An Overview of Complications of Inguinal Hernia Management

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Abstract

Background: Hernia is a protrusion of a viscous or part of a viscous through an abnormal opening in the walls of its containing cavity. Inguinal hernia is a frequent case to come across in the outpatient clinic as well as in emergency. Because of its frequency, it remains a common, yet an important medical problem. Male gender and the old age are the commonest etiological factors of groin hernia. Desarda technique is emerging suture-based procedure. This procedure is the tension-free, mesh-free, and pays attention to surgical physiology of the inguinal canal. The data available to assess the outcome of this technique is less due to centers conventionally using old and reliable techniques. Lichtenstein repair is the most commonly performed operation in the developed world. Lichtenstein mesh repair, however, has its own shortcomings that include its initial cost, nonavailability in many parts of the developing world, tendency to fold or wrinkle, and chronic groin sepsis that requires mesh removal. Because of the observed complications and postoperative dysfunctions, many investigators look for new hernia repair. An example of such effort is the Desarda method, which was presented in 2001 and became a new surgical option for tissue-based groin hernia repair.

Keywords: Inguinal Hernia, Desarda Repair

Background

A hernia is defined as an abnormal protrusion of an organ or tissue through a defect in its surrounding walls. Although a hernia can occur at various sites of the body, these defects most commonly involve the abdominal wall, particularly the inguinal region. Abdominal wall hernias occur only at sites at which the aponeurosis and fascia are not covered by striated muscle. These sites most commonly include the inguinal, femoral, and umbilical areas; linea Alba; lower portion of the semilunar line; and sites of prior incisions (1).

Most abdominal herniation arises in the groin, because it is the transition zone between the abdomen and thigh. the opening in the lower abdominal wall, bounded by the transversus abdominis arch and superior pubic ramus. It allows the passage of blood vessels, nerves, lymphatics, muscle, tendons, fascia and the vas deference in and cut of the hind limb and scrotum. The upper and lower halves are divided by the inguinal ligament. Inguinal protrusions present anteriorly; femoral posteriorly (2).

Hernias are a common problem; however, their true incidence is unknown. It is estimated that 5% of the population will develop an abdominal wall hernia, but the prevalence may be even higher. About 75% of all hernias occur in the inguinal region. Two thirds of these are indirect and the remainder are direct inguinal hernias. Men are 25 times more likely to have a groin hernia than women. An indirect inguinal hernia is the most common hernia, regardless of gender. In men, indirect hernias predominate over direct hernias at a ratio of 2:1. Indirect hernias are by far the most common type of hernia in women (3).

Management of Inguinal Hernia
Open Repair of Hernia:
It is safe to recommend no active treatment in cases of early, asymptomatic, direct hernia, particularly in elderly patients who do not wish surgical intervention. These patients should be warned to seek early advice if the hernia increases in size or becomes symptomatic. Surgical trusses are not recommended but may be required for occasional patients who refuse any form of surgical intervention. Elective surgery for inguinal hernia is a common and simple operation. It can be undertaken under local, regional or general anesthesia with minimal risk even in high-risk patients (4).

**Bassini Repair:**

1- Narrowing of internal ring (from medial side as this increase distance between internal & external ring = increase the canal obliquity which is an anti-hernial factor
2- Plication of fascia transversalis (interrupted sutures).
3- The conjoint tendon is sutured to the inguinal ligament behind the cord by non-absorbable prolene interrupted sutures.
4- Close the external oblique aponeurosis one layer in front of the cord.
5- Tanner’s releasing incision is a 5 cm incision in rectus sheath starts at the pubic crest to 2 cm from lateral edge of rectus abdominions muscle which can relief tension on conjoint tendon if present due to Bassini’s repair (5).

**Shouldice Repair:**

- Fascia transversalis is incised along the length of the canal starting from the internal ring to the pubic tubercle.
- Double breasting of the fascia transversalis behind the cord.
- suturing of the conjoint tendon to the inguinal ligament behind the cord.
- suturing of the external oblique aponeurosis in front of the cord (5).

**Preperitoneal (Stoppa) repair:**
The Stoppa repair is also known as Great Prosthesis for Reinforcement of the Visceral Sac. This technique was presented by Stoppa. The procedure is performed through a sub-umbilical incision. The dissection is carried out in front of the bladder and the sides laterally. The technique was initially developed for the repair of bilateral hernias, since the mesh covers both sides with all three hernia orifices. When the preperitoneal space is carefully dissected a large mesh is inserted. The mesh should have a width equal to the distance between the anterior superior iliac spines minus 2 cm and the height of the mesh should be equal to the distance between the pubis and the umbilicus. The mesh is fixated with one absorbable suture to the inferior border of the umbilical fascia (6).

**Lichtenstein Tension-Free Repair:**

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The Lichtenstein technique expands the domain of the inguinal canal by reinforcing the inguinal floor with a prosthetic mesh, thereby minimizing tension in the repair. Initial exposure and mobilization of cord structures is identical to other open approaches. The inguinal canal is dissected to expose the shelving edge of the inguinal ligament, the pubic tubercle, and sufficient area for mesh. The mesh is a 6 × 11 cm rectangle with a rounded medial edge, and it must be large enough to extend 2 to 3 cm superior to Hesselbach’s triangle (7).

