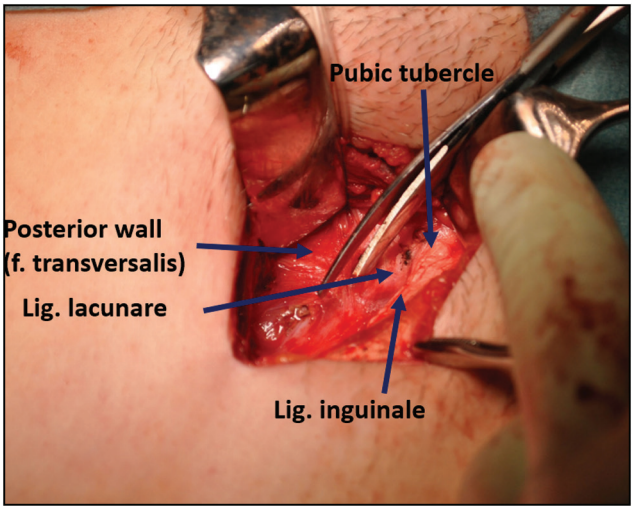

Figure 1: Anatomy of the inguinal floor

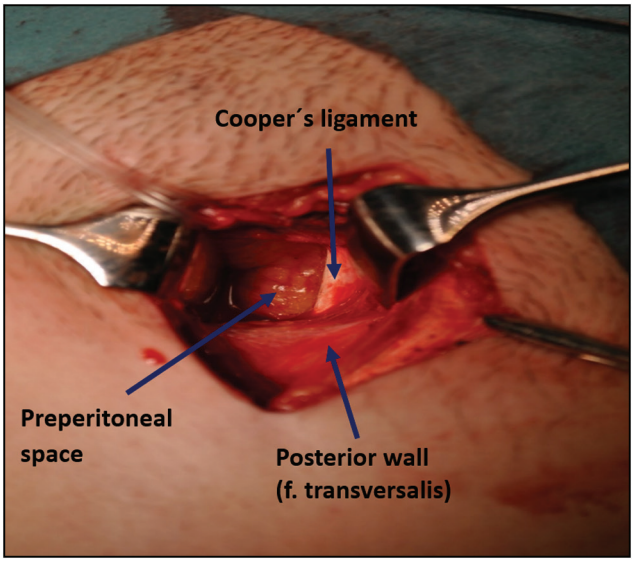

Figure 2: Preperitoneal space and the femoral canal above Cooper's ligament

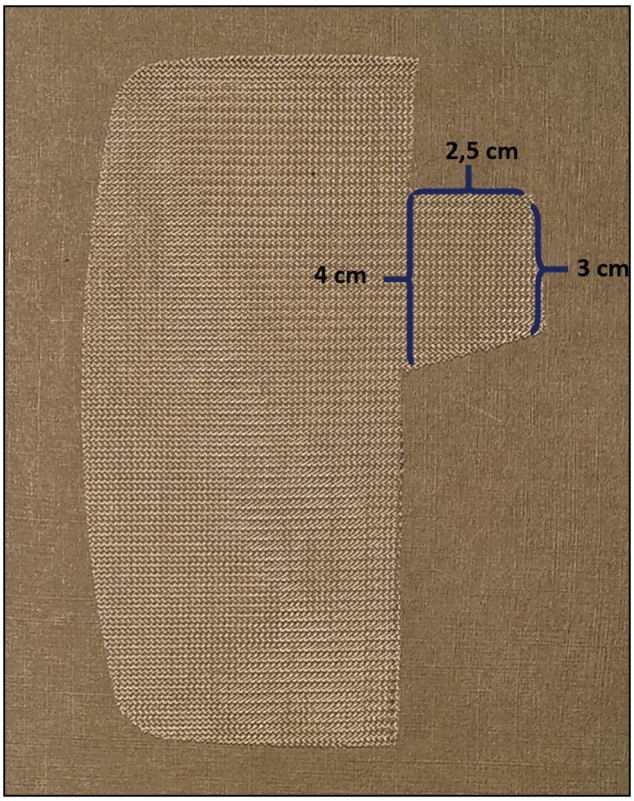

Figure 3: Mesh with a flap sutured to Cooper's ligament to cover the femoral canal

wide. The lower part of this flap is then fixed to Cooper's ligament with two non-absorbable 2.0 polypropylene sutures, one medially beside the pubic tubercle and one more laterally but at a safe distance from the femoral vessels [Figure 3].

The incision in the posterior wall is now closed by suturing the transversalis fascia to the mesh, that is, the upper part of the flap, followed by the final steps of the normal anterior mesh repair according to Lichtenstein.

Selection of participants

Inclusion criteria: Women 15 years and older operated with the ML technique for primary or recurrent groin hernia between May 1, 2018, and May 1, 2023.

