

**UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE „CAROL DAVILA”,
BUCUREȘTI**

**ȘCOALA DOCTORALĂ
DOMENIUL MEDICINĂ**

PhD SUMMARY

**Supervisor:
PROF. UNIV. DR.NICULAE IORDACHE**

**PhD Student:
UNGUREANU CLAUDIU-OCTAVIAN**

2024

**UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE „CAROL DAVILA”,
BUCUREȘTI**

**ȘCOALA DOCTORALĂ
DOMENIUL MEDICINĂ**

***SURGICAL IMPLICATIONS OF THE RIVES-STOPPA PROCEDURE IN
OPEN AND MINIMAL INVASIVE SURGICAL TREATMENT OF
PARIETAL ABDOMINAL DEFECTS***

PhD SUMMARY

**Supervisor:
PROF. UNIV. DR. NICULAE IORDACHE**

**PhD Student:
UNGUREANU CLAUDIU-OCTAVIAN**

2024

Table of contents

LISTA DE PUBLICAȚII.....	3
ABREVIERI.....	5
INTRODUCERE.....	8
I. PARTEA GENERALĂ - STADIUL ACTUAL AL CUNOAȘTERII	14
1. 1. NOȚIUNI DE ANATOMIE CHIRURGICALĂ A PERETELUI ABDOMINAL.....	14
1.2. CONCEPTUL TRIPARTIT AL PERETELUI POSTERIOR AL CANALULUI INGHINAL	17
1.3. VASCULARIZAȚIA STRATURILOR MUSCULARE ALE PERETELUI ANTEROLATERAL AL ABDOMENULUI ...	26
A. Vascularizație arterială.....	26
B. Drenaajul venos	29
C. Drenaajul limfatic.....	29
2.1. CLASIFICAREA EHS A HERNIILOR INGHINO-FEMURALE	30
2.2. NOMENCLATURA A TEHNICILOR DE CURĂ A DEFECTELOR PARIETALE (EVENTRAȚIILOR)	32
2.3. PROCEDEUL RIVES-STOPPA CLASIC (TEHNICA ”GIANT PROSTETIC REINFORCEMENT OF THE VISCERAL SAC” GPRVS).....	34
2.4. PROCEDEUL RIVES-STOPPA MODIFICAT PENTRU REPARAREA HERNIILOR INCIZIONALE ALE PERETELUI ABDOMINAL.....	35
2.4. 1. Indicațiile procedurii Rives-Stoppa modificat.....	41
2.4. 2. Avantajele procedurii Rives-Stoppa modificat	41
2.4. 3. Dezavantajele procedurii Rives-Stoppa modificat	41
2.5. CLASIFICAREA EHS A HERNIILOR INCIZIONALE.....	42
2.6. APLICAȚII ALE PROCEDEULUI RIVES-STOPPA.....	44
2.6.1. Aplicații ale procedurii Rives-Stoppa în chirurgia clasică herniară.....	44
2.6.2. Aplicații ale procedurii Rives-Stoppa în chirurgia laparoscopică herniară.....	44
II. CONTRIBUȚII PERSONALE.....	47
3. CONSIDERAȚII ASUPRA PROCEDEULUI TOTAL EXTRAPERITONEAL (TEP).....	47
4. REZULTATE ALE CHIRURGIEI HERNIARE ÎN HERNIA INGHINALĂ BILATERALĂ: POATE FI CONSIDERAT ABORDUL TOTAL EXTRAPERITONEAL CEA MAI BUNĂ OPȚIUNE?.....	48
4.1. Introducere.....	48
4.2. Material și metodă	48
4.3. Rezultate.....	59
4.4. Discuții	70
4.5. Concluzii	74
5. ABORDUL CHIRURGICAL ÎN HERNIA INGHINALĂ BILATERALĂ – UN STUDIU CAZ-CONTROL	76
5.1. Introducere.....	76
5. 2. Materiale și metodă	77
5. 3. Rezultate.....	80
5. 4. Discuții	86
5. 5. Concluzii	91
6. PREZENTARE DE CAZ ȘI REVIEW AL LITERATURII: DESPRE UN SEROM VOLUMINOS SIMPTOMATIC APĂRUT PRECOCE POSTOPERATOR DUPĂ CURA HERNIEI INGHINO-SCROTALE, PROCEDEU TEP.....	93
6.1. Introducere.....	93
6.2. Prezentare de caz	94
6.3. Comentarii asupra cazului și review al literaturii.....	95
6.4. Concluzii	104
7. ABORDUL LAPAROSCOPIC AL HERNIEI INGHINALE ASOCIATE CU CRIPTORHIDISM LA ADULT – SERIE DE CAZURI ȘI REVIEW AL LITERATURII	106
7.1. Introducere.....	106
7.2. Cura herniei inghinale, procedeu Trans Abdominal Properitoneal Extraperitoneal (TAPP) - tehnică standard	107
7.3. Prezentarea cazurilor	110
7.4. Comentarii asupra cazurilor și review al literaturii.....	114
7.5. Concluzii	117
8. CONSIDERAȚII ASUPRA PROCEDEULUI DE CURĂ HERNIARĂ CU LAMBOU PERITONEAL (PERITONEAL FLAP REPAIR).....	118