The lateral portion of the mesh is split such that the superior tail comprises two thirds of its width, and the inferior tail comprises the remaining one third. The medial edge of the mesh is fixed to the anterior rectus sheath such that it overlaps the pubic tubercle by 1.5 to 2 cm. This refinement to the original Lichtenstein technique minimizes medial recurrence (7).

For fixation of the inferior margin of the mesh, a permanent, synthetic, monofilament suture is used, placing sutures directly into the periosteum of the pubic tubercle. Fixation is continued along the shelving edge of the inguinal ligament from medial to lateral, ending at the internal ring. The upper tail of the mesh is then fixed to the internal oblique aponeurosis and the medial edge to the rectus sheath using a synthetic, absorbable suture (7). (fig. 1).

![Figure 1](image1.png)

**Figure (1)** Lichtenstein tension-free hernioplasty. m. = muscle; n. = nerve; v. = vein (8)

**Desarda repair:**
Desarda technique is emerging suture-based procedure. This procedure is the tension-free, mesh-free, and pays attention to surgical physiology of the inguinal canal (9).

Desarda and Ghosh suggested that, this repair method achieves the principle of “no-tension” presented by Lichtenstein. The strip is moved from the anterior to the posterior wall of the inguinal canal without tension on the posterior wall. The concept of an undetached, movable aponeurotic strip that “physiologically” enforces the posterior wall of the inguinal canal is original and interesting. The expenses of inguinal hernia management are not insignificant, especially in developing countries in Asia or Africa. A great advantage of Desarda’s technique is its low cost (9).
Mitura and Romanczuk (27) reported that with 6-month follow up of the Desarda technique, recurrence of inguinal hernia was not observed. Roy et al. (27) observed the outcome of inguinal hernia repair by Desarda method as an alternative to most popular Lichtenstein repair in 184 cases. Out of them, 12 cases had postoperative complications, particularly as 7 cases had developed wound infection, seroma was in 3 cases and hematoma in 2 cases. Furthermore, they reported that one patient had developed recurrent inguinal hernia. They concluded that the technique has the potential to enlarge the number of tissue-based methods available to treat groin hernias.

The most evident indications for use of the Desarda technique include use in young patients, in the presence of financial constraints, or if a patient disagrees with the use of mesh (10).

Post-operative complications

The most common complications of inguinal hernia repair include bleeding, seroma, wound infection, urinary retention, ileus, and injury to adjacent structures. Complications specific to herniorrhaphy and hernioplasty include hernia recurrence, chronic inguinal and pubic pain, and injury to the spermatic cord or testis (11).

1- Surgical Site Infection:

Inguinal hernia repair is considered a clean procedure, and the incidence of surgical site infection after repair should be low. Infection of the wound after hernia repair is a relevant complication that might induce significant morbidity and treatment costs and compromise the repair at longer term. There is a correlation to the degree of wound contamination during surgery, stratified as described by the Centers for Disease Control and Prevention (CDC) classification of wound contamination: clean/clean-contaminated/ contaminated/ dirty (12).

Superficial infection after inguinal hernia repair typically occurs within the first 30 days after surgery and often can be treated with simple drainage and antibiotic therapy. Deep surgical site infection involving the fascia and the implant may present late. Treatment is thus individualized based on patient factors and surgical judgement and may include antibiotic therapy, exploration and removal of the mesh with primary tissue repair as needed, limited exploration with excision of sinus tract and partial mesh or suture removal, and percutaneous drainage (13).

2- Nerve Injuries and Chronic Pain Syndromes:

Chronic post herniorrhaphy inguinal pain (CPIP) is the most common severe complication following modern inguinal hernia repair. CPIP is defined as pain that develops following inguinal hernia repair and lasts more than 3 months with other causes of pain excluded. The risk of developing moderate to severe chronic pain following inguinal hernia repair is 10–12% (14).

Evaluation of the patient with chronic inguinodynia requires close attention to symptoms and physical exam to try to discern the likely source of their pain. Many patients present with mixed symptomatology which clouds the clinical picture. Neuropathic, nociceptive (inflammatory non-neuropathic), somatic, and visceral pain are all commonly seen in post herniorrhaphy patients (15).

3- Cord and Testes Injury:

a. Testicular Complications

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Testicular complications include pain, ischemic orchitis, and testicular atrophy. Orchitis is the likely cause of pain and it may progress to testicular atrophy. Orchitis usually manifests within 24–72 h from surgery. It is associated with painful swelling of the testicle which is firm and unyielding and it may be associated with a low-grade fever (16).

