CURRENT TREATMENT STANDARDS OF COMPLEX, LARGE SIZED INCISIONAL HERNIAS

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The term ventral hernia is quite frequently misused by Georgian surgeons and even in some English-speaking literature. The term derives from Latin "venter" and means abdomen. Therefore, it would be correct to use this term more broadly referring all hernias issuing from the abdomen. In our opinion, the term "incisional" reflects the essence of the matter more closely, describing all hernias occurring after incision. Incisional hernias are a common late complication of abdominal surgery, with recent data reporting a prevalence after 1 year at 5.2% and 2 years of approximately 25%.

Recurrences after incisional hernia surgery are an unsolved problem to date. The reports in the literature range from 1% to 50%. The recurrence rate correlates to the follow-up time and there are only a few high-quality studies with a long-term follow-up.

High-quality prospective randomized trials on the broad subject of incisional hernias are rare in the scientific literature as well. A challenge for surgeons and multidisciplinary team is complex, large hernias with Loss of Domain (LD). In spite of the fact that the term complex hernia is quite broadly utilized there is yet no accepted consensus regarding the definition. The following features are characteristic for complex hernias: relatively big-sized (more than 10 cm) eccentric defects, complex anatomic peculiarities and/or a risk of infection. Usually, there are several concomitant risk factors [1,2]. Frequently, these are recurrent hernias and the patients have a history of complications. In addition, there is a risk of complications from the treatment of the hernias. Post-operatively impaired wound healing and recurrences also occur frequently.

Risk factors for incisional hernias might be distributed to the following two groups:

Major risk factors - obesity, COPD, smoking, diabetes, steroids, malnutrition, jaundice, abdominal trauma, bleeding, abdominal sepsis, wound infection, chemo or radiotherapy, connective tissue diseases, disturbances of the collagen metabolism, enhanced abdominal wall tension, re-laparotomies within 1-month, surgeon dependent factors, - incorrect lap and open abdominal closure.

Minor risk factors - anemia, malignancies, renal failure, more than 2 laparotomies through the same incision a year, postoperative: ventilation, coughing, vomiting, straining during defecation, heavy physical efforts.

This article highlights practical issues regarding useful classification, treatment modalities, and multidisciplinary decision-making. There is yet no generally accepted incisional hernia classification. We suggest that the classification should be simple, convenient and broadly accepted. It should facilitate preoperative, intra and postoperative planning; estimation of the expected complexity of minimally invasive treatment methods. It should help to estimate the cost-effectiveness of the treatment.

We summarized many existing classifications [1,2]. Here aere the most useful in practical sense the following criteria for incisional hernias: size, location, symptoms, reducibility, stability of the anterior abdominal wall, how far the gap edges are "escaped", number of the gaps, abdominal wall surface/defect surface ratio, patients body constitution, hernia content, scars, skin infections, risk of obstruction, differentiation "primary" or recurrent incisional hernia.

Treatment of the large incisional hernias is a challenge [3,4]. It needs meticulous planning in preoperative period. Especially if we should deal with giant defects with Loss of Domain (LD). This term is used as more than 25 % of viscera is dislocated out of the genuine abdominal cavity creating a secondary abdomen. In a supine position, those displaced organs are irreducible. There are several reports in the literature that the volume of displaced organs exceeded 50%. In our experience, the greatest volume was 40 %. For more a precise evaluation of LD we used hernia sac/abdominal cavity volume ratio. Ratio ≥0.5 confirms LD. The volume is measured via the sagittal and axial reconstruction of the CT scan: V = 0.52 x L x H x W).

For massive ventral hernia with LD we perform the following preoperative procedures:

1. Progressive Preoperative Pneumoperitoneum recommended by Carbonell et al [5].
2. Botulin toxin (Botox) injection according to the Thomas Ibarra-Hurtado method [7].
3. Preoperative optimization for postoperative respiratory risk factors.

For the Progressive Preoperative Pneumoperitoneum the following steps are performed:

a. Percutaneous vena cava filter is placed and anti-thrombotic medication started because of high risk for thromboembolic complications.
b. explorative laparoscopy and placement of the insufflation catheter
c. full liquid diet with protein supplementation
d. the patient is instructed to utilize incentive spirometry and ambulate daily
e. Beginning of Progressive Preoperative Pneumoperitoneum (from air hose at patient's bedside).
f. daily moisturizing of the skin because of dryness and cracking

If the patient will begin to complain of abdominal tightness and mild flank discomfort, insufflation is stopped. Once the patient begins to experience some shortness of breath or mild anxiety (there is no specific volume of air that should be insufflated nor the intra-abdominal pressure measured, the endpoint of insufflation will always be the patient's level of discomfort) if at any point the patient becomes hemodynamically unstable or the urine output decreases, the pneumoperitoneum can be evacuated).

