Effectiveness of the Surgical Techniques in Acute Inguinal Hernia

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The weakness in the abdominal wall may be a birth defect or it may be developed later in life when muscles are loosened with age, but also in various intense physical activities. Men are the most affected section of population, 8 times more prone to inguinal hernia than women. In certain moments, when the intestinal tissue descends towards the scrotum, bulging areas occur, accompanied by pain around testes. Appreciation of the degree of dystrophia and anatomic dislocation of the inguinal region made possible to adequately choose the tactics of the surgical treatment of inguinal hernias. Presenting a case of incarcerated right inguinal-scrotal hernia, epiploectomy, followed by treatment of hernia, an alloplastic technique. The choice of the technique to repair an inguinal parietal defect depends on the surgeon.

Keywords: inguinal hernia, surgical treatment, surgical techniques.

Appeared once with the biped posture, inguinal hernia has been certified in the second millennium BC, on the famous Egyptian papyrus of Ebers in 1552 and recorded on the sculpture in stone by the ancient Greeks. The concept hernia derives from the old Greek (hemios), a bulging, a bud. A female Phoenician small statue around 900 BC represented a bilateral hernia, with orthopedic support.

Located in the anterior-inferior region of the inferior abdominal wall, the inguinal-femoral region is the transition region between the abdomen and the anterior side of the thigh, that suffered major changes when passing to biped posture. At the surface, the limits of the regions are: horizontal line that unites the anterior superior iliac spine with the lateral border of the right abdominal muscle; inferior and lateral - the inguinal pocket; medial - the lateral border of the right abdominal muscle. Deep, due to continuity of the transversalis fascia, the inguinal region extends to the femoral region, for the two regions are unitary.

There are several tangible anatomic landmarks surgically speaking, such as: anterior superior iliac spine, pubic tubercle, and the inguinal ligament. The abdominal wall of the inguinal region is a bilaminar structure that includes the inguinal canal, housing the spermatic cords and the round ligament.

Inguinal hernias occur through the inguinal canal, an oblique pathway in the anterior-lateral abdominal wall, above the crural arch. The inguinal pathway is oblique downwards, inward and forward. It has two rings and four walls. Each ring is divided into four walls. The floor is made of the crural arch, has the shape of a hammock, and the roof is formed of the fascias of the transversalis fascia, the transversum and the inguinal ligament.

The skin is thin, medially covered by hairs of the pubic triangle. It is mobile on the underlying levels, except for the inguinal pocket, where it adheres through fibrous pathways that form the Petroquin’s ligament.

The superficial inguinal ring is close and hardened by the intercrural fibers of the innominate fascia that binds the pillars and the spermatic cord.

The inguinal ligament (Poupart’s ligament) is the inferior border of the aponeurosis of the external oblique. Towards the thigh it has a rounded surface due to inwards reflection of the inferior fibers. The strength of the inguinal ligament is due to the special obliqueness with 10-20 degrees of the aponeurotic fibers. The lateral half is narrower and is inserted in the anterior-superior iliac spine, the medial half is longer, and it makes the inferior wall of the inguinal canal. Through pubic insertion, the inguinal ligament has the shape of the band instead of a cord, and it is sharper on the lateral half.

Transversalis fascia is a part if the endo-abdominal fascia, and it forms a continuous layer that separates the abdominal muscular-aponeurotic layers from the peritoneum and properitoneal fat. In inguinal region, it covers the abdominal part of the abdominal transversum and its terminal aponeurosis, that closely adhears by interdigital fascicles.

The deep inguinal ring is an anatomic defect located on the transversalis fascia, formed because of the descent of the testes, has the shape of a V or a U, with the concavity upwards and lateral.

The femoral canal is an upside-down cone-shaped compartment, of about 2 cm long, that contains properitoneal lax connective tissue, numerous lymphatic vessels and inconsistently 1-2 sub inguinal lymph nodes. The femoral ring is the abdominal opening of the femoral canal where femoral hernias occur. The ring ends under the inguinal ligament.

Cooper’s ligament is the thickening of the superior pubic bone that covers the pectineal line and the insertion place of the abdominal transversum, transversalis fascia and iliopubic pathway, the dorsal border of the femoral cone. It has a curve like passing towards medial and it forms a 30-degree angle with the inguinal ligament.

The contents of the canal differ depending on the gender; in males, the spermatic cord, and in females - the round ligament of the uterus. The spermatic cord is formed of: arterial structures – deferential artery, originating in the inferior vesical artery or the middle rectal artery; the spermatic artery, a branch of the abdominal aorta; the spermatic artery, that arises from the inferior epigastric artery, the testicular veins and their coverings, divided into two groups: an interior one, that drains into the inferior vena cava on the right side, renal vein on the left side, and a posterior one, shorter, that drains into the inferior epigastric vein; the testicular lymphatics drain into the lumbar nodes; nerves - the genital branch of the genitofemoral nerve and vegetative autonomic nerves that form periarterial

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plexuses; vas deferens; fibrous cord – resulted by obliteration of the peritoneal-vaginal process.

