TRANSABDOMINAL PRE-PERITONEAL TECHNIQUE (TAPP) IN LAPAROSCOPIC SURGERY OF INGUINAL HERNIA

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Abstract: *Inguinal hernias represent a common pathology in the general surgery departments; the frequent complications of such pathology, as well as the temporarily reduced work capacity led imagining minimum invasive procedures, sustainable and free of any additional complications as compared to the classical techniques. Among all laparoscopic techniques, TAPP – transabdominal preperitoneal seems to be more accurate, with postoperative long distance results and with minimum complications compared both to the technique itself and to the classical techniques. TAPP stands for the classic surgery principles, accomplishes the benefits of a solid remaking of the abdominal wall and the possible complications are at least similar with the ones of the classical surgery. The procedure has the advantage of being less invasive, short hospitalization, good recovery of the patient without pains in the early postoperative period and rapid socio-professional reintegration of the patient. After a thorough analysis of the specialized literature, the present article highlights the accuracy of the TAPP technique, the complications that may occur, comparing the TAPP with the other laparoscopic and classic surgery techniques.*

Cuvinte cheie: *hernie inghinală, tehnica transabdominală properitoneală, chirurgie laparoscopică*

Rezumat: *Herniile inghinale reprezintă o patologie des întâlnită în serviciile de chirurgie generală, iar complicaţiile frecvente ale acestei patologii cât şi incapacitatea de muncă temporară au condus la imaginarea unor tehnicii minim invazive celioscopice, durabile, fără complicaţii suplimentare în comparaţie cu tehnica clasică. Dintre toate tehnicile laparoscopice imaginate, abordul properitoneal transabdominal – TAPP, pare să fie cel mai fezabil, de durată şi cu complicaţii postoperatorii minime atât "per se", cât şi în comparaţie cu tehnicile clasice. TAPP respectă principiile chirurgiei clasice, asigură o refacere de durată a peretelui abdominal, iar complicaţiile ce grefează acest procedeu sunt cel puţin comparabile cu cele din chirurgia clasică. Procedeul are avantajul minimei invazivităţii, duratei scurte de spitalizare, confortul crescut al pacientului prin lipsa durerilor din postoperator şi reintegrare socio-profesională rapidă. Articolul de faţă, printr-o analiză atentă a literaturii de specialitate, prezintă acurateţea tehnicii din TAPP, complicaţiile acestui procedeu şi, totodată, realizează o comparaţie atât cu celelalte tehnici celioscopice cât şi cu procedeele clasice*

Inguinal hernias laparoscopic surgery started to be exploited 20 years ago, when the surgeon L.W. Popp published the first series of inguinal hernia cases resolved this way. Then, Schultz introduces the "plug and patch" technique and McKernan communicated the pre-peritoneal technique in the year 1992. Today, laparoscopic hernioplasy is widely used, without being considered "the golden standard" in the treatment of such parietal disorders.(1-8)

PREOPERATIVE PREPARATION

For the comfort of both the patient and the surgeon, it is preferred that the operation be carried out under general anesthesia with oro-tracheal intubation. For a better visualization of the lower abdomen structures, bowel loops should be removed from the surgical field. Thus, the patient should be placed in the Trendelenburg position, in dorsal decubitus with an inclination of the trunk of 10º inferiorly and laterally towards the opposite side of the operated area, with arms in abduction to allow the maximum mobility of the surgical team. The surgeon will be positioned on the counter-lateral side of hernia, the assistant on the opposite side, and the monitor, at the patient's legs.