Outcomes

Primary outcomes for this pilot study were perioperative complications (defined as any adverse event, bleeding requiring surgical intervention, infection needing treatment, or reoperation). Secondary outcomes were long-term complications such as persisting pain, patient dissatisfaction, and reoperation for recurrent hernia in the operated groin.

Follow-up

Medical records were reviewed to find postoperative complications, unplanned hospital admission, revision surgery, or if the patient had sought medical care with symptoms originating from the operated groin.

Six months or later after surgery, a short follow-up PROM-questionnaire was sent to all patients. If no answer was received, a reminder was sent. The questionnaire comprised two questions.

The first question, "Grade the worst pain you have felt in the operated groin during the past week," was extracted from the IPQ. Patients were asked to grade any pain on a 7-point scale where "1" is pain-free and "7" is pain severe enough to seek immediate care. A score of 3 or less was categorized as no troublesome pain and 4–7 as persisting pain.

The second question, "Grade your overall satisfaction with your surgery on a scale from 1 to 4," was designed to examine patient satisfaction after surgery. This was answered by the patient on a 4-point scale where "1" = completely satisfied and "4" not satisfied with the operation at all. The cut-off was set at 3 or higher so that 1–2 = satisfied and 3–4 = dissatisfied.

Statistical analyses

The occurrence of adverse events and postoperative complications were registered as "yes" or "no." The results from the self-assessment questionnaires regarding persisting postoperative pain and patient satisfaction were registered as a value corresponding to that reported by the patient.

The sample size was too small to draw any statistically significant conclusions from the frequency of each of the above-mentioned adverse events or postoperative complications. Therefore, the frequencies of these are presented descriptively as numbers and per cent.

Data were analyzed using Microsoft Excel (office 365) version 16.42.

Ethical considerations

This pilot study was approved by the head of the Department of Surgery at Östersund hospital. Participants, baseline characteristics, and study results are coded and are presented in a non-identifiable fashion. The code key has been stored separately from all other research material.

Before the start of this pilot study, ethical approval was obtained from Mildmay Uganda Research and Ethics Committee and the Uganda National Council of Science and Technology for a larger randomized study, where this modified technique was planned to be compared with Lichtenstein's original technique. The IPQ used has been ethically approved in previous studies.

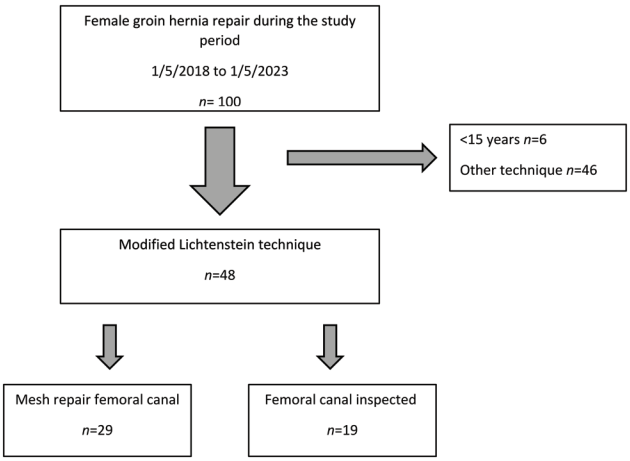

Figure 4: Study population (flow chart)

Clinical trial registry

No clinical trials were involved as it is only a pilot study.

Results

Forty-eight women over the age of 15 were included in this pilot study. They all underwent surgery for groin hernia between May 1, 2018, and May 1, 2023. Their condition was classified according to the International Statistical Classification of Diseases and Related Health Problems (ICD) with codes K40.0 to K41.9. Eight women had an isolated femoral or a combined femoral/lateral groin hernia confirmed during surgery. Another 22 had an anatomy inducive to femoral hernia. The ML method was performed in 29 women. In the remaining 19 (lateral, medial, or a combined lateral/medial hernia), control of the femoral space after incision of the inguinal floor showed no likelihood of development of a femoral hernia. In these, a mesh flap was not applied to the femoral canal; instead, suture of the incision of the inguinal floor and mesh applied were according to the Lichtenstein method. The study population (flow chart) is presented in Figure 4.

Baseline characteristics are presented in Table 1. The mean age of the cohort patients was close to 66 years (range 29–93). All patients were classified according to the American Society of Anesthesiologists (ASA-class) with a mean of 2 (range 1–4). The mean body mass index was 25.4 (range 17–35). Repair was performed as an emergency in nine patients suspected of having an incarcerated hernia. Thirteen patients were operated on under general anesthesia and the rest under local anesthesia. The reasons for choosing general anesthesia were emergency surgery, expected complex procedure, or patient request. The mean operating time (skin to skin) was 83 min (range 47–158). IPQ follow-up was conducted after a minimum of 6 months following surgery (range 6–37). Review of the medical records was made to examine if and why patients had sought medical care regarding symptoms in the groin following their hernia repair.