Innervation of the inferior portion of the anterior-lateral abdominal wall is made by nerves originating from spinal roots T12-L2. They are represented by: iliohypogastric nerve, ilioinguinal nerve, and the genital branch of the genito nerve.

The aetiology of the inguinal hernia stopped, at the beginning on the 20th Century, at a unifying theory, the imbalance between aggressive factors upon the abdominal wall (abdominal strain and visceral pressure) and protective factors (structural muscular-fascial integrity). Modern research in last decades pointed out changes of inguinal anatomic structures in the supportive connective tissue.

For each weak point of the abdominal wall, there is a name of hernia. The weak points of the abdominal walls appear, usually, where the anatomic structures pass from the abdomen to the neighboring regions or the other way around.

The herniating organ crosses the abdominal wall in inguinal region in a certain pathway. Considering the direction of the pathway, oblique or perpendicular to the abdominal wall, there is an oblique hernia or a direct hernia. The pathway may be, in some hernias, a ring.

Topographically, two types of landmarks can be described; emergency landmarks of the hernial sac, determined by projection in fossa of the collection of fluid, depending on which there are: external oblique inguinal hernia – externalized by medial parietal fossa; direct inguinal hernias - externalized by medial parietal fossa; internal oblique inguinal hernias, arising through medial parietal fossa; femoral hernias.

This classification may have more complex forms, such as direct external oblique hernia, or various unilateral or bilateral associations that may raise interesting surgical-anesthetic and technical-tactical challenges. Progression landmarks, for external oblique inguinal hernias and femoral hernias with extra parietal-abdominal evolution. The external oblique inguinal hernia have a few possible stages: the hernial point, with the projection of the sac in deep ring, with a round swelling, of about 2 cm; inguinal-interstitial hernia located between the deep and the superficial ring, ovaloid, with big axes in the axis of the funicle; bubonocele is formed beyond the superficial inguinal ring; funiculal inguinal hernia shows a tumor at the root of the scrotum, near the testicle; scrotal-inguinal hernia is the most advanced form, in which the abdominal viscera invade the scrotum, with giant dimensions. Less frequent in women, it is called inguinal labial hernia.

In addition to distinct, well defined types of hernia, there are double or complex variants, presenting cysts of cordon or associated hydrocele. There are also other classifications of parietal defects: Mc-Vay classification, Casten classification, Halverson-McVay, and Gilbert classification.

In 1993 Bendavid presented a complete classification of all the hernial defects, starting from the myopectineal orifice with potential weak areas. Each classification is made on the nature, quality, and disposal of various muscular-ligamental structures.

The symptoms are: a swelling in the inguinal area of the scrotum in men or of labium majus in women; a small discomfort or pain in inguinal area or in scrotum. The discomfort felt more intense while bending or weightlifting and disappears while lying down; the sensation of weight, swelling, burn in the area of the hernia, scrotum or the inside of the thighs.

Symptomatology is dominated in general by pain experienced as weight, traction, but vivid, more intense with effort or standing up. It can mimic a painful syndrome, typical to biliary, ulcerous, appendicular sufferance.

A hernia must never be inferred based on the simple appearance of parietal deformation, just like not any pain in the weak areas with risk for herniation is a hernia.

During general examination, the following must be examined: the status of the cardio circulatory apparatus, the status of respiratory apparatus, any presence of constipation, any urine retention; the rectal exam is compulsory.

Local examination consists of: inspection, palpation, assessment of reducibility by manual pressure, estimating the size, location and elasticity of the hernial ring; the content of the hernial sac can be estimated by palpation -remitent, elastic, enterocoele or soft consistency with granular surface-epilocele, and by percussion -dullness, tympanism or auscultation -presence or absence of peristatic noises; the standing patient is asked to cough with the tip of the index finger inserted in the hernial canal -feeling the hit: of the viscera in the exploring finger (as a response to coughing).

Differential diagnosis: benign tumors of the inguinal region (fibroma, lipoma, angioma); fluid inguinal adenopathy; cysts of cordon; hydrocele can be mistaken for scrotal inguinal hernia, but it is not reducible, the testicle can be palpated, incorporated in the fluid mass, and the palpation of the mass is felt like a fluid under tension. The case of a communicating hydrocele may generate confusion, especially because, by complete persistence of the peritoneal-vaginal canal, coexists (varicocele, especially when it is large).

