

# Surgical Treatment of Purulent Complications and Widespread Paraprostatic Infection in the Area of the Mesh Prosthesis After Laparoscopic Transabdominal Preperitoneal Hernioplasty on the Right with Involvement of Abdominal Organs Using Laparoscopic Access

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**ABSTRACT** Laparoscopic transabdominal, preperitoneal hernioplasty for inguinal hernia using a synthetic mesh prosthesis is the most common operation in modern surgical practice. Given the minimally invasive approach, infectious complications are rare. Despite the rarity of infectious complications, their development requires additional use of medications, long-term use of antibiotics, repeated traumatic surgical interventions, which leads to prolonged pain syndrome, hernia recurrence and is accompanied by a serious deterioration in the mental and physical condition of patients. Ultrasound and computed tomography with contrast are quite informative research methods for diagnosing abscesses associated with the implantation of a synthetic mesh prosthesis. In this article, we consider a clinical observation: a 36-year-old man with an abscess in the area of a synthetic mesh prosthesis after laparoscopic prosthetic preperitoneal hernioplasty on the right for inguinal hernia 4 months after the initial operation. The infectious process spread from the area of the infected prosthesis into the abdominal cavity, was limited by internal organs with the formation of an abscess. The resulting complication was treated by laparoscopic access. The purpose of our article is to draw the attention of surgeons to the possibility of a rare infectious complication in the area of the synthetic mesh prosthesis after right laparoscopic preperitoneal hernioplasty for inguinal hernia 4 months after the initial operation, after which the infectious process may spread from the area of the infected prosthesis into the abdominal cavity. The emphasis is placed on the difficulties of preoperative diagnosis of the complication and its surgical correction by laparoscopic access.

**Keywords:** abscess in the area of a synthetic mesh prosthesis, postoperative complication, abdominal abscess, infectious complication, laparoscopy, inguinal hernia, transabdominal preperitoneal hernioplasty, minimally invasive treatment methods

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AO – abdominal organs  
CT – computed tomography  
IH – inguinal hernia  
MT – small pelvis

SMP – synthetic mesh prosthesis  
SP – small pelvis  
TAPP – transabdominal preperitoneal prosthetic  
hernioplasty

## INTRODUCTION

Inguinal hernias (IH) occur in 27–43% of men and 3–6% of women in the human population and account for 80–85% of all abdominal hernias [1]. Hernioplasty using synthetic mesh prostheses (SMP) is the most common operation performed in modern surgical practice; more than 20 million operations for IH are performed annually worldwide [1, 2]. Surgical correction remains an effective and the only method of treating IH [1, 3].

The main surgical method for correcting IH is hernioplasty using SMP, however, the use of SMP may be complicated by infection, despite aseptic technique and preoperative antibiotic prophylaxis. The exact mechanism of complication development is unknown [1, 2]. Infectious complication of SMP is one of the postoperative complications in hernioplasty using SMP and can lead to repeated surgery to remove SMP [2, 3]. Postoperative infectious complications are rare, are divided into early superficial infections and late deep infections in the SMP area, and occur in 0.02–5% of cases after laparoscopic hernioplasty [3, 4]. Late deep infection of the abdominal cavity is defined as an acute inflammatory reaction in the surgical site, which is detected several months or years after surgery, and is extremely rare, ranging from 0.09 to 0.35% [2, 4–6]. The infectious process of the abdominal cavity after laparoscopic hernioplasty can spread to nearby abdominal organs (small and large intestines, appendix, bladder, greater omentum, etc.) with the formation of infiltrates and abscesses [7]. For the purpose of diagnosis and assessment of the situation,

ultrasound examination of the abdominal organs, small pelvis and anterior abdominal wall is usually performed as a starting examination method [5, 8, 9]. In addition, computed tomography of the abdominal organs and small pelvis (CT of the abdominal cavity and pelvis) with contrast of the surgical site is recommended, which helps to determine the optimal surgical tactics [7, 10]. Additional endoscopic examinations (colonoscopy, cystoscopy) allow to establish a defect in the wall of the involved hollow organs, which is especially important after the isolation of these organs from the infiltrate. Also, diagnostic laparoscopy, which begins the reoperation, allows to establish the degree and nature of the involvement of internal organs, confirm the results of preoperative diagnostics and finally select a surgical program for the correction of the complication [8]. We present a clinical observation of surgical treatment by laparoscopic access of a patient with an abscess in the area of the infected SMP after laparoscopic transabdominal preperitoneal hernioplasty (TAPP) of the IH on the right.

