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Review Article

A Review of Current Management Methods for Inguinal Hernias.

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Abstract

Inguinal hernias are often the reason doctors recommend surgery to patients. Two-thirds of patients experience jaw bone problems, often accompanied by pain. Diagnosis is usually made through physical examination and physical examination, and the history is sufficient to confirm the diagnosis without any scientific findings. Inguinal hernias can cause severe pain and can be interrupted by closure or strangulation, requiring urgent surgical treatment. However, the risk of strangulation in asymptomatic or mildly symptomatic hernia patients is low enough to ensure that initial care is effective and appropriate. Chronic and recurrent hernias are other complications that require follow-up in asymptomatic patients. Patients with symptomatic hernias require surgical treatment. This article reviews the current status of diagnosis and treatment of inguinal hernia patients.

Keywords: *Asymptomatic, incarceration, inguinal hernia, strangulation, symptomatic, watchful waiting.*

Introduction

Groin hernias have been a topic of interest since ancient civilizations, with the Egyptian tomb of Ankh-ma-Hor at Saqqara dating back to 2500 BC. The term "hernia" comes from the Latin word "bud" or "offshoot," and the condition is due to an organ protruding through the body cavity that normally contains it. In 1562, Gabrielle Falloppio first described the inguinal ligament, which was later established as an integral component of groin hernia repair. The term "groin hernia" refers to three distinct types: indirect inguinal, direct inguinal, and femoral.

Historically, operative management of a groin hernia was discouraged due to consistently poor results. However, in 1889, Bassini described a novel technique of suturing the transversalis fascia, transversus abdominis muscle, and internal oblique muscle (Bassini's famous "triple layer") to the inguinal ligament, drastically improving patients' outcomes. This pure tissue repair became the gold standard for groin hernia repair for most of the twentieth century. More than 70 modifications of Bassini's tissue technique were subsequently described, with the multi-layer Shouldice repair perhaps being the most significant.

In 1984, Lichtenstein popularized an alternative "tension-free" prosthetic repair, which involves the use of mesh to reinforce the posterior wall of the inguinal canal. Later, laparoscopic minimally invasive approaches (MISs) were introduced, resulting in faster recovery and decreased post-operative pain. More recently, laparoscopic herniorrhaphy using robotic technology has become increasingly popular.

Throughout the twentieth century, it was recommended that all groin hernias should be surgically repaired, regardless of whether the patient presented with symptoms or not. However, in 2006, an approach of "watchful waiting" emerged as a viable and safe option for patients who were asymptomatic or minimally symptomatic.

Groin hernias are the most common reason for primary care physicians to refer patients for surgical management, with over 1.6 million diagnosed in the USA annually and more than 500,000 groin hernias being surgically repaired each year. Risk factors for the development of inguinal hernias include male sex, increased age, and genetic predisposition.

Clinical Presentation and Diagnosis

Patients typically present with a bulge in the groin that is associated with pain in two-thirds of cases.[17] Painful hernias are most frequently described as a dull aching, heavy, dragging, or burning sensation. Maneuvers that increase intra-abdominal pressure, such as straining, lifting, or coughing, may exacerbate pain or hernia size by causing intra-abdominal contents to be pushed through the fascial defect.[18] Some patients may complain of worsening symptoms at the end of the day or after increased activity. Minor symptomatic cases may be temporarily improved by lying down or reducing the hernia manually. Severe or unbearable pain, that is, sudden onset, suggests possible strangulation and should be treated as an emergency.

