



## MODERN APPROACH IN INGUINAL HERNIA: A REVIEW

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### ABSTRACT

**Introduction:** In modern medical science, inguinal hernia still is a one of the main surgical problem with its various unexpected outcomes. But there is still a surgical dilemma for even the skilled surgeon, when it presents with some unusual contents. At the point of decision making, watchful waiting or go for surgery is common debate. is it better to go with mesh based surgery or suture based are also kind of another debate, and various study and authority favor and focus on various results. Watchful waiting used to be an acceptable strategy for minimally symptomatic hernia; many recent studies are contradictory in that decision because there are huge complications in emergency surgeries. The definitive treatment of inguinal hernias, regardless of their origin or type, is surgical repair. Various types of surgical corrections are fit in different presentations; hence the main decision point of surgery is surgeon's skills, knowledge and update towards recent studies.

**Objectives:** Our team's particular objective to review on this topic is to facilitate especially young surgeons, surgical residents and general practitioners to share some advanced knowledge on modern approach in the management of inguinal hernias with putting some spotlight on its various possibilities and ongoing researches on this topic.

**Methods:** Most of accessible, possible and related studies in inguinal hernia from 1960s to 2018 were collected from both reprint requests and by searching PubMed and other database. Data extracted included authors, country, and year of publication, age and sex of patients, pathophysiology, risk factors, clinical features, investigations, types of surgical treatment, and post-operative complications and various findings in inguinal hernias in the prospective of advance management.

**Results:** Study provides some focused information and explains the higher incidence of inguinal hernias in males than females. Many debates which appears in the process of management, it particularly is the main source of study, while the etiology explains requirement and provide the physiological background for the different modern and advanced methods for management of inguinal hernia, and explains the reason for recurrence of hernias using the older sutured repairs and various other factors. At the same time, study was kept some visualization on recent hernia surgery guidelines and many authenticated results in the process of inguinal hernia management.

**Conclusions:** As the medical science is constantly evolving and to keep up to date knowledge and information of these researches and findings is important. Here, the main effort of our team is to gather and provide advance knowledge towards proper management of inguinal hernias to reduce associated complications, recurrence rates, and also careful handling of these unusual contents and findings of inguinal hernias in the process of management.

**Keywords:** Laparoscopic technique; inguinal hernia; mesh repair; suture repair

## BACKGROUND

In common terminology any kind of protrusion, bulging or projection of an organ or any part of an organ through the body wall, where it normally contains is hernia. In the case of inguinal hernia the protrusion occurs throughout inguinal canal. On the basis of relationship to inferior epigastric vessel inguinal hernia basically divided in direct and indirect inguinal hernias. Inguinal hernia is most common, among acquired or congenital hernias, with life time risk prevalence of 25% in male and 2% in female.<sup>1</sup> regarding on recent years till 2018 data, shows that more than 20 million patients undergo groin hernia repair annually in worldwide aspect.<sup>2</sup> In general primary medical clinics groin hernias are the most common hernias referred to the surgical consultations. According the researches 96% of groin hernias are inguinal hernia and 4% are femoral by the presentation.

In majority of cases surgical treatment is successful but recurrences leads reoperations in about 10–15% and long-term disability due to chronic pain of more than 3 months occurs in 10–12% of patients. In about 1–3% of patients have presented with severe chronic pain and this kind of reports have tremendous negative effect on health and healthcare costs globally, When there are certainly better outcomes possible. Currently three hernia societies [1.The International Endo Hernia Society (IEHS) 2011, 2.European Association for Endoscopic Surgery (EAES) 2013, 3.European Hernia Society (EHS) 2014] have separately published guidelines claiming to improve treatment and update the surgeon's education.<sup>3</sup> Even if we have most facilitated modern medical science and knowledge; still the hernia is one of the great problem in surgical field. Our main intention through this paper is to put some spotlight on the modern studies and possible improvement on approach to inguinal hernia.

## METHODS

Most of the accessible and available publications in inguinal hernia generally from 1960s to 2018 were obtained from both reprint requests and by searching PubMed and other database. Extracted data from these papers covered authors, country, and year of publication, age and sex of patients, pathogenesis, as well as risk factors for development of inguinal hernias, racial distribution, and various updates on presentation of symptoms, surgical treatment and unusual findings in inguinal hernia in the prospective of advanced management.