CONCLUZII ȘI CONTRIBUȚII PERSONALE	120
BIBLIOGRAFIE	125

This paper includes a **general part**, which contains two chapters: the first with three subchapters, which deals with the problem of parietal anatomy addressed to the inguinal and anterolateral regions, and the second with six subchapters, which refer to the classifications of hernias and events, along with the nomenclature of techniques for cleaning parietal defects and description of the Rives-Stoppa standard procedure, as well as a modified technique for incisional hernia treatment.

The anatomy section includes a description of the triangle of F. K. Hasselbach, which is one of the bases of inguino-femoral hernia classifications and has returned to the spotlight of parietal surgeons with increasing interest in laparoscopic hernia surgical anatomy [10].

Current anatomical changes originally described by Hasselbach included direct and indirect hernias of the superviseal hernias, thus altering the bipartite concept to a tripartite one of the posterior wall of the inguinal canal.

Another structure described by Fruchaud is the myopectineal orifice (MPO), which influences the correct repair of inguinofemoral hernias. The hernial sac must be dissected from the MPO area, and the prosthetic material must extend at least 3-5 cm beyond the limits of the MPO to prevent migration of the mesh, which can lead to recurr [12].

Another highly disputed structure is the transversalis fascia, which has a distinct importance in the total extraperitoneal process (TEP) [11]. Laparoscopic surgical treatment also led to the definition of two ‘hot’ areas called trigons: the pain triangle (‘triangle of pain’) and the danger triangle (‘triangle of doom’), and, by whose recognition can reduce the risk of neurovascular complications [18]. Vascularization of the abdominal anterolateral wall is another theme discussed in a separate chapter.

Of the classifications described, we adhered to those proposed by the EHS for inguinofemoral hernias [29], but also for incisional hernias [33].

In the chapter on the modification of the Rives-Stoppa (RS) process, we also dealt with the indications of the process, along with its advantages and disadvantages [70]. Indications for the modified RS process are complex events associated with predisposing factors for recurrence (parietal defect > 5 cm, multisacular hernias, and associated comorbidities), events with various localizations (median, subcostal, paramedian, transverse, transverse, flank,

parastomal, etc.), and events in obese patients with an increased recurrence rate in other surgical procedures.

Another chapter described the anatomical plans for mounting the prosthetic material: onlay, inlay, sublay-preperitoneal, and sublay-intraperitoneal. The sublay-retromuscular procedure had the lowest recurrence rate.