The instrumentation used is the classic one, used in most laparoscopic operations: Veress needle, three 10 mm trocars, 30 inclination camera, balloon trocar, a 5-mm dissection trocar, 5 mm clamp dissection, 10 mm curve clamp dissection, needle carrier, 10 mm tampon-carrier clamp clips or pins applicator to secure the mesh, hook cautery, 5 mm curve scissors dissection, flush-suction cannula, 15/15 cm mesh. (1-8)

APPROACH POINTS

Trocars provision for inguinal hernias cure varies significantly depending on the type of the intervention used. For properitoneal transabdominal approach (TAPP), symmetrical positions for instrumentary trocars are recommended to be used, since a subclinical weakening of the apparently healthy inguinal region has been relatively frequently found. Regarding the extraperitoneal total technique (TEP), besides the subumbilical trocar, another one on the median line is used, halfway at the

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pubo-umbilical distance, and a lateral trocar on the same side as hernia, and if available, a clip applicator fixing the mesh. In bilateral TEP hernias, four trocars of 10 mm in diameter are required in order to allow the introduction of a variety of instruments. However, at least two trocars should be of 10 mm, one for optics and another one to allow the introduction of the mesh, an exception being the case in which the introduction and setting mesh are made by the subumbilical trocar, under the control of a 5 mm camera from a lateral trocar.(1-8)

ANATOMICAL LANDMARKS

Laparoscopic anatomy of the inguinal region requires the identification of landmarks on which to perform properitoneal space dissection, outlining the necessary elements for a proper disposal and eventual fixation of the mesh. Intraperitoneal image of inguinal regional allows viewing the medium umbilical ligaments, the midline located urachus, of the epigastric vessels with iliac vascular package origin and the deep inguinal orifice that penetrates through the spermatic cord. It consists of spermatic vessels with oblique inferior-medial line and the deferent duct that joins it coming from the small pool. Vascular lesions may affect the iliac and epigastric vessels, as well as corona mortis, defined as an anastomosis between the epigastric and obturators branches, located on the back of the bin, medially to iliacs. Regarding the TEP, the deep entering with the balloon dissector can damage the dorsal penis vein.(1-5,7,9,10)

Transabdominal Properitoneal technique (TAPP)

TAPP involves peritoneum incision in the right of the inguinal fissures, dissection of anatomical regional elements, positioning and fixing the mesh and closing the peritoneum.

I.Peritoneum incision begins transversally, 1-3 cm above the profound inguinal orifice and extends medially up to the medial umbilical fold without intercepting it.

II.Complete dissection of the properitoneal space with starts with the removal of the adipose tissue from the lower edge of the transverse muscle, from the Cooper ligament, ilio-pubic tract and from the epigastric vessels.

III.Preparation of the hernial bag of the external oblique hernia, direct and femoral, is usually made by blunt dissection, separating and dissecting the preherniar lipoma that frequently accompanies the bag. It should be also highlighted the ilic-pubic tract portion of the spermatic cord laterally situated, as it is one of the points of support for calibration by suturing the deep inguinal orifice.

IV. Closing the hernial gap is considered a vital manoeuvre, which involves choosing an appropriate mesh type in terms of size and material, of corresponding diameter, sutured with a monofilament thread, of 0 in thickness. Closing the deep inguinal gap is made laterally from the spermatic cord, by suturing the transverse muscle at the ilio-pubic tract, while the breaches of Hesselbach area, of direct hernias, are closed by suturing the lower edges of the transversal muscle to the ilio-pubic tract or to the Cooper ligament. Especially for direct hernias, the suture of transversalis fascia in X is useful, because the tension is generally higher. As against the direct hernias, femoral hernias do not need suture, mesh application being sufficient. (6-8,11-14).

The meshes used were originally of 10/15 cm size, but they need to be adapted so that to cover all areas of potential herniation. They must cover medially 1 cm of the right abdominal muscle on the same side as the hernia, come down inferiorly and medially to 1 to 1.5 cm in bins, 2 cm higher to arcuate Douglasline and reach the antero-superior side of the iliac spine. For the customary physiological passage of the spermatic cord, mesh incisions are being used, its position, length and orientation depending on the anatomical conformation of the patient. This incision can be recalibrated by suturing or applying a second mesh reinforcing the incision area. Meshes are made of very different materials, but most of the times polypropylene is used, which has the advantage of being more rigid and allows for easier application, even without fixation. Other materials include polyester, which is cheaper, but must be fixed in at least on four points due to its lower consistency, as well as tetrafluorethylene.