### **Approach to evolution of Hernia and surgery:**

Though inguinal hernia definitely was a problem from the time, when human being started bipedal walk. Various literatures suggest that, it was a problem of many famous personalities in history. On records during the end of 16<sup>th</sup> century the first hernia surgeries were performed. That continues with 1960s Prosthetic material utilization commenced initially only in elderly patients, with recurrent inguinal hernias. These prosthetic/mesh surgeries came up with fairly positive results, and that continues to adoption of mesh repair in younger patients. By early 1980s minimally invasive techniques were started and that developed to Laparoscopic Trans Abdominal Pre-Peritoneal (TAPP) and Totally Extra Peritoneal (TEP) endoscopic techniques, collectively, “laparo-endoscopic Surgery” came in to practice. Though these surgeries have own drawbacks on economical and various other sides but the surgeries were performed up to 55% of cases in some developed countries like Australia and Switzerland. <sup>4</sup>

### **Approach to causative factors:**

Increasing age and male sex are major risk factor for a groin hernia. There are other conditions found to be associated with increased risk for both sexes are smoking, which causes a defective connective tissue metabolism, and chronic obstructive pulmonary disease. As in women, rural residence, higher body stature, and umbilical hernia were found as additional risk factors for inguinal herniation. Low body-mass index, high intra-abdominal pressure, associated disease like collagen vascular disease, thoracic or abdominal aortic aneurysm, patent processus vaginalis, history of open previous appendectomy, and peritoneal dialysis are reported also as risk factors for inguinal hernia.<sup>5</sup> People associated with abnormalities on matrix metalloproteinase (MMP), (increased MMP-2 expression and MMP tissue inhibitor 2 activity) Disease like Ehlers–Danlos, Marfan’s, Hurler’s, and Hunter’s syndromes, have shown to increased risks of having direct hernias in many patient. As matrix metalloproteinase is a family of proteolytic enzymes that degrade protein components of the extra-cellular matrix. It has shown that such increased proteolytic activity may cause weakness in structural tissue and abnormal connective-tissue homeostasis in many cases.<sup>6</sup>

It still remains controversial that heavy lifting as a risk factor. A recent systematic review showed data concerning the relationship between occasional heavy lifting, repeated heavy lifting, or a single strenuous lifting episode and the development of a groin hernia to be inconclusive.<sup>2</sup> But now these studies have favors on

that, weight lifters do not have an increased incidence of inguinal hernias as it use to appear in previous studies.<sup>7</sup>

Indirect hernia etiology correlates with the process of embryology of the groin and descent of testis. That's why we take indirect hernia as congenital hernia, regardless of the age of the patient. Clear reason is protrusion of an abdominal viscous into an open processus vaginalis. Commonly any condition that increases the pressure in the intra-abdominal cavity may play a vital role to the formation of a hernia. The cause of direct inguinal hernia is weakness in the transversalis fascia and the area of the Hesselbach's triangle. This is a structural triangle which is bounded laterally by the inferior epigastric vessels, medially by the lateral border of the rectus abdominis muscle and inguinal ligament inferiorly.

It is thought that abnormal collagen metabolism plays an important role in the primary inguinal hernia development. When type III collagen increases it leads to a decreased ratio of type I to type III collagen. This alters the physical properties and the strength of the collagen matrix of the abdominal wall, Here that may lead an individual to inguinal hernias development.<sup>8</sup>

### **Approach to pathophysiology:**

The larger size of their inguinal canal and deep ring, which transmitted the testicle and accommodates the structures of the spermatic cord is one reason why men are many times more likely to have an inguinal hernia than women.<sup>9</sup> Indirect hernias in men follow the same route as the testes descends, which descends from the abdomen into the scrotum during urinary and reproductive organs development. An indirect hernia is generally believed to have a congenital component which requires a potential hernia sac, i.e. the processus vaginalis. After the descent of the fetal testis into the scrotum from the retroperitoneum, the processus vaginalis should obliterate.<sup>10</sup> if the processus vaginalis is not obliterated, fat or bowel may get into it.