In the last chapter, we referred to the application of the RS procedure in open and laparoscopic hernia surgery. I mention here the special contribution [8] of Jorge Daes, by describing and applying the eTEP (extended TEP) process, which led to the emergence of the eTEP-RS, process, with the addition of TAR (release of the abdominal transverse), in certain situations, popularized in Romania recently and robotically through the efforts of Victor Radu [9].

Hernioplasty can be performed in an open or minimally invasive manner (laparoscopic or robotic surgery). The current recommendation of HerniaSurge [35] (a group of herniologists supported by EHS) is that hernial repair be performed with prosthetic (mesh) material; it is also recommended that the parietal surgeon be able to provide the patient with both types of approach (previously and posteriorly [1, 2]).

Of the open procedures, in the cure of inguino-femoral hernias, the Lichtenstein technique is the standard of care; however, in certain situations, one can opt for a tissular procedure such as Shouldice. When there are resources and the surgeon masters the technique, re-order minimally invasive procedures (preperitoneal transabdominal [TAPP], TEP, and robotic variants) [36].

The recent introduction of robotic surgery in hernioplasty (rTAPP, rTEP) has led to a better understanding of anatomy, and Jorge Daes's contribution through the critical view of the myopectineal orifice, a recent study, viewed as an application of the critical view of safety (CVS) from other surgical areas, which states the principles of anatomy that can guide a correct hernial cure [173].

Understanding the anatomy of the preperitoneal space and the posterior inguinal anatomy leads to a minimally invasive procedure without complications. In addition, a good and sufficient dissection will help lay the prosthetic material, the size of which was set at 15 ×

11 cm (or $15 \times 10/12$ cm), thus completely covering all hernial defects. The purpose of these principles is to reduce recurrence, a constant concern in parietal surgery.

Another problem encountered by parietal surgeons is chronic postoperative pain, which can be limited by viewing and protecting the nerve filaments. In addition, the limitation of fixation in minimally invasive procedures, proposed by the EHS, since 2014 protects the femurocutaneous lateral nerve, genital branch, and femoral branch of the genitofemoral nerve when fixation can damage the ilioinguinal and iliohypogastric nerves.

Of the minimally invasive procedures, the TEP procedure is the application of the principles developed by Rives-Stoppa for inguino-femoral hernias [34]. The advantages of minimally invasive procedures are on the one hand, for the patient (socio-professional reintegration, small incisions, absent wound complications, etc.), and on another hand, for the surgeon. Familiarity with inguinal anatomy from a previous perspective will be understood through practice and improvement, the posterior inguinal anatomy, which leads to the mastering of hernias and their complications.

The special part of the personal contributions includes six chapters and one last chapter, which includes the general conclusions of the thesis. The first chapter of the special part refers to personal considerations of the total extraperitoneal procedure (TEP), along with the seven steps proposed by G. Ferzli [34]. For the proper conduct of the TEP procedure, we add another three steps, in which I refer to the hernial sac issue and treatment of the parietal defect.

The second chapter of the special part includes the first working hypothesis, namely, whether the laparoscopic approach using the TEP technique is optimal for the cure of bilateral inguinal hernias. This study shows the characteristics and results obtained in our department of general surgery. The European guidelines, Herniasurge and EAES (The European Association for Endoscopic Surgery), propose a minimally invasive approach in patients with bilateral inguinal hernias as recommended and optimal, given the surgeon's experience, as well as the available resources [35, 36].

This chapter describes the TEP technique in detail, with personal additions, and emphasizes the idea of exhaustive dissection of the myopectineal space, reduction of the bag, parietalization of the spermatic funicle, and the use of nets of 10×15 cm, bilaterally mounted, overlapping on the midline. Technical additions and mesh placement are described for hernias

with large defects (type L>3 according to the current EHS classification). The study involved 83 patients with 158 hernias (12 non-inguinal: 2 femoral, 2 obturatorial, and 8 umbilical). The inclusion criterion was a symptomatic bilateral inguinal hernia.