After 7 days of PPP, a CT scan is repeated to determine the suitability of the abdominal wall repair (if the bowel has not fallen back and the volume of the abdomen does not look to have increased significantly, the PPP should continue for more than 4 to 5 days and CT scan is repeated).

Botulin toxin (Botox-BT) injection starts approximately one month before planned incisional hernia repair. We perform BT injection under sterile technique using ultrasound guidance. The planned tract is anesthetized with 1% lidocaine. BT solution is prepared by diluting 100-150 units of Botox ® into 100 units of sterile saline. Three locations are chosen along the lateral abdominal wall utilizing ultrasound guidance to identify all 3 muscle layers. Using a 21 gause 7 cm needle attached to the BT/saline solution, the 3 layers of the muscles are traversed. Care is taken not to violate peritoneum Injection is started in the transversus (Pic.).

Pic.Botox injection spots in case of incisional hernia

Preoperative optimization for postoperative respiratory risk factors includes: a number of peri-operative relevant factors should be optimized as best as possible prior to complex abdominal wall reconstruction: optimal drug treatment of COPD. Smokers should abstain from nicotine. A pre-existing diabetes mellitus should be treated optimally (HbA1c<7%). Obese patients should aim for a weight reduction pre-operatively. Bariatric procedures (gastric balloon/endobarrier or even surgery) may be recommended to morbidly obese patients to support weight loss. If ulcers or impetigo are present, these have to be treated pre-operatively. In cases of fistulas or mesh infections, antibiotics must be administered targeting the causative agent(s). As the wound areas are often rather large, any medication with anticoagulant properties should be reduced to the necessary minimum in order to avoid postoperative hematomas or hemorrhage. On the other side, consequent drug and mechanical prophylaxis against thrombosis are necessary because of the increased risk from increased intra-abdominal pressure/ decreased venous return.

Surgery for giant incisional hernias has undergone major changes in the last two decades and patients can now be treated with high success rates. With the use of prosthetic mesh becoming the standard of care in the management of incisional hernias, the subsequent rate of recurrence has been lowered to 8–24% from 33 to 44%, but it has not been eliminated, however the question of debate now is the positioning of mesh; on the rectus sheath or under rectus sheath.

Our acknowledgments to prof. A.N. Kingsnorth (UK) who with our team introduced Lichtenstein hernia repair, Rives-Stoppa procedure and component separation technique first time not only in Georgia but also in many post-soviet countries at the beginning of the 21st century. Also our US colleague prof. E. Nicolo, who with us utilize Chevrell onlay technique for the first time in Georgia. After these beginnings, 15 years passed and we gained huge experience, which is shared here, in the article.

The Technique of mesh placement is still at the surgeon's discretion. In Kokerling's meta- analysis the author [9] compared the onlay vs. sublay technique in open incisional hernia repair and identified better outcomes for the sublay operation. Nonetheless, an Expert Consensus Guided by Systematic Review found the onlay mesh location useful in certain settings. Therefore, all studies on the onlay technique were once again collated and analyzed.

Based on the available literature the onlay compared with the sublay technique in incisional hernia repair is associated with markedly more wound complications and seroma rates and with a comparable recurrence rate. Therefore, in the onlay technique the occurrence of wound complications and seroma formation must be prevented through selective indications, surgical experience, careful dissection in the abdominal wall, and prophylactic measures such as drainage, abdominal binders, fibrin sealant. Furthermore, those settings in which the onlay technique has advantages must be better defined [9].