The pinchcock action of the internal ring musculature during abdominal muscular straining prohibits protrusion of the intestine into a patent processus. Muscle paralysis or injury can disable the shutter effect. In addition, the transversus abdominis aponeurosis flattens during tensing, thus reinforcing the inguinal floor. A congenitally high position of the aponeurotic arch may preclude the buttressing effect. It is also seen that increasing the incidence of hernia in patients of appendectomy or femoral vascular procedures.<sup>11</sup>

Inguinal hernia is a known complication after radical retropubic prostatectomy, whether it is open or laparoscopic, and has been reported in up to 15-21% of patients. It has also been suggested that all lower mid line incisions have the same increased risk, as they disrupt the shutter mechanism and thus increase the risk of an inguinal herniation.<sup>12</sup>

### **Approach to classification:**

Inguinal hernia basically classified as, Direct, Indirect and mixed other than these are known as pantaloon, Romberg or saddle bag hernias, regarding their relationship to the inferior epigastric vessels.

Abdominal contents herniate medially to the inferior epigastric vessels are direct inguinal hernias. When abdominal contents protrude through the deep inguinal ring, lateral to the inferior epigastric vessels these are known as the indirect inguinal hernia. But there is no clinical merit to differentiate between direct or indirect inguinal hernias. It is blamed that failure of embryonic closure of the processus vaginalis is the main reason behind the case. In combined hernia, sacs are on both sides of the inferior epigastric vessels. Mostly direct inguinal hernia is seen less common and present in the later ages and associated with stress, strain and weakened abdominal muscle around the inguinal canal.<sup>13</sup>

On clinical examination hernia can be classified as reducible or irreducible. Reducible hernia means the one which contents can be pushed back into the abdomen by applying manual pressure on bulging site. Where the contents cannot be pushed back into the abdomen by applying manual pressure these hernia are taken as irreducible hernia. Irreducible hernias are again classified into obstructed and strangulated hernias. Obstructed hernia is one in which the lumen of the herniated part of intestine is obstructed and strangulated hernias are the one in which the blood supply of the hernia contents is compromised and leading to ischemia. Here the lumen of the intestine may or may not be patent. Intraoperative findings are the basis of final recording for any kind of hernia classification.

### **Approach to features of inguinal hernia:**

Generally, patients present with groin pain, swelling or lump. The presence of Swelling or lump may be asymptomatic in some patients. But mostly inguinal hernia comes with a clear sign of presentation like bulge in the area on either side of the pubic bone. Many associated symptoms may be a burning, gurgling or aching sensation at the bulge, or pain and discomfort in the groin, mostly relates with bending over coughing or lifting object. By the time hernia increases, abdominal content like the stomach, small bowel, colon, and liver can descend into the hernia in many cases.<sup>14</sup> it is seen in many cases, pain and swelling around the testicles revealed with the protruding intestine descends into the scrotum and bulge.

Incarcerated hernia may be associated with inability to manipulate the hernia through the defect site. Symptoms like pain, nausea, and vomiting, indicate bowel obstruction while persistence of pain and tenderness of an incarcerated hernia indicate strangulation. In addition, there will be signs of associated systemic toxicity in the case of bowel Ischemia.

### **Approach to diagnosis:**

The gold standard for inguinal hernia diagnosis is clinical examination but clinical examination alone can miss hernias, especially in obese women, men and multiple hernias where only some of the hernias are apparent with physical examination.<sup>15</sup> clinical examination plus ultrasound was found to be superior to clinical examination alone in many studies.<sup>16</sup> Process of physical examination should begin by carefully inspecting the inguinal areas for bulges while the patient is standing. After the process, the patient should be asked to cough or strain down (i.e., Valsalva manoeuvre) while the physician observes for bulges. Diagnosis is based not only on inspection but also by palpation with an open hand over the groin area which might feel a bulge or detect

the impulse of a hernia during a Valsalva maneuver or with a finger introduced into the scrotum in many cases.<sup>17</sup>

