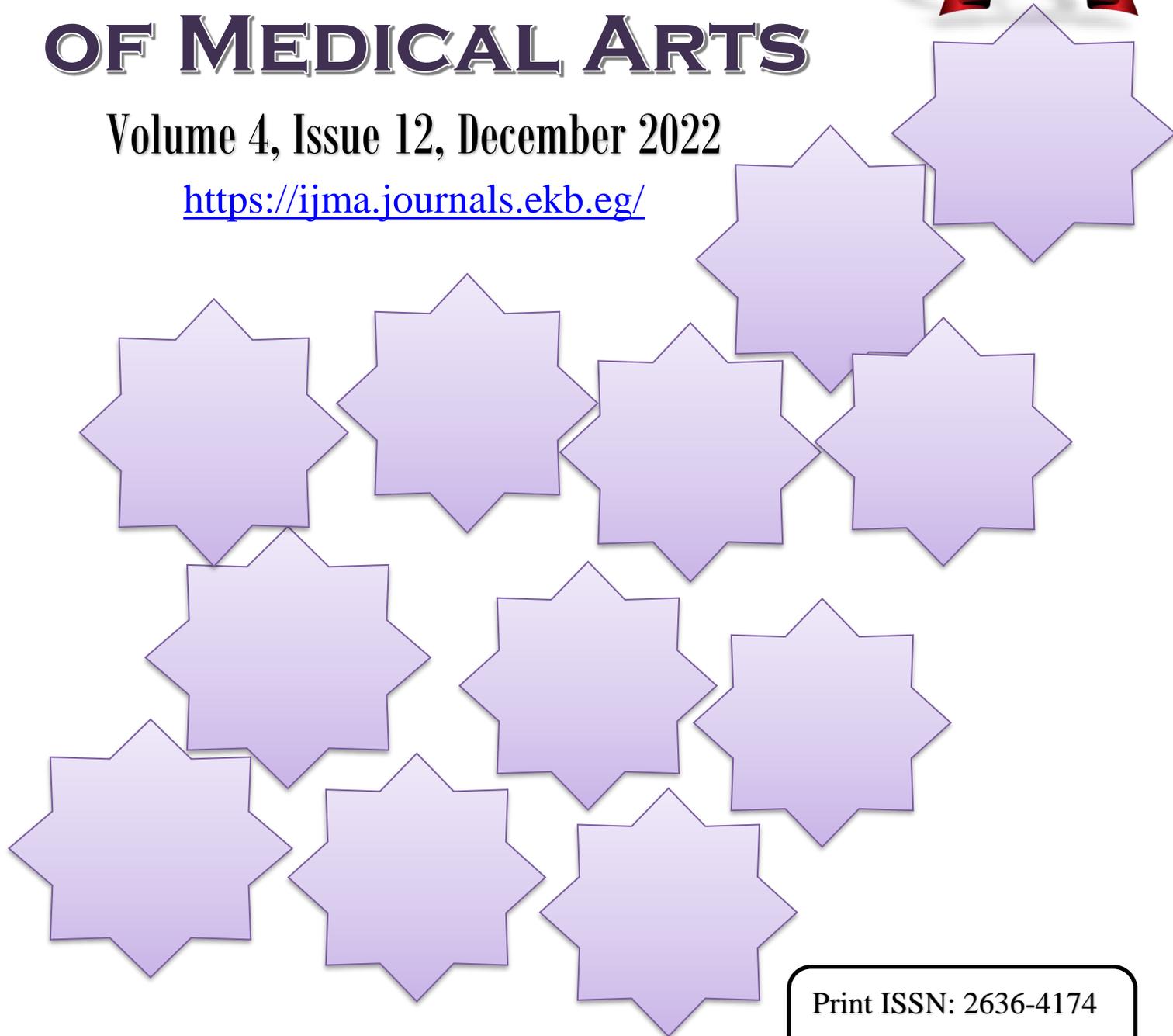


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Original Article

Comparative Study between Lichtenstein versus Lichtenstein Combined with Mesh Plug in Management of Inguinal Hernia

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ABSTRACT

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Background and Objective: Inguinal hernioplasty is an ordinary operation all over the world. Many types of repair are present. Aim of the surgeon is to improve the outcome and decrease the recurrence. We evaluated the addition of a mesh plug with the usual repair as a synergistic way to reduce the recurrence.