Table 1: Baseline characteristics

Patients	*n* = 48
Age, years (range)	65.7 (29–93)
ASA-classification (range)	*n* = 36 (1–2)
	n = 12 (3–4)
Body mass index, mean value (range)	25.4 (17–35)*
Current smoker (%)	*n* = 5 (10.4)
Emergency surgery (%)	*n* = 9 (18.8)
Anesthesia (%)	Local *n* = 35 (72.9)
	General *n* = 13 (27.1)
	Regional *n* = 0 (0)
Operation time, min, mean value (range)	82.2 (47–158)
Inguinal pain questionnaire (IPQ), return rate (%)	*n* = 40 (83.3)
Follow-up time IPQ, months, range	6–37
Hernia anatomy (%)	Lateral *n* = 30 (62.5)
	Medial *n* = 8 (16.7)
	Femoral *n* = 4 (8.3)
	Lateral/femoral *n* = 4 (8.3)
	Lateral/medial *n* = 2 (4.2)

*Missing four values, no registration of weight and/or height.

Table 2: Peri- and postoperative outcomes

Serious adverse events*	*n* = 0
Intraoperative complications	*n* = 0
Postoperative complications, total	*n* = 3
Postop infection	*n* = 1
Seroma	*n* = 1
Infected hematoma requiring incision	*n* = 1
Unplanned hospital admission	*n* = 0
Recurrent hernia	*n* = 0
Persisting pain, inguinal pain questionnaire (IPQ) (%)	≥4 *n* = 4 (10)
	<4 *n* = 36 (90)
Patient satisfaction, IPQ (%)	≥3 *n* = 2 (5)
	<3 *n* = 38 (95)

*Urgent surgery required due to complication after primary surgery

Outcomes are presented in Table 2. There were no serious adverse events (defined as urgent surgery required due to complication after primary surgery). Three patients developed a postoperative complication (6.25%): one wound infection treated with antibiotics; one infected hematoma requiring incision (Day 9, no revision of the mesh repair needed as the infection was superficial); and one seroma where no intervention was needed. No unplanned hospital admission was necessary, and no reoperation for recurrence was registered. The response rate to the IPQ was 83.3% (40/48). Of the 40 patients who answered the IPQ, four reported persisting pain (10%), that is, a value of 4 or above on the 7-point scale. Two patients (5%) reported dissatisfaction with their surgery, posting 3 or higher on the 4-point scale.

Discussion

The specific aim of this pilot study was to evaluate the ML repair in the management of groin hernia in a

female patient cohort regarding safety, perioperative complications, persisting postoperative pain, recurrence, and patient satisfaction. Among the 48 women included, only minor surgical complications, no serious adverse events, and no recurrence were seen.

Research into groin hernia surgery today is mostly carried out on men, and there is little scientific support for best practice in women. International Guidelines recommend an endoscopic approach for groin hernia repair in women.[3] This technique has a long learning curve and requires expensive equipment rarely seen in resource-limited settings. The standardized Lichtenstein technique is known by most general surgeons, and the ML technique described in this study involves only a few extra steps that are easy to learn. The method covers all potential groin hernia sites and is preferably performed under local anesthesia. From the safety point of view, attention must be paid to the proximity of the femoral vessels when the mesh flap is sutured to the Cooper's ligament. It is a cost-effective method as the material and instruments necessary are widely available, and it can be performed in resource-limited settings.

We could not find any published study that examined the ML technique as described here. Other modifications have been published. Recently, a study by De Gols *et al*.[17] used a modified open technique where a piece of mesh is placed under the Lichtenstein mesh covering the femoral orifice. In a randomized controlled trial Wang *et al*. compared a modified Kugel technique with that of Lichtenstein supplemented by a mini-mesh that covers the femoral ring.[18] The modifications in these two trials are closely similar to the one performed in this study, with the difference being the separation of the meshes. Other methods have been tested such as the mesh plugs, or preperitoneal umbrella techniques with good results. However, these techniques deviate from the original Lichtenstein technique with which many surgeons are familiar.[19,20]

The study is limited by the small size of the cohort and the short-term follow-up. It is only a descriptive pilot study and was not compared with any other technique, and there was no control group. The operations were performed by few dedicated surgeons with good experience in hernia repair, which may mean that our results are not always fully applicable in the normal clinical setting. Only women were included in this pilot study, but we see no reason why it could not be used on men if a femoral hernia is suspected.

In conclusion, this small pilot study on female hernia repair using the ML technique showed it to be a safe, cost-effective, and easy-to-perform procedure. The apparent safety of the method has encouraged us to initiate a larger RCT.

Author contributions

AE, KB: Concept, study design, data gathering, manuscript writing, background research; FL: Manuscript writing; PN: Concept, study design, manuscript writing, background research.

Ethical policy and institutional review board statement

The study conformed to the principles outlined in the Declaration of Helsinki.

Declaration of patient consent

Patient approval was gathered via the IPQ form that was distributed to the study population.

Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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