Variable	**US trial**	**UK trial**	**The Netherlands Trial**
Year (initial results)	2006	2006	2018
Patient number	720		496
Age	> 18 (mean 58)	160	> 50 (mean 65)
Hernia size	Any	Visible bulge	Any
Hernia reducibility	Not required	Required	Not required

Table 1: Comparison of watchful waiting randomized controlled trials

Table 2: Comparison of crossover rates and long-term follow-up in Watchful Waiting Trials

	US trial, short term	**US trial, long term**	**UK trial, short term**	**UK trial, long-term**	**The Netherlands trial, short term**
Follow-up, years	Mean 3.2 (range 2–4.5)	Max 11.5	Median 1.6	Median 7.5 (range 6.2–8.2)	3
Crossover rate	23% at 2 years	68% at 10 years	29%	54% at 5 years 72% at 7.5 years	38%
Hernia accident rate inwatchful waiting group	0.6% (*n* = 2)	1.2% (*n* = 3)	1.3% (*n* = 1)	2.5% (*n* = 2)	2.3% (*n* = 6)
Pain as reason for crossover*	86%	54%	48%	72%	91%

Inguinal hernias are primarily diagnosed by history and physical examination with secondary imaging rarely needed.[19] Some patients with a clinical history suggestive of a hernia with no physical findings may need additional imaging studies to rule in or rule out the diagnosis. Visual examination should be performed first, by having the patient stand as the physician inspects for a visible bulge while seated in front of the patient. If needed, the patient should be directed to perform a Valsalva maneuver to promote hernia visibility. If no visible bulge is present, the physician may palpate the base of the scrotum or labia majora toward the pubic tubercle using the index finger.[20] The goal is to insert the index finger into the external ring, and upon the patient performing a Valsalva maneuver, a soft impulse may be appreciated.[20] Imaging with non-contrast magnetic resonance imaging (MRI) or computed tomography (CT) with Valsalva is recommended for diagnosing groin hernias when physical examination is insufficient.[21] Ultrasound (US) is less expensive but is highly dependent on the expertise of the examiner.[21] The sensitivity values for MRI, CT, and US are 0.91, 0.77, and 0.56, respectively. Whereas the specificity values of MRI, CT, and US are 0.92, 0.25, and 0, respectively.

Management

The management of inguinal hernias has evolved to improve patient safety and quality of life. Recent evidence from three randomized control trials suggests that for patients who present asymptomatically or minimally symptomatic and do not wish to undergo elective hernia repair, a conservative approach of

"watchful waiting" is a safe alternative. This is especially important as post-herniorrhaphy groin pain, which occurs in a small percentage of patients undergoing an inguinal hernia repair, may become incapacitating in some patients. However, long-term follow-up of watchful waiting trials has found that up to 68% of patients who do not elect to undergo immediate hernia repair will eventually be treated surgically due to worsening pain or lifestyle limitations from progression. Although it is safe to delay surgery for patients with asymptomatic or minimally symptomatic inguinal hernia, eventual surgical intervention is nearly inevitable if the patient lives long enough.

Surgical Treatment

Patients who present with a bowel obstruction or signs of strangulation (extremely tender groin mass and signs of sepsis, e.g., fever, tachycardia, hypotension, emesis, and confusion) due to their groin hernias require emergency surgery. Watchful waiting is not an appropriate treatment option for any patient with painful, symptomatic groin hernias. Patients with significant lifestyle limitations, such as reduced mobility, due to pain or other factors should be offered operative repair to improve their quality of life. It should be noted that incarceration is not synonymous with strangulation, nor will it inevitably lead to strangulation, as many patients with chronically incarcerated groin hernias are asymptomatic. Hernia repair is performed either as an open (tissue- or mesh-based) procedure or a minimally invasive (laparoscopic or robotic) procedure.

The choice of which procedure is performed is most often based on surgeon expertise and access to resources, rather than patient factors.[25] Evidence-based practice guidelines recommend a tailored approach to inguinal hernia management based on the individual patient. For example, the guidelines recommend an MIS to bilateral inguinal hernia or recurrent inguinal hernia that was previously repaired with open surgery, thereby repairing both hernias in one operation, instead of two separate interventions.[26] Despite guidelines, however, it is estimated that only 42% of surgeons offer an MIS to this patient population.[27] Multiple factors influence which operative approach is performed, including the surgeon's characteristics of age, practice type, and location. Patient factors that inform choice of approach include overall health, hernia characteristics, and type of original repair for recurrent hernias. One study interviewed surgeons to investigate other individual factors that led to practices outside of recommended guidelines, finding that access and resources, namely, the surgeon's opportunity to operate on the robot at their institution, were significant factors that influenced approach as well.[25]