Patients and Methods: A clinical trial involved 200 inguinal hernia patients and was conducted in the General Surgery Department of the Faculty of medicine, Al-Azhar University, New Damietta. Patients were randomly divided into two equal groups; Group A: patients performed Onlay mesh hernioplasty surgery, whereas Group B patients performed combined Onlay-Plug mesh hernioplasty surgery. For six months, post-operative results in both groups were evaluated.

Results: Group [B] patients who had undergone combination Onlay-Plug mesh hernioplasty surgery have increased incidences of after-surgery pain, scrotal swelling, cord sensitivity, and infected wounds, revealing a significant difference in the two groups.

Conclusion: Adding mesh plug has no value. Onlay mesh is sufficient for the repair of inguinal hernioplasty.

Keywords: Hernioplasty; Lichtenstein repair; Mesh plug; Onlay mesh.



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INTRODUCTION

Hernias are abnormal appendages of the viscera [or portion of it] through a conventional or unconventional orifice, usually in the abdominal cavity. They are most usually observed in the crotch, incisions, or para-umbilical regions [1]. A changed ratio of type I over type III collagen has been linked to adult male inguinal hernias, according to morphologic and biochemical findings [2]. These alterations cause weakness in the fibro connective tissue and inguinal hernias to form in the groin. The need for artificial strengthening of the weak abdominal wall tissue was realized due to this process [3].

A complete hernia exits the inguinal tract through the superficial or external ring and into the scrotum, whereas an incomplete hernia is limited to the inguinal canal. In contrast to indirect hernias, which can also be complete, direct hernias always seem to be incomplete [4]. Any adult patient can undergo a Lichtenstein tension-free mesh repair, regardless of age, weight, overall health, or coexisting medical conditions [5].

In the Lichtenstein hernioplasty, the defect is covered by an artificial non-absorbable mesh patch. The mesh is sutured from the pubic tubercle to the superior aspect section above the internal inguinal ring with a non-absorbable monofilament suture. On the medial side, the mesh is linked to the aponeurotic tissue that lines the pubic tubercle. Continuing superiorly along on the transverses abdominis or fused tendon. The iliopubic tract is stitched to the inferolateral tip of the mesh [6].

In order to generate a new internal inguinal ring, an incision is formed, and the resulting tails are tied together around the spermatic cord. This method is termed the Onlay technique in this study.

In the Gilbert approach, a funnel-shaped occlusion of polypropylene mesh is used to seal a hernia after being introduced into the internal inguinal ring [7]. This plug is stitched to the surrounding structures and held in place with a mesh patch overlaid. This technique is known as Onlay plug repair.

Later, the plug and patch [Onlay + plug] method of hernia repair gained popularity [1].

THE AIM OF THE WORK

To Evaluate after-surgery results, including [recurrence, pain, scrotal swelling, cord sensitivity, and wound infection] between the Onlay and mixed Onlay-Plug techniques for mesh inguinal hernia repair to assess if there is any advantage of adding a plug to Onlay technique.

PATIENTS AND METHODS

A total of 200 inguinal hernia patients were evaluated in this exploratory clinical trial comparing the two most common repair methods from December 2020 to June 2022, at the Department of General Surgery, Faculty of Medicine Al-Azhar University, New Damietta.

Inclusion criteria: Inguinal hernia patients over the age of 18, with unilateral indirect, direct Type. Patients were split into two equally sized groups, Groups A and B. One hundred patients by computer-generated randomization.

Exclusion criteria: bilateral inguinal hernia, recurrent or complicated hernia, Patients unfit for anesthesia or surgery. Patient refusal.

The following procedures were applied to all patients: complete history collection, pre-operative anesthesia assessment, and post-operative monitoring. Both groups employed the same mesh and suture materials. Evaluation of outpatient clinical information, release status, surgical, and lab results. All patients received their releases 24 hours after surgery and six months follow-up.