Imaging generally doesn't support in every case to diagnose a hernia, but may be useful in certain clinical situations like; suspected sports hernia, recurrent hernia, uncertain diagnosis, surgical complications, especially chronic pain.<sup>17</sup> It should however note that its use is limited to a small number of patients, because in the vast majority of patients, clinical examination is sufficient. Sometime ultrasound may be useful in diagnosing inguinal hernias in patients who report symptoms but do not have a palpable defect. Generally, it may also be helpful in differentiating an incarcerated hernia from a pathologic lymph node or other cause of a firm, palpable mass. For most sensitive detection of a hidden hernia in a patient with clinical suspicion for hernia, Magnetic resonance imaging (MRI) provides the best favor.<sup>18</sup>

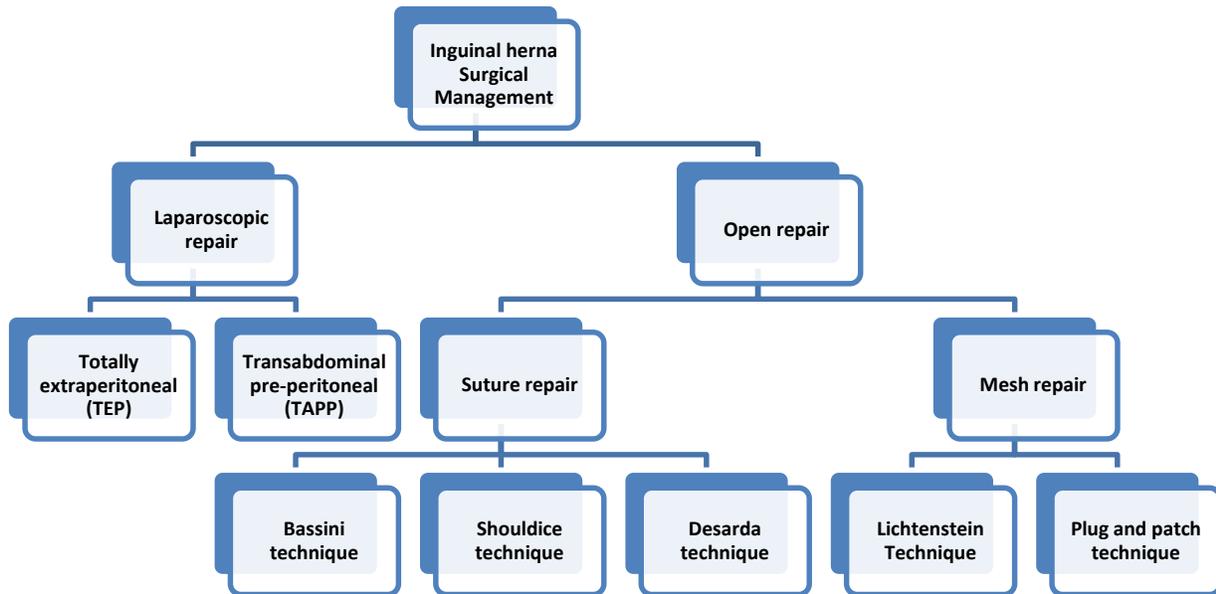
### **Approach to decision making for surgery:**

About one third of inguinal hernia patients are asymptomatic. In those asymptomatic inguinal hernias, the chance of incarceration is very low about 0.3-3% per year and risk of postoperative complications in other side, especially in the elderly patient due to significant comorbidities. In the case of symptomatic inguinal hernia, the option we have is to correct surgically with no confusion due to the associated complications like incarceration or Strangulation.<sup>19</sup> In some cases like asymptomatic inguinal hernia watchful waiting is the suitable option but it can never be appropriate for symptomatic hernia that's due to the vigorous complications like; strangulation or bowel obstruction. In 2014 a study reported on clinical consequences after of watchful waiting strategy in asymptomatic inguinal hernia, but the study suggest that emergency hernia repair was also associated with significantly more adverse events of (4.7 vs. 18.5%). Mortality increased from 0.1 to 5.4%.<sup>9</sup> this is why it's always an ethical question to decide whether to go for surgery or watchful waiting.