The retrospective statistical analysis evaluated quantitative and qualitative variables (the combination of variables was determined by the chi-squared test), with reference to the characteristics of the patients in the study (sex, age, associated comorbidities, ASA score, etc.), the characteristics of the hernia (type of hernia, associated interventions), and the process used (operator time, type of prosthetic material used, intra-and postoperative complications, hospitalization time). Postoperative seroma was present in six patients (7.23%), but all these cases were managed conservatively. There were two bleeding complications requiring reintervention, two complications described as ‘sensation of mesh,’ and one patient experienced recurrence (1.2%).

Therefore, we conclude that the TEP procedure is an excellent option for the treatment of bilateral inguinal hernias, with a low recurrence rate and considerable advantages for the patient from a minimally invasive perspective. The advantage of TEP over open procedures is the identification and concomitant treatment of other hernias.

What I would like to point out is that ‘internal’ beauty of the TEP technique; thus, a number of terms are introduced ‘angel hair,’ ‘lighthouse,’ are introduced, which by observing and defining them allows the surgeon to be familiar with the dissected preperitoneal space.

Another important advantage of TEP over other techniques is the location of the extraperitoneal dissection, which protects the intraperitoneal organs. I should also emphasize the comparison with the rTEP process (roboticTEP), which involves time on the console and another docking time, which increases the total time of the intervention. Therefore, TEP remains superior from this perspective as well as in terms of intervention costs.

Of course, minimally invasive operations decrease the duration of hospitalization due to the absence of complications related to the morbidity of the wound, but also the risk of nerve damage; however, the subjectivity of patients must also be noted. Sometimes, general anesthesia is more difficult for some patients to tolerate, especially if they are elderly and have comorbidities.

Chapter 5 came in this note, through the second study to bring clarification: age > 65 years can be regarded as a factor influencing the surgical approach; in other words, can we operate minimally invasive and patients older than 65 years? (another hypothesis).

The advantage of the open process, for example, the Lichtenstein process, is that it can be performed safely under local anesthesia. But other techniques, such as Stoppa or TREPP (preperitoneal trans-teaca abdominal right) can be performed with loco-regional anesthesia. Therefore, if we reduce the discussion to anesthesia, open procedures will win (although some authors have described TEP as having good results with spinal anesthesia [174]).

This second case-control study comprised the control group of laparoscopic patients operated on by the TEP technique, thus trying to determine the risk of open surgery in these patients, with a risk factor of > 65 years. In our study, we considered the case group as patients who underwent open-label surgery, and the control group as patients who underwent laparoscopic surgery, following the risk factor age of > 65 years.

In the control group (laparoscopic), 82 patients underwent laparoscopic TEP surgery under general anesthesia, while in the case group, 23 patients underwent open surgery through one of the known techniques (Lichtenstein, Germany, Rives, Stoppa), using local or spinal anesthesia. For all patients analyzed, prosthetic materials were used: 3D bard, ultralight, or polypropylene monofilament (PPMF).

Several variables with statistical significance were studied and subjected to multivariate analysis: age > 65 years, neoplastic status, use of anticoagulants, and inguin-scrotal hernia status. Risk factors were compared between the two groups: cases and control, using multivariate logistic regression analysis. The relative risk (RR) for cases versus controls was estimated by calculating the Odds Ratio (OR) with 95% confidence intervals (CI 95%). We used Microsoft Excel 2023 ® and SPSS 23.0, for data collection and analysis.

It can be noted here that at the age of > 65 years, these statuses are commonly associated: many patients have had or currently have neoplasia; also, a large number of patients have a strong cardiology, which requires treatment with anticoagulants; moreover, in old age, we encounter more frequently bulky inguino-scrotal hernias, evolutive, and in some situations, complicated.

Adjusted risk (aOR) showed that patients aged > 65 years had a *four times higher risk* of open surgery than minimally invasive surgery.

Similarly, *the use of anticoagulants* has been found to have at least a 38 times higher risk of open surgery. How age affects the choice of the open technique at the expense of the minimally invasive technique is an aspect that must be correlated with the risk factors associated with age – a theme to explore in future studies.