Operative Assessment

In Group A, patients had the Onlay technique of Lichtenstein tension-free hernia repair, in which a film of prolene mesh was secured to the inguinal ligament and anterior rectus membrane to strengthen the floor of the inguinal canal [figure 1].

Group B patients underwent a Plug/Inlay method, in which a cone-shaped patch of prolene mesh was inserted into the defect and secured to the remaining part of the ligated sac using a vicryl suture or to the border of the defect in cases with direct inguinal hernia [figure 2]. A double mesh repair is accomplished by placing a piece of an Onlay mesh piece over the inguinal floor.

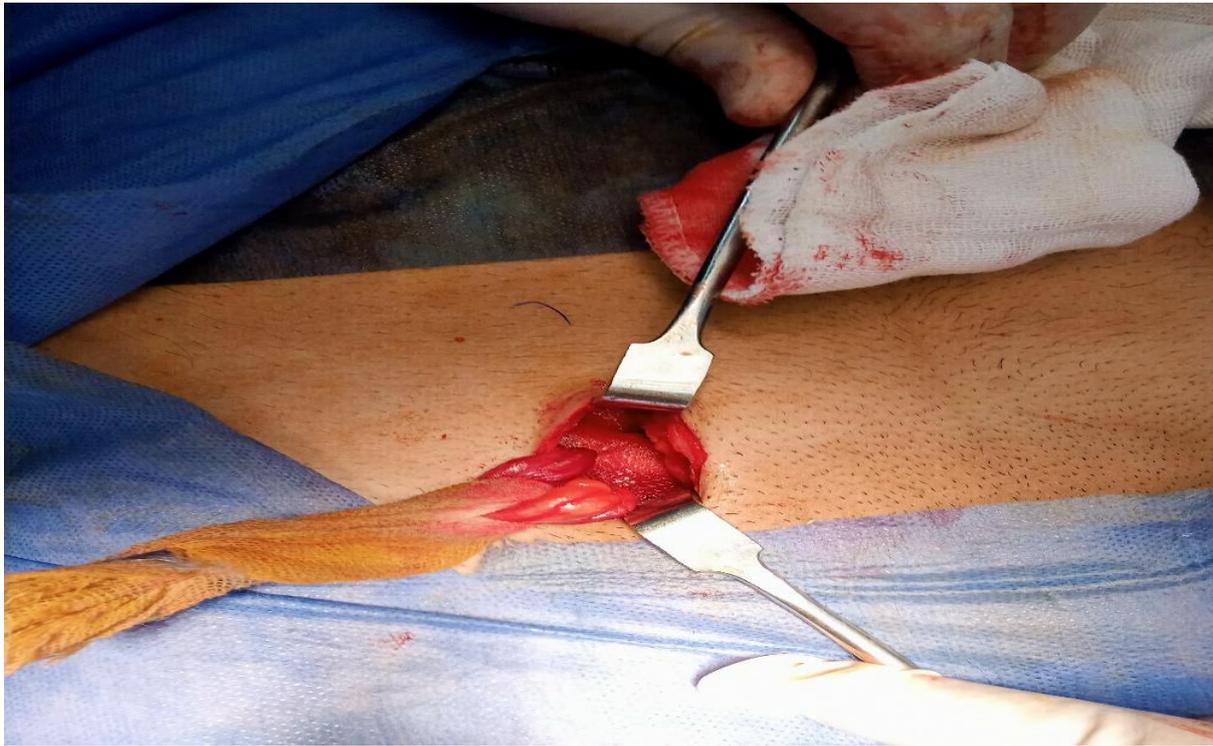


Figure [1]: Onlay mesh repair



Figure [2]: Mesh-plug repair

RESULTS

Demographic data, including age, sex, diagnostic modality, and types of hernia, were noted in both groups [Table 1].

Group A had an average VAS of 4.46 on day one, and Group B had an average VAS of 5.12,

but by day 7, Group A had an average VAS of 3.11, and Group B had an average VAS of 3.90. Pain assessed using a visual analog scale [VAS] at 1, 3, and 6 months post-op also differed significantly between the two groups. The duration of post-operative pain was greater in Group B patients who had performed paired Onlay with Inlay mesh hernioplasty.