To enter the meshin the field operator, the 5 mm homolateral trocar and 10 mm umbilical trocar can be used, as well as the clips applicator, which allows a bilateral fixation of the mesh and a positive angle to the abdominal wall, if the central trocar is used. Experimental research shows that the fixation strength increases with the number of clips and that resistance increases in the first two weeks only on the basis of cellular infiltrate and is significantly higher two months later because of the collagen deposited. The prosthesis is applied on the Copper ligament, on the ilio-pubic tract medially to the iliac vessels, on the lateral side of the right abdominal muscle and on the lower edge of the transverse muscle.

To facilitate unfolding, one can use special meshes that have self-opening systems similar to that of an umbrella or others that have an elastic marginal ring, which opens when the trocar is released. Under no circumstances, do not apply clips in the triangle bordered by the deferent duct and the spermatic vessels because of the danger of major damage to the iliac vessels, neither under the ilio-pubic tract, laterally to the spermatic cord, because it enters the triangle area of pain, through which the genito-femoral and lateral femoral cutaneous nerves are passing. When fixing the Cooper ligament do not put extreme pressure on the applicator, as the clips will slide the bins and will close the gap.(1-4,6,5-18)

V. Finally cavity drainage is practiced by placing a drain tube, inserted through a minimum incision, which descends along the epigastric vessels, to the most declivous point, posteriorly and inferiorly by symphysis.

VI. Peritoneum closure is necessary to avoid the direct contact of the mesh with the intestinal loops that can only be made with clips or continuous suture, finished with intracorporal knot or blocked at the ends with clips. The most appropriate for this suture is stitching, resorbable 20-22 cm long thread.(1-4,6-8,11-14)

INTRAOPERATORY INCIDENTS AND ACCIDENTS

In the cardiac patients, pneumoperitoneum increases the risk of arrhythmias, heart failure, cardiac decompensation. In the patients with large inghino-scrotal hernias, with sliding hernias, there is the risk of intestinal injury. During pre-peritoneal transabdominal technique, bowel burns may occur by using unisolated tools, with the appearance of bedsores, late perforations and secondary peritonitis. It is possible to damage the deferent and spermatic vessels, with the occurrence of scrotal hematomas and testicular ischemia. During pre-peritoneal technique, dissection under the right abdominal muscle may cause hematoma.(13)

POSTOPERATIVE CARES AND COMPLICATIONS

Postoperative care is simple. An eventual drainage may be removed after 12-24 hours, depending on the amount drained. Discharge can be done 2 days later. Clips are removed after 3-4 days. The resume of the physical activity is more rapid (7-14 days).

The most common complication is the recurrence by incomplete coverage of the parietal defect. Occlusions by strangulation of the intestinal loops in trocars orifices or in peritoneal surjet breach are specific to the transabdominal technique. It is also possible to experience neuropathy secondary to incorrectly applying the clips to fix the mesh. Persistent pain

for 4-6 weeks required laparoscopic removal of the clips and more than 6 months complaints imposes classic neurectomia. Minor complications such as hydrocele or ischemic orchitis are rare (6).

SEQUELAE

Sequelae are very rare, much rarer than in the classical technique.

RESULTS, PROGNOSIS

The results are good (recurrence rate less than 3% according to most authors). The prognosis is favourable.

The careful analysis of the specialized literature that compared the laparoscopic techniques with the conventional ones could not establish a standard technique and a uniformization of the indications for this type of parietal defects. Comparing the TAPP and TEP techniques, there are no significant differences in terms of surgery length, postoperative complications, recurrences or socio-reintegration. More hernias are cited on trocars ports places and visceral lesions for the TAPP technique, but without a consensus in the literature on these postoperative complications.

In conclusion, the study of the specialized literature reveals no consensus regarding the establishment of the specific indications for the laparoscopic technique, the decision depending to the surgeon's experience, the results obtained by different types of laparoscopic approach, technical feasibility and of course according to the patient's option.(19-22)

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