### **Approach to Management:**

Till 2018 there were various studies undertook in the favor of surgical management as well as medical management. Till the date there has no medical management shown favorable result to at least consider fewer patients in the medical side. It's the fact that till this date, surgical repair is the best option of management. The reason behind this strict surgical advice is the huge risk of complications like incarceration or strangulation.<sup>20</sup> Still in many cases, surgical repairs are not taken as only blind and best option, that's because of patients' request and many other unfavorable condition to fit for surgery.<sup>21</sup> In such cases watchful waiting is a reasonable option, especially in those cases like minimally symptomatic hernias, that's because of the significant risk of chronic post herniorrhaphy pain more than 10% patients, and the minimal risk of incarceration about 0.3-.3% per year.<sup>22</sup> In those cases which has been chosen for surgery, it's challenging to define the best option. The reason behind this is we have to keep in mind of surgical outcome, fast recovery, cost effectiveness and various other factors.

**Surgical Management:**



**Open repair:**

Open surgical method for inguinal hernia surgery is believed that, it started with the end of 16<sup>th</sup> century. Open repair has travelled with many suture based and mesh based technique till now. Bassini technique is first described Suture based methods in 1884. Since then, several other researches have followed with variations of the open suture method all bearing their name. Many of them became popular and came in to practice like, shouldice technique, Desarda technique and others. By the date 1960s open hernia surgery came up with prosthetic methods and then prosthetic mesh with very low recurrence rate. But mesh based technique also have their own drawback like foreign body sensation, mesh rejection, and so on.

**Suture repair:**

Main principle of suture repair is, bringing the tissue together and sutures the defect. These days suture repair is just an alternative to mesh placement. Especially when mesh placement is contraindicated or not possible, this kind of situations are most commonly due to concerns of contamination in cases ongoing infections of the groin, strangulation or perforation of the bowel.<sup>23</sup>

**Bassini technique:**

This technique came in to practice after the name of famous surgeon Edoardo Bassini. In this technique, the conjoint tendon which is formed by the distal ends of the transversus abdominis and internal oblique muscles is approximated to the inguinal ligament and closed.<sup>24</sup>

### **Shouldice technique:**

This technique is after the name of Dr. Edward Erle Shouldice, this is the most commonly utilized most effective non-mesh technique.<sup>25</sup> a continuous repair with 32–34 gauge stainless steel wire is used for the reconstruction which may be substituted with a 3–0 polypropylene suture. Four-layer of tissue reconstruction is done by using two separate sutures. Though this method is superior non-mesh technique, still the results is much higher rates of hernia recurrence in patients when compared to mesh repairs.<sup>26</sup>

### **Desarda technique:**

This method is after then name of Prof. Desarda, according to the related authority it is claimed as superior to other non-mesh technique.<sup>27</sup> in this method, upper flap of the external oblique aponeurosis is sutured to the inguinal ligament, *behind* the spermatic cord the external oblique is incised again, 1-2 centimeters above the inguinal ligament, simultaneously creating a new lower edge to the upper flap, made out of a strip of external oblique that is several centimeters wide. The upper edge of this flap is sutured to the internal oblique. This is generally very simple mesh free and tension free repair method based on the physiological principle with very low recurrences and complications.

### **Mesh repair:**

In the aspect of reducing the recurrence rate of hernias, meshes have shown the very significant role. Still there are some associated problems related to meshes as well. When mesh has certain features like material, strength, elasticity, density, and pore size Standard polypropylene mesh is the most frequently used one. It is cheap, available, non-absorbable, and strong enough to avoid recurrence. But still there, some actual problems with mesh use like; foreign body sensation and chronic post-operative pain and have created a conflict about standard polypropylene mesh.<sup>2</sup> Here these points' favors on polyester mesh might be an alternative, but it did not attain that popularity as it can degrade with time, especially in the case of infected site.<sup>28</sup>

### **Lichtenstein Technique:**

This technique was introduced by the Lichtenstein Hernia Institute in 1984 and is most commonly used method today in worldwide. A flat mesh is placed over the site of defect and repaired. The European Hernia Society recommends that in the cases of open approach Lichtenstein method is an indication.<sup>2</sup> recent studies have shown that mesh attachment with the use of adhesive glue is faster and less likely to cause post-op pain as compared to attachment via suture material. Main attraction towards this method is very low post-operative pain and minimal recurrence rates 0 to 2 %.