Table [1]: Demographic and clinical characteristics

		Group A [n=100] [Onlay technique]	Group B [n=100] [Onlay +mesh plug] technique	P value
Age	Mean	34.3	33.8	0.56
	Range	18-54	19-53	
Sex	Male	86 [86%]	83 [83%]	0.69
	Female	14 [14%]	17 [17%]	

Table [2]: Surgical outcome

		Group A	Group B	P value
Average surgery time [minute]		32.8 [30-60 min]	35.02 [35-60 min]	0.03
Mean pain score [VAS; 0-10].	24 hours	4.4	5.1	0.03
	One week	3.1	3.9	0.04
	One month	0.13	0	0.01
	Three months	0.01	0.11	0
	Six months	0	0.18	0
Scrotal edema		9 [9%]	26 [26%]	0.000
Seroma		0	0	0
Recurrence		0	0	1.000
Cord tenderness		0	7	0.014

DISCUSSION

The primary objectives of inguinal hernia repair are sac excision, reduced contents reductions, and defect closure. Decreasing the recurrence is also very important. Tension at the stitching area is a significant reason for relapse. Artificial mesh has made it possible to treat hernias without significantly changing the patient's anatomy or creating unnecessary tension [8].

When persistent pain in the groin continues over three months following surgery and causes significant impairment, we call it chronic pain. The ilioinguinal nerve may have been torn or sutured to the mesh during the inguinal hernioplasty procedure [8].

Paresthesia, hypoesthesia, and hyperesthesia are all symptoms along the sensory region of the damaged nerve. The intestine could be the origin of the patient visceral pain. Mesh implantation has the potential to cause tissue degradation in the preperitoneal area. Other urogenital disorders may also play a role in the development of visceral pain, such as dysuria, painful ejaculation condition, and erectile dysfunction [8].

As a last resort, surgery [mesh removal, reoperation for recurrence, and neurectomy] may be performed. Other treatments include waiting it out, medications, local anesthesia, sensory stimulation, and nerve ablation. Therefore, chronic pain needs to be properly evaluated and controlled because of the impact

it has on mobility, productivity, rest, social interactions, and mental health. We found a statistically significant difference between the groups when we compared VAS scores for pain on post-operative day one and day seven.

Group A had an average VAS of 4.46 on day one, and Group B had an average VAS of 5.12, but by day 7, Group A had an average VAS of 3.11, and Group B had an average VAS of 3.90. Pain assessed using a visual analog scale [VAS] at 1, 3, and 6 months post-op also differed significantly between the two groups. Our data showed that the duration of post-operative pain/chronic inguinodynia was greater in Group B patients who had performed paired Onlay with Inlay mesh hernioplasty. Meanwhile, post-operative pain complaints were 4% of patients in the plug and patch group and 8% of patients in Lichtenstein's group [9, 10].

Seroma is a collection of clear serous fluid [filtered blood plasma], This is composed of blood plasma that has seeped out of ruptured small blood vessels and the inflammatory fluid produced by injured and dying [10]. Typically observed 7-10 days after surgery and displayed as a variable mass. It can be related to a local inflammatory reaction towards mechanical injury imposed by tissue dissection during surgery, foreign bodies like mesh prostheses and sutures, and a wide dissection causing a larger dead space. In most cases, seromas will heal on their own within a couple of weeks. Sometimes, aspiration may be necessary for bigger seromas [11].

Post-operative seroma development can be avoided by performing minimal tissue incisions and avoiding dead space formation. Seromas are not considered concerns unless they last longer than six weeks, show signs of continued growth, or cause noticeable symptoms [12]. We found no cases of seroma among our study participants. **Sreedhar et al.** [13] found that one case [3.33%] of seroma required management via aspiration and evacuation, followed by compression.