Starting with the problem of large inguino-scrotal hernias, Chapter 6 discusses one of the complications of hernioplasty, namely postoperative seroma. The working hypothesis refers to the existence of ways in which seroma can be prevented after laparoscopic hernial cure of inguin-scrotal hernias; it also addresses the issue of the hernial sac.

Usually, postoperative seroma is asymptomatic and self-limiting; however, when treatment is necessary, it usually refers to conservative therapy, which can be accompanied in particular situations by aspiration puncture. However, in some patients, it can be a problem with persistent pain symptoms despite the conservative therapy mentioned, as well as anxiety for the parietal surgeon, through the prospect of confusion with a herniated relapse.

Therefore, there is also a problem with the hernial sac, because reducing the rate of seroma formation and improving healing can be achieved through good management of the hernial sac. Many techniques have been described for solving this hernial sac and false sac, called the pseudosac, which is the remaining portion of the sac created by inflammation and hernial progression at the scrotal level.

Primary abandon-of-the-sac, which often gives good results, in some patients has the defect of continuation of sacular inflammation; hence, the progression of the seroma, as was the case presented in the third study [126].

As variants, Daes describes the high ligation of the bag [120], Berney presents the technique with endoloop [128], the aspiration type drainage is mentioned with very good results [130-134], Li J. like Petersen they close the defect [135,136] and others.

There is no perfect technique, but criticism is made of the closure of the defect and ligatures of the sac by ischemia, which causes inflammation; therefore, the progression to

seroma, as well as the increase in operative time and postoperative pain, which occur through the traction and adhesion of these ligatures/sutures.

The fact is that surgical trauma should be minimal, which is demonstrated by the presence of elevated C-reactive protein (CRP), which could be correlated with bulky seroma (the situation of the presented case demonstrates it).

This marker of inflammation, which is extensively used in many areas of surgery, may be a predictor of seroma occurrence and persistence.

Conclusions of this study on a series of three cases, of which one patient had intrachannel testicular ectopia (one patient) and the other two patients had intra-abdominal ectopia and ectopia at the boundary with the deep inguinal orifice, showing that the TAPP process is feasible and safe for solving both associated pathologies, with good results. Therefore, simultaneous treatment has the advantage of a single anesthesia, and the laparoscopic approach can additionally help to diagnose and confirm the location of ectopic testes.

A line of study is drawn up in this regard, and we will try to present the results of this postoperative CRP-serom association in the future.

However, there are surgeons who consider the TAPP technique superior to TEP, and through their experience, they show the advantages of this procedure.

In this regard, the fourth study in Chapter 7 presents an application of the TAPP technique in the hernial cure associated with cryptorchidia (testicular ectopia) in adults. In this chapter, I describe the TAPP technique in detail, with iconography from personal experience. It is worth mentioning here that I prefer peritoneal closure with continuous resorbable sutures.

Other applications of the Rives-Stoppa process include incisional hernias. Retromuscular placement of the net is the positioning with the best results over time, in terms of hernial relapse as well as postoperative complications. Surgery for these hernias can be open or minimally invasive. The open process has evolved from the standard Rives-Stoppa technique to its multiple modifications.

Currently, i perform prosthetic mesh fixation at two points to avoid migration of the prosthetic material. I also adhered to the idea of the largest possible size of the net, which should exceed $2 \times$ the diameter of the defect.

The laparoscopic technique is based on the indications of Jorge Daes, who developed the eTEP [8] procedure, which applied to the events will be called eTEP-RS (applied Rives-Stoppa), which will lead to the placement of the prosthetic material in the retromuscular space without fixation.

However, this technique is not easy, from positioning the patient to dissecting the sac and closing the posterior defect as well as the anterior sheath. Occasionally, the inability to close the posterior sheath leads to abdominal release of the transverse muscle (TAR), either uni- or bilaterally, in aid of hernia repair. This also adds to the complexity of repair. We have carried out several such procedures using the RS-TAR technique for the treatment of incisional hernias in a number of patients with wide defects (W3 according to the EHS classification of events), which will be the theme of further study.