### **Plug and patch technique:**

This method is second most common mesh repair technique after Lichtenstein method. In this method surgeon tailor the plug and patch to best fit the needs for initial inguinal hernia repair. This method is generally having 5-10 min shorter operation time comparing to Lichtenstein method. Smaller size defect of 3 cm or less

are excellent candidates for plug-and-patch repair but larger and recurrent hernias are not generally the choice of this method. Due its higher rates of mesh shifting and tendency to irritate surrounding tissue, in most cases this technique is not recommended by European Hernia Society.

### **Other Mesh techniques:**

By the progression of time, various tension free mesh technique has developed. But their uses and efficacy are limited and not much popular. Which are Prolene mesh system (PHS), Kugel (preperitoneal repair), Stoppa Technique, Trabucco (Hertra mesh), Wantz technique, Rutkow/Robbins technique.

### **Laparoscopic repair:**

Laparoscopic method came in to practice firstly by Ger and colleagues in 1990. At the beginning laparoscopic method has seen as attractive alternative to open hernia repair for many patients and surgeons. But by the time many other unfavorable factors also have been identified. Main contradiction was results of open mesh repairs are similarly good, and the learning of laparoscopic technique and many other factors. At the center of the controversy was laparoscopic and open techniques are equivalent in regard to recurrence risk, pain, and recovery. Most important is both open and laparoscopic technique have their own drawback and favor. Now there are mainly two methods of laparoscopic repair: transabdominal preperitoneal (TAPP) and totally extra-peritoneal (TEP) repair. Commonly when performed by experienced surgeon in hernia repair, there are fewer complications than Lichtenstein, mainly less chronic pain. But in the case of surgeon is experienced in general laparoscopic surgery and not in the specific subject of laparoscopic hernia surgery, laparoscopic repair is not advised. And that can appear with more recurrence risk than Lichtenstein method, and may be associated with presenting risks of serious complications, as organ injury. When properly done, laparoscopic methods benefit with smaller incisions, less bleeding, less infection, faster recovery, reduced hospitalization, reduced chronic pain and many other factors.

### **Transabdominal preperitoneal (TAPP):**

Transabdominal preperitoneal surgery requires access to the peritoneal cavity with placement of a mesh through a peritoneal incision. Mesh will be placed in the preperitoneal space covering all potential site of hernia in the inguinal region. At the end peritoneum will be closed above the mesh, leaving it between the preperitoneal tissues and the abdominal wall, where it becomes incorporated by fibrous tissue and protect the hernia site.

### **Totally extraperitoneal (TEP):**

TEP repair was first introduced in 1993, in this method peritoneal cavity is not entered and mesh is used to seal the hernia from outside the peritoneum. This approach is considered to be comparatively little more difficult than TAPP, but it is believed that it may lessen the risks of damage to the internal organs and of adhesion formation leading to intestinal obstruction. Some of the studies suggested that TEP has a higher risk of recurrence than open mesh repair.<sup>29</sup>

**Contraindications to laparoscopic surgery:**

Although there are good results with a TAPP approach, but those patients who have previous recurrence from a prior laparoscopic repair, patients with prior or planned pelvic operations like radical retro-pubic prostatectomy or pelvic irradiation, patients with a strangulated hernia generally should avoided to go for laparoscopic surgery and should undergo open repair. Because laparoscopic repair is more dangerous, and primary suture without mesh may be necessary if the hernia site is contaminated. Incarcerated hernia is also a relative contraindication of laparoscopic method, because traction on the intestines risks injury and contamination of sterile field. At the time, when patient’s medical condition seems to be general anesthesia is risky, an open approach using local anesthesia should be performed.