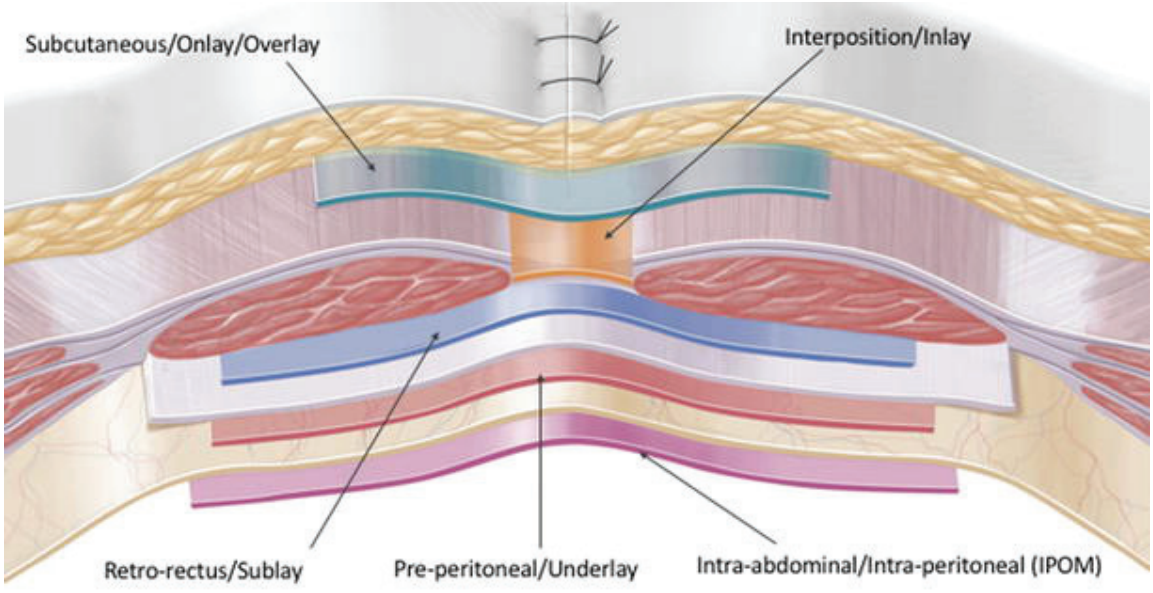

Fig. 1. Anatomy of anterior abdominal wall and mesh placement spaces

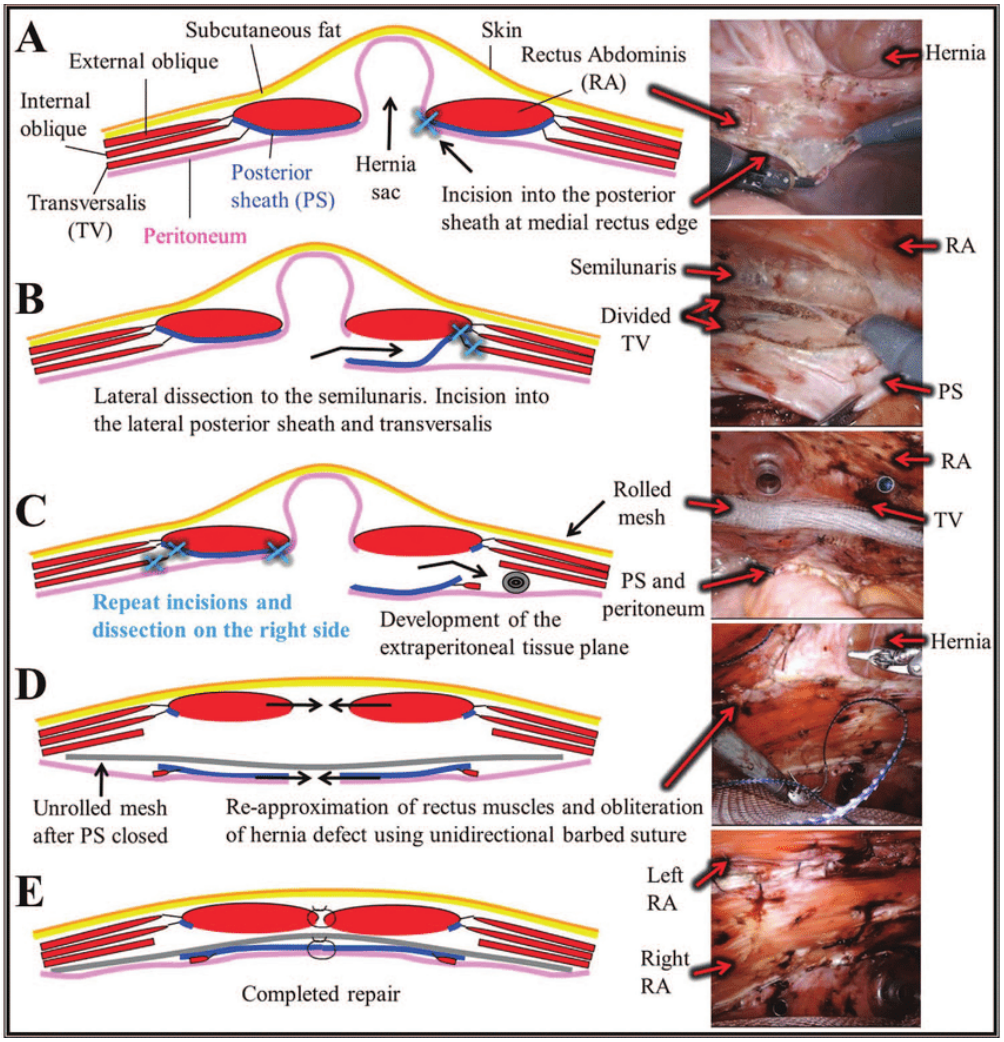

Fig. 2. TAR schematic drawing

In sublay technique, the rectus sheath is opened on both sides and the posterior layer is sutured at the midline. The synthetic mesh is then placed over the posterior layer of the rectus sheath, behind the rectus abdominis muscle, and fixed with a few sutures or fibrin glue. Evolution of sublay repair with the introduction by Rives and Stoppa, followed by Ramirez proposing the anterior component separation at around the same time when Wantz introduced the retromuscular prefascial repair to the United States. Subsequent improvements in component separation techniques including the open anterior perforator-preserving technique, the laparoscopic technique, posterior component separation, and TAR are also shown in Fig. 2. As illustrated in the aforementioned timeline, approximately 25 years passed between the description of the sublay repair and the adjunctive procedure that made it possible to implement appropriately. It then took another two decades for the true scope and applicability of myofascial releases to be described. With substantially decreased surgical site infections (SSIs) and recurrence rates, combining component separation techniques with a sublay mesh repair allows patients with previously "inoperable" hernias to not only have an operation but also one that is durable with decreased recurrence rates.

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SUMMARY

CURRENT TREATMENT STANDARDS OF COMPLEX, LARGE SIZED INCISIONAL HERNIAS

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There is yet no generally accepted incisional hernia classification.This article highlights practical issues of classification, treatment modalities, and multidisciplinary decision-making. We summarized many existing classifications of hernia and suggested the classification that facilitates