Pain is usually severe and may last for up to 6 weeks after surgery. Ischemia is usually due to thrombosis of the spermatic cord venous plexus from vigorous dissection of the hernia sac, although placement of mesh is also associated with inflammation and scarring which may compromise vascular flow to and from the testicle. Testicular pain is usually transient and responds to scrotal elevation, scrotal support and analgesia (17).

b. Infertility:

The incidence of infertility is 0.3–5% after inguinal hernia surgery. Infertility as a result of inguinal hernia repair usually occurs from damage to the reproductive organs at the time of the repair. Because of the limited surgical treatment options for male infertility, detailed informed consent about the possibility of infertility after inguinal hernia repair should be conducted and the necessary care taken to protect the vas deferens during surgery (18).

c. Hydrocele:

Post-hernioplasty hydrocele occurs through disruption of lymphatics around the spermatic cord. This postoperative complication has an occurrence rate of 3–33%. Hydroceles have been reported as postoperative complications for inguinal herniotomies (IH), The hydrocele that results from an IH typically resolves without further treatment, Prevention of a postoperative hydrocele from IH is carried out by careful incisions during surgery. For example, fine dissection of fat along the spermatic cord and careful ligatures of lymphatics are some methods for prevention (19).

4- Hernia Recurrence:

In many cases of recurrent hernias require the use of prosthetic mesh for successful repair. Choosing a different approach (usually posterior) avoids dissection through scar tissue, improves visualization of the defect and reduction of the hernia, and decreases the incidence of complications, particularly ischemic orchitis and injury to the ilioinguinal nerve (20).

5- Mesh complications:

Mesh infections typically present with local erythema, tenderness, swelling, and warmth of the abdominal wall around the infected mesh. Generalized manifestations, such as pain, fever, malaise, chills, or rigors, are experienced by some patients. Chronic mesh infections can present with a discharging sinus, enterocutaneous fistula, and visible mesh (21).

6- Urinary Retention:

Risk factors for retention include age > 60, history of benign prostatic hyperplasia, anesthesia time exceeding 2 h, and excessive intravenous fluid therapy during the operation. Limited use of intravenous fluids during the operation, not fixing the mesh using tacks and making sure the patient’s urinary bladder has been emptied before undergoing general anesthesia are steps the surgeon can attempt to reduce the chance of postoperative urinary retention. In the case of urinary retention, one time catheterization to empty the bladder is sufficient in the majority of patients (22).

7- Ileus and Bowel Obstruction:
The laparoscopic trans abdominal approach is associated with a higher incidence of ileus than other modes of repair. This complication is self-limited; however, it necessitates sustained inpatient observation, intravenous fluid maintenance, and possibly nasogastric decompression. Abdominal imaging may be helpful to confirm the diagnosis and to exclude bowel obstruction. Prolonged absence of bowel function, in conjunction with a suspicious abdominal series, should raise concern for obstruction. In this case, CT of the abdomen is helpful to distinguish anatomic sites of obstruction, inflammation, and ischemia. In TAPP repairs, obstruction occurs most commonly secondary to herniation of bowel loops through peritoneal defects or large trocar insertion sites (23).

8- Seroma and Hematoma:
Seroma and hematoma are well-recognized complications following any type of hernia repair. Seroma has a reported incidence of 5–7 % after laparoscopic repair, while the incidence of hematoma is around 8 %. Hemostasis can help to reduce the incidence of postoperative hematoma. If seroma/hematoma develops postoperatively, observation is sufficient as it usually resolves with time. In some situations, hematoma might decompress through the trocar site, which can be uncomfortable for the patient. Those collections should not be aspirated or drained without obvious signs of infection (24).

9- Visceral and vascular Injury:
Small bowel, colon, and bladder are at risk for injury in laparoscopic hernia repair. The presence of intra-abdominal adhesions from previous surgeries may predispose to visceral injuries. Direct bowel injuries may also result from trocar placement. Bowel injury may also occur secondary to electrocautery and instrument trauma outside of the camera field. Missed bowel injuries are associated with increased mortality. If injury to the bowel is suspected, its entire length should be examined, and conversion to open repair may be necessary. Bladder injuries are less common than visceral injuries, and they are usually associated with perioperative bladder distention or extensive dissection of perivesical adhesions. As with bladder injuries encountered in open surgery, cystotomies must be repaired in several layers with 1 to 2 weeks of Foley catheter decompression. A confirmatory cystogram may be performed before catheter removal to confirm healing of the injury (25).

The most severe vascular injuries usually occur in iliac or femoral vessels, either by misplaced sutures in anterior repairs, or by trocar injury or direct dissection in laparoscopic repairs. The most injured vessels in laparoscopic hernia repair include the inferior epigastrics and external iliacs. If injured, the inferior epigastrics may be ligated with a percutaneous suture passer or endoscopic hemoclips. If the tissue pressure exerted by pneumoperitoneum is greater than an injured vessel’s hydrostatic intraluminal pressure, bleeding will not manifest until pneumoperitoneum is released. The presentation of an inferior epigastric vein injury is often delayed because of this effect, and it may result in a significant rectus sheath hematoma. Accordingly, the surgeon should be aware of this intraoperative consideration (26).
References