Chapter 8 refers to a process that is considered an extension of the RS process, which involves the dissection and opening of the hernial sac, followed by the incision of the anterior sheath on one side and the posterior sheath of the abdominal right on the opposite side in order to create two flaps: one formed by the anterior sheath of the right and the sack on the respective side and the other by the posterior sheath and the continuation of the sack on the same side. Retromuscular dissection is the usual procedure, up to the crescent line, with mounting of the prosthetic material in this space, as in the RS process.

The two flaps will thus form an anterior and a posterior layer, with the prosthetic material being isolated on the one hand from the subcutaneous space through the previous layer, and on the other hand, the intraperitoneal content through the posterior layer. However, this process implies the existence of a large peritoneal sac, which will be preserved but must have a structure that is sufficiently resistant to participate in the hernial cure. Thus, this process is considered versatile and has shown excellent results in the literature [170,171].

Our experience is still reduced to less than 20 cases with this process, and we can report promising preliminary results, which remains a direction for future research and application in

the cure of large events of type W2-W3, in which the closure of the previous layer causes problems.

Another line of future study refers to the parastomal hernias, which have been shown that the retromuscular process of mounting the prosthetic material has a clear benefit, decreasing the rate of relapse of these hernias [175]. Our experience with these hernias shows that the application of the procedure proposed by Pauli (adding the TAR to the hernial cure) has led to promising results that will be published later.

References

10. FK Hesselbach (1806) Anatomisch-chirurgische Abhandlung über den Ursprung der Leistenbrüche. Würzburg, Baumgärtner.
12. Yang XF, Liu JL. Anatomy essentials for laparoscopic inguinal hernia repair. *Ann Transl Med.* 2016 Oct;4(19):372. doi: 10.21037/atm.2016.09.32.
11. Wolloscheck T, Konerding MA. Dimensions of the myopectineal orifice: a human cadaver study. *Hernia.* (2009) 13:639–42. 10.1007/s10029-009-0559-1.
18. Sabuncuoglu MZ, Dandin O, Kiliç C. A new anatomical approach to laparoscopic hernia repair: Triangle of dissection. *Clin Anat.* 2015 Nov;28(8):965-6.
29. Miserez, M., Alexandre, J.H., Campanelli, G. *et al.* The European hernia society groin hernia classification: simple and easy to remember. *Hernia* 11, 113–116 (2007).
33. Muysoms FE, Miserez M, Berrevoet F, Campanelli G, Champault GG, Chelala E, Dietz UA, Eker HH, El Nakadi I, Hauters P, Hidalgo Pascual M, Hoeflerlin A, Klinge U, Montgomery A, Simmermacher RK, Simons MP, Smietański M, Sommeling C, Tollens T, Vierendeels T, Kingsnorth A. Classification of primary and incisional abdominal wall hernias. *Hernia.* 2009 Aug;13(4):407-14.
70. Stoppa R. Groin hernia repair by bilateral extraperitoneal mesh prosthesis. In: Zurker M, Kark AE, Wantz GE (eds) *Surgical management of abdominal wall hernias.* 1999, vol 16. Martin Dunitz Ltd, London, pp 203–214.
8. Daes J. The enhanced view-totally extraperitoneal technique for repair of inguinal hernia. *Surg Endosc.* 2012 Apr;26(4):1187-9. doi: 10.1007/s00464-011-1993-6.
9. Radu VG, Lica M. The endoscopic retromuscular repair of ventral hernia: the eTEP technique and early results. *Hernia.* 2019 Oct;23(5):945-955.
35. HerniaSurge Group. International guidelines for groin hernia management. *Hernia.* 2018 Feb;22(1):1-165.
1. Bittner R, Bain K, Bansal VK, Berrevoet F, Bingener-Casey J, Chen D, Chen J, Chowbey P, Dietz UA, de Beaux A, Ferzli G, Fortelny R, Hoffmann H, Iskander M, Ji Z, Jorgensen LN, Khullar R, Kirchhoff P, Köckerling F, Kukleta J, LeBlanc K, Li J, Lomanto D, Mayer F, Meytes V, Misra M, Morales-Conde S, Niebuhr H, Radvinsky D, Ramshaw B, Ranev D, Reinpold W, Sharma A, Schrittwieser R, Stechemesser B, Sutedja B, Tang J, Warren J, Weyhe D, Wiegering A, Woeste G, Yao Q. Update of Guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias (International Endohernia Society (IEHS))-Part A. *Surg Endosc.* 2019 Oct;33(10):3069-3139.