pre-operative, intra and postoperative planning. Progressive Preoperative Pneumoperitoneum effectively helps to overcome postoperative respiratory complications. For big defects, we use Botox injections in according to Thomas Ibarra-Hurtado method one month prior to surgery. Rives-Stoppa procedure is a golden standard in incisional hernia repair. Component Separation (anterior and posterior) gives good results as well. It maintains flexibility of anterior abdominal wall. We prefer to cover relaxing incisions after CS on newly formed midline with triple sheet of mesh. It prevents recurrences in the mentioned areas. Treatment of giant hernias needs surgeons high experience in the field and multidisciplinary approach. Management of this kind of hernias should be done in specialized Hernia Centers.

Keywords: incisional hernias, Chevrell onlay method, Rives-Stoppa procedure.

РЕЗЮМЕ

СОВРЕМЕННЫЕ СТАНДАРТЫ ЛЕЧЕНИЯ БОЛЬШИХ ИНЦИЗИОННЫХ ПОСТОПЕРАЦИОННЫХ ГРЫЖ

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В статье освещаются вопросы, касающиеся классификации, методов лечения послеоперационных грыж. Предложенная классификация облегчает оценку ожидаемой сложности.

Проанализована научная литература по вопросу хирургического лечения инцизионных грыж; отмечено, что мало научных работ, основанных на рандомизированных проспективных исследованиях высокого качества. Следовательно, нет достоверных рекомендаций, в том числе – по вопросу хирургического лечения больших, сложных (комплексных) грыж с потерей обычного месторасположения.

Хирургическое лечение крупных послеоперационных грыж является вызовом для многопрофильной команды врачей. Особое внимание уделяется предоперационной подготовке пациента, что подразумевает стабилизацию дыхательных, гемодинамических, метаболических параметров, устранение кожных инфекций, формирование прогрессирующего пневмоперитонеума и, в большинстве случаев, инъекции ботокса по периметру т.н. «бегающих» мышечных краёв по методу Ibarra-Hurtado.