**Comparison between open and laparoscopic technique**

Laparoscopic hernia surgery	Open hernia surgery
<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Quicker recovery</li> <li>• Less pain during first day of surgery</li> <li>• lower postoperative complications like ;infections, bleeding and seromas</li> <li>• Less risk of chronic pain</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Needs surgeon highly experienced</li> <li>• Longer operating time</li> <li>• Increased recurrence of primary hernias in learning Surgeon</li> </ul>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Shorter operation time</li> <li>• Cost effective</li> <li>• Lower recurrence in compare to surgeon only learning on laparoscopic</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Higher post-operative pain.</li> <li>• Longer recovery time</li> <li>• Higher chance of post-operative bleed and related complications</li> </ul>

**Approach to proper anesthesia:**

Generally, regional and local anesthetic techniques are used to perform open IH surgery. In the case of regional anesthesia, it can be performed via epidural, spinal and paravertebral routes.

The benefits of ideal anesthetic technique are good perioperative and postoperative analgesia. Optimal operating condition, fewer complications, cost effective, and early patient discharge. The EHS guidelines on inguinal hernia treatment recommend that, local anesthesia can be considered for all adult patients with primary reducible unilateral inguinal hernia. In 2009 one meta-analysis revealed methodological

shortcomings.<sup>30</sup> Many studies have been concluded that local anesthesia was came with a lower incidence of urinary retention and various other complications when compared with general anesthesia.

### **Approach to complication of hernia surgery:**

Common complications of hernia surgery are infection of the site, bleeding from site, damage to surrounding structures, such as blood vessels, nerves, or the bladder and urinary retention requiring to placing a catheter. Post- herniaorrhaphy pain is a condition where 10-12% of patients complain severe pain following inguinal hernia repair because of complex combination of different forms of pain signals.<sup>2</sup> this kind of condition can be seen with any inguinal hernia repair technique. The condition when unresponsive to pain medications, further surgical intervention is often required in some case.<sup>31</sup> removing the mesh and bisection of regional nerves is commonly performed to solve the problem.<sup>32</sup> there are various researches going on concerning to minimize the complication. But main factor to minimize the complication is surgeon's skill, level of his/her modern knowledge and update.

### **Approach to post-operative prophylactic measures & prevention:**

Post-operative Prophylactic antibiotics in inguinal herniorrhaphies are taken as preventative measures for infections. In the case of prosthetic material is used prophylactic is particularly important, but the question comes when unwarranted antibiotic use may create problems, like; Drug allergies, C. difficile infection, bacterial resistance and economic part with various other factors. Patients with risk factors and in contaminated and infected conditions, antibiotic use is widely accepted. But prophylactic antibiotic use under clean conditions and limited risk factors for infection are questioned. Current evidence is presented with that there is a potential risk of resistance to the prophylactic antibiotic given varying between countries and different Settings. The wound infection in the placebo groups were seen from 0 to 18%, likely reflecting the basal wound infection rates in the studied population. Studies have also shown that on the basis of highly accepted guidelines and expert opinions, less than 5% wound infection rate in the placebo group, defines a low-risk environment.<sup>33</sup> There was latest Cochrane meta-analysis, encompassing 11 randomized control trial was published in 2012, the overall meta-analysis results large clinical diversity (inclusion criteria variations regarding diabetes and recurrent hernia) and methodological diversity (surgical variations, drain use, average surgical time, seroma aspiration, timing of shaving). It was shown that, wound infections in low risk environment were notably very low.

Indirect inguinal hernias are not preventable due to their connections with congenital defect; however, it is believed that direct inguinal hernias may be prevented by maintaining a healthy weight, stop smoking, preventing straining during bowel movements, and maintaining proper lifting techniques when, heavy weight lifting.

## CONCLUSIONS

As the medical science is constantly evolving and to keep up to date knowledge and information of these researches and findings is important. Here, the main effort is to gather and provide advance knowledge towards proper management of inguinal hernias to reduce associated complications, recurrence rates, and also careful handling of the cases and findings of inguinal hernias in the process of management.

### Recommendations:

As inguinal hernia can present in hospital with various unexpected contents, it is recommended to evaluate the content and clear the surgical dilemma in various possible methods that include laboratory investigation, surgical correlation and possible evaluation to prevent recurrence and best outcome.

### Limitation:

Common limitation of our study is the various studies undertook in the related field and it is very difficult to customize all the important content in single paper with satisfying coverage, and some papers were very difficult to reach and access. Topic itself is very vast and related to many of other content.

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