Open Approach

The open repair with mesh technique is the gold standard for most patients with an inguinal hernia, due to its association with a 50%-75% lower risk of hernia recurrence, lower risk of chronic pain post-operatively, and an earlier return to work compared with a sutured repair. The Shouldice technique is recommended due to its lower risk of recurrence compared with other pure tissue repairs. The best results with the Shouldice procedure are seen in specialty clinics such as the Shouldice in Toronto, but are not reproduced in general practice.

Minimally invasive approach (MIS) is another option for repairing groin hernias using laparoscopic techniques. Most often, the repair is performed in the preperitoneal space behind the muscular elements of the groin, referred to as a transabdominal preperitoneal (TAP) approach. A totally extraperitoneal approach (TEP) is also performed, with the potential advantage of avoiding intra-abdominal access through the peritoneum.

The outcomes of patients who have undergone open or minimally invasive inguinal repairs have been widely studied. A meta-analysis performed in 2019 reported on 16 trials including over 51,000 patients that compared open, TAPP, TEP, and robotic preperitoneal inguinal hernia repairs (rTAPP). Ultimately, all modalities were comparable in the short term.

The chance of developing post-operative groin pain following hernia repair is an important point to discuss with patients before proceeding with surgery. It is reported that chronic post-operative is evident in approximately 8%-16% of the patients, without consideration of the surgical approach. Overall, it appears that MISs most likely result in less groin pain than open procedures.

It is commonly believed that open inguinal hernia repair is thought to cause worse post-operative pain than minimally invasive surgery, and thus patients are often prescribed more opioids at discharge. However, a study investigating opioid use after surgery with open and MIS techniques found no difference in opioid use by approach. More than one-third of patients used no opioids (open 38% vs. minimally invasive surgery 44%; P = 0.42). Bilateral repair was not associated with increased opioid use (univariate odds ratio 1.23, P = 0.58).

Most authorities agree that a minimally invasive procedure should be recommended for patients with bilateral inguinal hernias because both can be repaired through the same three minimal access ports, avoiding the need for bilateral groin incisions. A recurrent hernia after an open inguinal herniorrhaphy failure should also be repaired by an MIS method, as long as there are no contraindications to laparoscopy, such as severe adhesion or inability to tolerate general anesthesia.

Groin hernias in women

There is a paucity of data that investigates groin hernia outcomes in women; significant The rate of emergency procedures in women is 3-4 times higher than in men, and watchful waiting is not appropriate due to increased hernia strangulation and difficulty distinguishing inguinal from femoral hernias. Surgical repair is routinely recommended for non-pregnant women with groin hernias, and pregnant women with a groin bulge should have round ligament varicosities ruled out by ultrasound before considering surgery.

Recent economic data assessing the impact of watchful waiting on costs to the patient and hospital are lacking. A US trial in 2006 compared watchful waiting to surgical repair, finding that both were reasonable from a cost-effective standpoint. The cost per quality-adjusted life year (QALY) for the repair group was $59,065 per patient. However, additional studies assessing the financial impact and cost-effectiveness of watchful waiting compared to surgical repair are warranted to further understand the economic consequence on stakeholders.

Conclusion

Inguinal hernias are a very common problem. Diagnosis is typically made from history and physical examination. Watchful waiting is a safe initial strategy for men with asymptomatic or minimally symptomatic inguinal hernias, though most patients will eventually undergo operative repair within 10 years due to increasing pain or lifestyle limitations. The risk of hernia incarceration or strangulation is sufficiently low, however, if watchful waiting is the preferred management. Operative management should also be offered to patients and is a safe procedure, although post-operative pain may develop in some cases.

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