Из хирургических методов лечения процедура Rives-Stoppa считается «золотым стандартом» в лечении послеоперационных грыж. В случае больших дефектов его можно легко расширить до процедуры освобождения поперечных мышц живота, т.е. до TAR (Transversus Abdominis Release), что определяет хорошие результаты и, что наиболее важно, поддерживает и/или восстанавливает гибкость мышц передней брюшной стенки.

Как показали исследования, метод Chevrell onlay характеризуется значительно более высокими показателями осложнений послеоперационной раны и образования серомы, чем процедура Rives-Stoppa.

Лечение крупных инцизионных грыж требует определённого опыта в этой области и мультидисциплинарного подхода; лечение же следует проводить в специализированных медицинских центрах.

რეზიუმე

პოსტოპერაციული დიდი ინციზიური თიაქრების მკურნალობის თანამედროვე სტანდარტები

გ.გიორგობიანი, ა.კვაშილავა

თბილისის სახელმწიფო სამედიცინო უნივერსიტეტი; ავერსის კლინიკა, საქართველო

სტატიაში განხილულია საკითხები პოსტოპერაციული თიაქრების კლასიფიკაციის და მკურნალობის მეთოდების შესახებ. შემოთავაზებული კლასიფიკაცია აიოლებს მოსალოდნელი გართულებების შეფასებას.

გაანალიზებულია სამეცნიერო ლიტერატურა ინციზიური თიაქრების ქირურგიული მკურნალობის საკითხის შესახებ; აღნიშნულია, რომ მაღალი ხარისხის რანდომიზებულ პროსპექტულ კვლევებზე დაფუძნებული სამეცნიერო ნაშრომების რაოდენობა მცირეა. აქედან გამომდინარე, არ არსებობს სარწმუნო რეკომენდაციები, მათ შორის – დიდი, რთული (კომპლექსური) თიაქრების ქირურგიული მკურნალობის შესახებ ჩვეული ადგილმდებარების დაკარგვით. პოსტოპერაციული დიდი თიაქრების ქირურგიული მკურნალობა გამოწვევას წარმოადგენს ექიმთა მრავალპროფილური გუნდისათვის. განსაკუთრებული ყურადღება ექცევა პაციენტის ოპერაციამდელ მომზადებას, რაც გულისხმობს სუნთქვის, ჰემოდინამიკური და მეტაბოლური პარამეტრების სტაბილიზებას, კანის ინფექციების ალაგებას, პროგრესირებადი პნევმოპერიტონეუმის ფორმირებას და, უმეტეს შემთხვევაში, ბოტოქსის ინიექციას Ibarra-Hurtado-ს მეთოდით კუნთების ე.წ. მორბენალი ნაპირების პერიმეტრზე.

მკურნალობის ქირურგიული მეთოდებიდან პროცედურა Rives-Stoppa ითვლება პოსტოპერაციული თიაქრების მკურნალობის “ოქროს სტანდარტად”. დიდი დეფექტების შემთხვევაში შესაძლებელია მისი გაფართოება მუცლის განივი კუნთების განთავისუფლების პროცედურამდე, ე.ი. TAR-მდე (Transversus Abdominis Release), რაც განსაზღვრავს კარგ შედეგებს

და, რაც ძალიან მნიშვნელოვანია, ინარჩუნებს და/ან აღადგენს მუცლის წინა კედლის კუნთების მოქნილობას.

როგორც კვლევებითაა ნაჩვენები, Chevrell onlay მეთოდი ხასიათდება პოსტოპერაციული ჭრილობის გართულების ბევრად უფრო მაღალი მაჩვენებლით და სერომის წარმოქმნით, ვიდრე პროცედურა Rives-Stoppa. დიდი ინციზიური თიაქრების მკურნალობა მოითხოვს გარკვეულ გამოცდილებას ამ სფეროში და მულტიდისციპლინურ მიდგომას; მიზანშეწონილია, რომ მკურნალობა ჩატარდეს სპეციალიზებულ სამედიცინო ცენტრებში.

OVARIAN CANCER TREATMENT OPTIMIZATION: THE COMPLEX ANALYSIS OF THE RESULTS OF CYTOREDUCTIVE SURGERY, MICROSCOPIC MALIGNANCY AND T-LYMPHOCYTIC INFILTRATION OF THE TUMOR

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Ovarian cancer ranks 7th among the most common cancers in the world and 8th among the causes of death [1-3].