2. Breuing K, Butler CE, Ferzoco S, Franz M, Hultman CS, Kilbridge JF et al (2010) Incisional ventral hernias: review of the literature and recommendations regarding the grading and technique of repair. *Surgery* 148(3):544–558.
36. Poelman MM, van den Heuvel B, Deelder JD et al (2013) EAES Consensus Development Conference on endoscopic repair of groin hernias. *Surg Endosc* 27(10):3505–3519.
173. Daes J, Felix E. Critical View of the Myopectineal Orifice. *Ann Surg*. 2017 Jul;266(1):e1-e2. doi: 10.1097/SLA.0000000000002104. PMID: 27984213.
34. George Ferzli, Mazen Iskandar. Laparoscopic totally extra-peritoneal (TEP) inguinal hernia repair. *Annals of Laparoscopic and Endoscopic Surgery*, vol 4 (2019).
174. Yildirim D, Hut A, Uzman S, Kocakusak A, Demiryas S, Cakir M, Tatar C. Spinal anesthesia is safe in laparoscopic total extraperitoneal inguinal hernia repair. A retrospective clinical trial. *Wideochir Inne Tech Maloinwazyjne*. 2017 Dec;12(4):417-427. doi: 10.5114/wiitm.2017.72325.
126. Morrell, AC, Morrell, ALG, Malcher, F, Morrell, AG, and Morrell-Junior, AC. Primary Abandon Of-Of-The-Sac (PAS) Technique: Preliminary Results of a Novel Minimally Invasive Approach for Inguino-Scrotal Hernia Repair. *Arq Bras Cir Dig*. 2020;33(2):e1519.
120. Daes J. Endoscopic repair of large inguinoscrotal hernias: management of the distal sac to avoid seroma formation. *Hernia*. 2014 Feb;18(1):119-22.
128. Berney CR (2012) The Endoloop technique for the primary closure of direct inguinal hernia defect during the endoscopic totally extraperitoneal approach. *Hernia* 16:301–305.
130. Sood A, Kotamarti VS, Therattil PJ, Lee ES. Sclerotherapy for the Management of Seromas: A Systematic Review. *Eplasty*. 2017 Aug 28;17:e25.
131. Ismail M, Garg M, Rajagopal M, Garg P (2009) Impact of closed-suction drain in preperitoneal space on the incidence of seroma formation after laparoscopic total extraperitoneal inguinal hernia repair. *Surg Laparosc Endosc Percutan Tech* 19(3):263–266.
132. Gao D, Wei S, Zhai C et al (2015) Clinical research of preperitoneal drainage after endoscopic totally extraperitoneal inguinal hernia repair. *Hernia* 19(5):789–794.
133. Fan JKM, Liu J, Chen K et al (2018) Preperitoneal closed-system suction drainage after totally extraperitoneal hernioplasty in the prevention of early seroma formation: a prospective double-blind randomised controlled trial. *Hernia* 22(3):455–465.
134. Agresta, F, Mazzarolo, G, Balbi, P, and Bedin, N. Inguinal-scrotal Hernias in Young Patients: Is Laparoscopic Repair a Possible Answer? Preliminary Results of a Single-Institution Experience with a Transabdominal Preperitoneal Approach. *Hernia* (2010) 14(5):471–5.
135. Li J, Zhang W (2018) Closure of a direct inguinal hernia defect in laparoscopic repair with