In present, the treatment of inguinal hernias has two strategic lines: (elective) surgical treatment, and orthopedic treatment.

The surgical treatment in elective conditions is not complex, does not involve major exploration of the peritoneal cavity and large visceral manipulations, is not subject to metabolic complications, while the postoperative mortality is almost zero.

Orthopedic treatment is absolutely indicated in uncomplicated hernias secondary to advanced neoplasia or secondary to extended cirrhotic ascites, with minimal surgery benefit. In case of strangulation, the intervention is postponed only to restore the hydric and electrolytic balance by administering Ringer solution intravenously. The antibiotic therapy is started systematically.

The adequate preparation may need a longer time for administering liquids and electrolytes, especially potassium and blood for patients suffering from bowel obstruction for several days. Prior to stabilization of the general state, the intervention may have disastrous results.

For uncomplicated hernias, one evening before the surgery, an evacuation enema is performed, as well as sedatives. Preoperative, the bladder is emptied.

For voluminous hernias, one must consider the possibility of intestinal or colic resection, with the appropriate bowel preparation. Because suppuration, one of the complications of this surgery may recurrence, it is important to do the local preparation of the patient. Local anesthesia with 0.5% novocain is preferred.

The operative steps are dissection of the inguinal canal, repairment of the myopectineal ring, and closure of the inguinal canal.

The sac is a white membrane, anterior and inside the spermatic cord; usually, it is slightly different from the
surrounding structures. If the hernia is small, the sac is upwards in the canal. The vas deferens can be recognized by palpation due to its firm consistency compared to other structures of the cord. The wall of the sac is slightly raised and carefully opened to avoid any damage to the content. While the borders of the sac are kept with clamps, the content is pushed in the peritoneal cavity. With the index finger of the left hand inserted in the sac to give counter-resistance, the surgeon releases the sac with his right hand by blunt or sharp dissection.

Sharp dissection is used to separate the vas deferens and adjacent vessels from the sac. If done carefully, one may encounter a few bleeding points, which can be kept away from the sac by blunt dissection with compression. Continue the dissection until reaching the peritoneal fat which will be removed, identifying the peritoneum behind the hernial fluid collection. The sac is open at 2-3 cm distance from the fluid collection and the index finger can explore to point out the presence of an inverted Y hernia, a direct hernia, or a femoral hernia.

To ensure the closure of the sac, a bursa is performed on the inner side of the fluid collection, or several transfixion suture points. The lumen of the fluid collection of the sac must be viewed when placing and closing the suture, to avoid any possible damage of the omentum or the intestine. This suture should include fascia transversalis and peritoneum. The fluid collection of the sac can be sometimes identified as a whitish and slightly thickened ring. That sac should be ligated proximal to this ring. After the thread of bursa is tightened, the excessive sac is cut away from the fluid collection and the index finger can explore to point out the presence of an inverted Y hernia, a direct hernia, or a femoral hernia.

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Tissular techniques: Marcy operation (balancing the deep inguinal ring); Bassini.

Since 1884, when Bassini published the surgical technique of the inguinal hernia, numerous techniques have been applied. Many of them, after a period of enthusiasm, have been abandoned because of not having the expected results. During the last 30 years, the surgical treatment of inguinal hernias continued being the most debated topic of all general surgery operations. The surgical treatment of inguinal hernias can no longer be viewed as the simple suture of the borders of a parietal defect. Ferguson’s technique (keeping the cordon in place).

Techniques derived from Bassini surgery are a group of surgical techniques that obey to Bassini’s postulate: resection of cremaster muscle, complete opening of the posterior wall, tissular repair of the posterior wall.

Tissular Lichtenstein’s technique was published in 1976, attempting to improve Bassini’s technique, replacing the triple layer.

Techniques that use the iliopubic tract (Condon’s technique) -the purpose of this surgical intervention in herniorrhaphy is to amplify the known hernial protection mechanisms -the sphincter of the deep ring, for the indirect forms, and the shutter of the aponeurotic arch of the transversalis for direct forms. Keeping the anatomic accuracy to Bassini’s technique, R. E. Condon adopts a technique based on distinct use of iliopubic tract in herniorrhaphy.

Repairing the posterior wall of the inguinal canal, it could be considered anatomic, maybe the best method.

Lichtenstein doesn’t challenge the iliopubic tract, but he regards it of a variable consistency, unable to support a routine herniorrhaphy. Between the iliopubic tract and the aponeurotic arch of the transversalis there is a significant space that destroys through a weak suture may develop a tension that may generate relapse.

In indirect hernia, apply a strengthening of the posterior wall of various sizes, but one must recalibrate the deep ring. There are no standard criteria to repair the medial cord posterior wall.