The high mortality rate is due to the absence of effective screening methods and the indolent course of the disease. About 70-80% of the cases of ovarian cancer are diagnosed on the advanced stages (III or IV) of the disease, and the recurrence rate is 75%, while the five-year disease-free survival period is observed in only 35% of patients [4].

Today, the complete cytoreduction of the tumor - the "debulking" surgery – has established itself as a leading choice in the treatment of ovarian cancer.

The main point of cytoreductive surgery is the complete elimination of the macroscopic tumor, which often requires intervention on several organs of the abdominal cavity (resection of the peritoneum, diaphragm (stripping), liver, pancreas, intestine (especially rectosigmoid, which is required in 30-50% of cases of disseminated ovarian cancer), splenectomy, cholecystectomy, appendectomy, omentectomy, salpingo-oophorectomy, hysterectomy) [5-7].

It is important that the complications, associated with the debulking surgery do not increase the mortality rate [8,9].

It is known that the prognosis of ovarian carcinomas is significantly determined by their histological types and the grade of microscopical malignancy. Besides, according to the data of recent years, the clinical outcome and prognosis of ovarian cancer are closely correlated with the presence of tumor-infiltrating lymphocytes (TILs) in the microenvironment of the tumor.

The importance of TILs has been already established in melanomas, non-small-cell lung cancers, "triple-negative" forms of breast cancer, while in cases of the prostate, kidney, esophagus and colorectal carcinomas TILs are being actively studied and the obtained results are being used for choosing a course of immunotherapy [10-12]. The study of TILs has been started in ovarian tumors as well. However, their diagnostic value is not thoroughly clear. Data on their importance in ovarian tumors of various morphological forms are particularly poor [13-15].

The study aimed to investigate the association of accumulation of Infiltrating T-lymphocytes and their subtypes with histology of ovarian cancer tissue excised during debulking surgeries considering the microscopic malignancy grade and the clinical stage.

Material and methods. The present multicenter, retrospective-prospective study involves 64 ovarian cancer patients. It is noteworthy that in advanced cases of ovarian cancer, generally the treatment was started with neoadjuvant chemotherapy, and subsequent surgical treatment prevalently included a total hysterectomy and omentectomy. Since 2016, we have started the treatment recognized as the gold standard: debulking surgery with adjuvant platinum-taxane-based chemotherapy. The patients were selected on the basis of anamnesis and clinical and instrumental examinations, considering the age and comorbidities.

Patients' including criteria were the following: diagnosis of ovarian cancer, adult age, performed treatment (total hysterectomy, omentectomy, debulking surgery with adjuvant chemotherapy [primary cytoreduction] or neoadjuvant chemotherapy with subsequent debulking surgery and adjuvant chemotherapy [interval cytoreduction] or secondary cytoreduction in case of recurrent tumor. Patients' excluding criteria were the following: age 80 years and older, acute hypoalbuminemia and hypoproteinemia, a severe rise of the liver enzymes, the presence of radiologically confirmed distant methastasis. All patients had signed the informed consent form. The patients were divided according to age, clinical diagnosis and scale of surgery, stage of the disease, microscopic malignancy of the tumor, location, histology and lymphocyte infiltration.

Material obtained from 64 surgeries of the ovarian cancer was examined by standard histological (H&E) and immunohistochemical (IHC) technique. Initially, the tumor tissue was fixed in 10% buffer formalin for 6-12 hours. This time is perfect for retaining the antigen in the tissue and preventing the false-negative results of IHC. After fixation, the material was proceeded in the «Leica Bond Max» device and embedded into paraffin. Paraffin blocks were cut into 3 μm thick slices for standard histology and IHC. Shimizu/Silverberg systems as well as "two-tier" grading systems were used to determine the tumor differentiation grade in serous carcinomas. The malignancy grade was determined by the application of an immunohistochemical study technique using the oncoprotein p53 marker. Each specimen was analyzed by two morphologists independently. In the case of two different interpretations of the results, a joint discussion was held until a consensus was reached.

TILs were detected by applying immunohistochemistry using "Novocastra" antibodies: CD2, CD3, CD4, CD8. The markers' expression was studied separately in the stromal and parenchymal components. The percentage of $CD2^+$, $CD3^+$, $CD4^+$, $CD8^+$ lymphocytes in the tumor tissue was calculated by the "ImageJ" software.