- barbed suture: a simple method to prevent seroma formation? *Surg Endosc* 32(2):1082–1086.
136. Petersen M, Friis-Andersen H, Zinther N. Does closure of the direct hernia defect in laparoscopic inguinal herniotomy reduce the risk of recurrence and seroma formation?: a systematic review and meta-analysis. *Hernia*. 2023 Apr;27(2):259-264.
8. Daes J. The enhanced view-totally extraperitoneal technique for repair of inguinal hernia. *Surg Endosc*. 2012 Apr;26(4):1187-9. doi: 10.1007/s00464-011-1993-6.
170. Nielsen, M.F., de Beaux, A. and Tulloh, B. (2019), Peritoneal Flap Hernioplasty for Reconstruction of Large Ventral Hernias: Long-Term Outcome in 251 Patients. *World J. Surg.*, 43: 2157-21631. <https://doi.org/10.1007/s00268-019-05011-0>.
171. Malik A, Macdonald AD, de Beaux AC, Tulloh BR. The peritoneal flap hernioplasty for repair of large ventral and incisional hernias. *Hernia*. 2014 Feb;18(1):39-45. doi: 10.1007/s10029-013-1086-7.
175. Pauli EM, Juza RM, Winder JS. How I do it: novel parastomal herniorrhaphy utilizing transversus abdominis release. *Hernia*. 2016 Aug;20(4):547-52. doi: 10.1007/s10029-016-1489-3.

List of articles published

Articole publicate *in extenso* ca rezultat al cercetării doctorale

1. **Ungureanu CO**, Ginghina O, Stanculea F, Iosifescu R, Cristian D, Grigorean VT, Popescu RI, Dobre R, Iordache N. Surgical Outcome in Bilateral Inguinal Hernia Repair: Laparoscopic Total Extraperitoneal Approach (TEP) as Best Approach? *Maedica (Bucur)*. 2023 Dec;18(4):598-606. doi: <https://pubmed.ncbi.nlm.nih.gov/38348087/> PMID: 38348087; PMCID: PMC10859215. (*Studiu cuprins in capitolul II.4*)
2. **Ungureanu CO**, Ginghina O, Stanculea F, Vacarioiu I, Ene C, Iosifescu R, Georgescu DE, Cristian DA, Grigorean VT, Iordache N. Surgical Approach to Bilateral Inguinal Hernia. A Case-Control Study. *Chirurgia (Bucur)*. 2023 Dec;118(6):642-653. doi: <https://pubmed.ncbi.nlm.nih.gov/38228596/> PMID: 38228596. ISI Factor de impact: 0.6 (*Studiu cuprins in capitolul II.5*)
3. **Ungureanu, CO**, Ginghina, O., Stanculea, F., Ene, C., ... & Iordache, N. (2024). Large Symptomatic Inguinoscrotal Seroma Occurred Early after Laparoscopic Total Extraperitoneal Hernia Repair (TEP): a Case Report and Literature Review. *Maedica*, 19(1),195. <https://doi.org/10.26574/maedica.2024.19.1.195> (*Studiu cuprins in capitolul II.6*)
4. **Ungureanu, C.**, Floris Stanculea, Octav Ginghina, Daniel A Cristian, Valentin T Grigorean, Razvan Popescu, Dragos Georgescu, Niculae Iordache, Laparoscopic approach of inguinal hernia associated with adult cryptorchidism: case series and literature review, *Journal of Surgical Case Reports*, Volume 2024, Issue 4, April 2024, rjae232, <https://pubmed.ncbi.nlm.nih.gov/38605699/> ISI Factor de impact: 0.5 (*Studiu cuprins in capitolul II.7*)