In indirect hernia the technique focuses on strengthening the posterior wall, without paying too much attention on the repair of the deep ring.

More and more the traditional surgery of hernias is replaced by hernioplasty without tension because by traditional repair of inguinal-femoral parietal defects structures that normally are not in apposition are joined; the use of iliopubic tract in repair leads to raising it with the anterior-medial enlargement of the femoral ligament, that may lead to the onset of a iatrogenic femoral hernia; there are metabolic and biochemical proves that certify the association of direct inguinal hernia with a damage of the collagen in connective tissue of the inguinal region. Their use in repairment of such structures with a low biologic quality is illogical.

The goals of the laparoscopic treatment of inguinal hernias are similar with the ones of the classic technique - dissection of the sac and protection of the posterior wall to avoid the relapses. Currently, the most used technique is the transabdominal one, consisting in incision of the peritoneum near the inguinal fossae, dissection of the anatomic elements in the region, with the dissection and resection of the sac, application and fixation of the surface, and the closure of the peritoneum.

The principles are like the ones used in classical technique: a convenient way of approach, precise identification of the anatomic elements, resection of the lipoma, adaptation of the technique to the type of hernia and to the patient.

Contraindications refer to complicated hernias (strangulation with hernial occlusion, saccular peritonitis, irreducibility), sliding hernia, cardiac patient, who cannot be operated under general anesthesia, to whom the pneumoperitoneum increases the risk for arythmia and of cardiac decompensations, children, young people with hernias type I or II Nyhus.

The operatory preparations do not involve special measures. General anesthesia with orotracheal intubation is preferred. Epidural anesthesia without CO2 insufflation can be used, using devices to raise the abdominal wall.

The preperitoneal transabdominal procedure included the techniques through which the preperitoneal space is approached by incision of the peritoneum in abdominal cavity.

The post operatory care is simple. Any drainage is suppressed after 12-24 hours, depending on the drained quantity. After 2 days, the patient may be released from hospital. The stiches will be removed after 4 days. The patient may resume physical exercises much sooner (7-14 days).

The most frequent complication is the relapse by incomplete covering of the parietal defect. Occlusions by strangulating an intestinal loop in trocar orifices or in the peritoneal sac are specific to transabdominal technique.

Experimental part
Material and method
A male patient, 55 years old, was included in a study, conducted at Department of Surgery, of Clinic Hospital Cl Iasi, between 02/05/2019 and 10/05/2019, with presumed diagnosis: inguinal hernia.
Results and discussions

The patient was hospitalized with sub-occlusive phenomena on an incarcerated hernial formation (incarceration: irreducible through adherences to sac, reaction fluid serous-citrine – various dilatation of the cross of internal saphenous vein); a feeling of traction with burning in inguinal-scrotal hernia.

Objective examination was essential for inguinal-scrotal hernia diagnosis.

The clinical examination was performed with the patient standing, asking him to cough, when hernia showed.

Inguinal-scrotal hernia appears clinically like a mass, inguinal tumefaction located immediately above the inguinal arcade, down to the scrotum. The tumefaction is often obvious when the intraabdominal pressure increases (standingposition, cough crying, etc.) and it spontaneously disappears when the abdominal muscles are relaxed, and the patient is lying down. The teguments of the inguinal region and of the scrotum are elastic, normally colored, but the scrotal folds faded by distention.

At the inferior pole of the tumefaction the testes is palpated, with normal volume and consistency.

Epiploectomy was performed, followed by the treatment of hernia, an alloplastic procedure.

The surgical treatment was classic, alloplastic = elliptical incision – vertical or horizontal – suppressing the umbilical = hernial pouch (sac + content) = repair of the abdominal wall: - peritoneum is horizontally sutured – the aponeurotic muscle is sutured (classic procedure) either horizontally (Mayo technique), or vertically (opening the sheath of the right).

Good post-operative evolution. The lab exams show normal values, and well as pathologic values: serum uric acid: 7.24; gamma glutamyl transferase 57; total bilirubin 1.23; tgp 66.

Diagnosis upon release from hospital: incarcerated right inguinal scrotal hernia.

Secondary diagnosis upon release from hospital: sub-occlusive syndrome, right acute orchiepididymitis, hepatic steatosis and chronic hepatitis, cholesterolosis chronic occlusive syndrome, right acute orchiepididymitis, hepatic inguinal hernias.

The patient was called again for another check up, the content is an interstitial segment.

The palpation reveals a mass of elastic consistency, reduced under gentle pressure, cranial and posterior, disappearing with perception of hydroaerial noises, when the content is an interstitial segment.

The effectiveness of the surgical technique is given by the ratio of post-operative complications (especially the incidence of the chronic pain) and the recurrence ratio.

References


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