It is unusual for an open inguinal surgical site to get an infection. Infections caused by mesh have a documented incidence of between 1% and 8%, based on the series examined. Determining whether the infection has spread beyond the superficial incision layer or has only affected the mesh implant is a challenge that must be met [14]. In most cases, oral drugs, scrotal support, and rest are all that are needed to treat it effectively. Multiple theories have been proposed for this phenomenon, including traumatic vascular disruption, and inguinoscrotal hernia repair, resulting scrotal cavity filled with exudative fluids [15].

Immediately following hernia repair surgery, most infections can be managed with vigorous antibiotic treatment if the wound is opened and drained as soon as possible. Patient diet, smoking history, and persistent cough are all factors of general issues. Hernia size, cremaster muscle and hernia sac incision, untreated hernias, and inadequate mesh implantation all have a role in the specific factors [16, 17].

A post-operative infection of the groin hernia that includes a mesh prosthetic is distinguished by the fact that it typically does not manifest for a long period of time post-operation, between two weeks and three years. Staphylococcus species, gram-negative bacteria [mostly Enterobacteriaceae], and anaerobic bacteria are the most prevalent types of infectious agents that can cause mesh infections. Our research found that SSI affected 2.0% of the individuals in Group B. Both patients reported continuing groin pain when they came to see us in our outpatient department six months following their surgeries. We carried out an ultrasonographic examination, which revealed the presence of a sinus tract in both cases, which originated deep from the location of the inlay mesh. Wound infection was found in four patients [4%] who had Lichtenstein repair and four patients [4%] who had plug and patch repair. It was treated with antiseptic dressing in

addition to oral antibiotics and anti-inflammatory medicines, which gave satisfying results. **Hatada et al.** [14] documented a patient who developed a prosthetic infection three months after undergoing mesh-plug inguinal hernioplasty repair. The patient underwent sinus tract excision and excision of the infected mesh. Scrotal edema is a prevalent complication of open hernioplasty repair.

If the spermatic cord is dissected too profoundly, the pampiniform plexus delicate veins and the testicular artery may be injured. Hernias with bigger sacs require more incision for spermatic cord skeletonization, which can cause scrotal edema [18]. In situations with whole sac inguinoscrotal hernia, the sac should separate from the whole spermatic cord, beginning at the base of the scrotum and progressing all the way to the internal ring, increasing the risk of scrotal hemorrhage and edema. In our study, 10% of Group A individuals and 26% of group B participants experienced scrotal edema. This may be because of increased tissue handling and trauma risk while putting inlay mesh for either indirect or direct hernia repair [18]. However, by day seven after surgery, scrotal edema had subsided to a similar degree in both groups. Exclusion of the cremasteric muscle layer, cord movement, disectomy or ablation of the hernia sac, stitching of the inguinal floor, or specifically placing of an inlay mesh [plug] may all cause injury to the inguinal segment of the genital branch of the genitofemoral nerve, resulting in significant post-operative cord tenderness [19]. Seven percent of group B participants reported pain along the spermatic cord radiating to the testes and occasionally rigid. On physical examination, spermatic cord tenderness was evoked. This kind of groin discomfort pain may be due to the pressing of tissues around the spermatic cord by scar tissue or prosthetic material [20].

The inguinal hernia can reoccur for various reasons, both general and specific. Tough handling, pressure release method, and stitch material all have a role in surgical procedures [20].

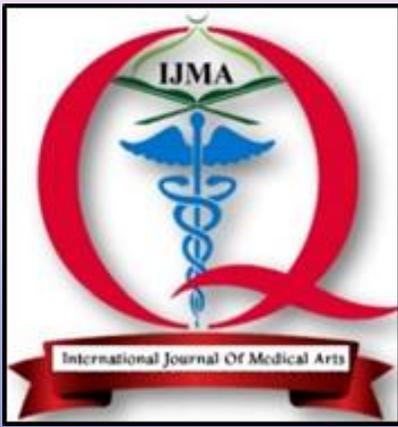
In this study, no recurrence has occurred.

Conclusion: Adding a mesh plug has no value. In addition to, Onlay mesh is sufficient for the repair of inguinal hernioplasty.

Conflict of Interest and Financial Disclosure: None.

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