### Clinical observation

A 36-year-old man came to the emergency department of the I.V. Davydovsky City Clinical Hospital with complaints of pain in the right half of the abdomen, in the right inguinal region; subfebrile body temperature, pain during urination and defecation. It is known that 4 months ago he underwent a planned operation for right-sided IH. Laparoscopic TAPP hernioplasty using SMP was performed. In the postoperative period, he noted abdominal pain, swelling of the spermatic cord, pain in the testicle, and

an increase in body temperature. Antibacterial (Levofloxacin, Metronidazole, Amoxiclav) and anti-inflammatory therapy were performed with a short-term effect. Results of examination upon admission: Body temperature is 37.2°C, palpation of the abdominal wall surface in the right inguinal region reveals a zone of tissue compaction of the anterior abdominal wall and underlying tissues, forming a moderately painful infiltrate measuring approximately 10×15 cm, not displaceable relative to the surrounding tissues. The intensity of abdominal pain on a pain scale is 4–5 points. Also, in the projection of the navel, a hernial protrusion up to 1 cm in size is determined, slightly painful upon palpation, not reducible into the abdominal cavity. Peristalsis of the small intestine is auscultated; symptoms of peritoneal irritation are negative. Urine is unchanged, percussion symptoms are negative on both sides. Diuresis is not impaired. A clinical blood test reveals an increase in the number of WBC to  $12.1 \times 10^9/\text{l}$ , C-reactive protein to 133.3 mg/l.

Ultrasound of the abdominal cavity and pelvic organs: free fluid was detected in the inguinal areas in the abdominal cavity, with a layer thickness of up to 7 mm. In the right inguinal area, a conglomerate was detected, measuring approximately 71×44 mm, which included loops of the small intestine, a section of the greater omentum, fluid, and a mesh prosthesis.

CT of the abdominal cavity and pelvic organs with contrast: in the right iliac region, descending downwards in front of the urinary bladder, merged infiltrates with small hypodense inclusions (probably effusion) are determined, with a total size of about  $98 \times 71 \times 156$  mm, accumulating a contrast agent (Fig. 1). The bladder walls are thickened to 15 mm, the dome of the cecum (the walls are thickened by approximately 10 mm), the appendix dilated to 10 mm and loops of the ileum are soldered to the infiltrate. The infiltrate is also adjacent to the anterior abdominal wall, with a loss of the fat layer between the abdominal muscles on the right. Stripes of effusion are noted around the infiltrates, a layer of up to 20 mm, and in the intermuscular space on the right up to 15 mm. The retroperitoneal lymph nodes of the lumbar region are enlarged to 11 mm, the iliac ones to 13 mm (on the right), the inguinal ones on both sides to 12 mm and quantitatively in the right iliac region. There is effusion in the small pelvis.

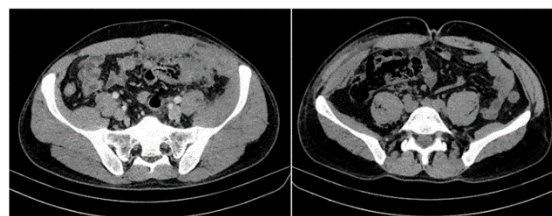


Fig. 1. Preoperative computed tomography of the abdominal cavity and pelvic organs with contrast

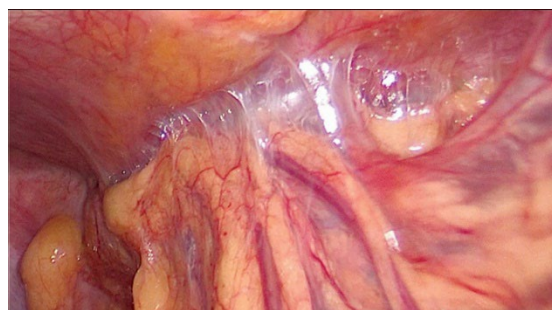


Fig. 2. Intraoperative photo: adhesion process of the involved abdominal organs

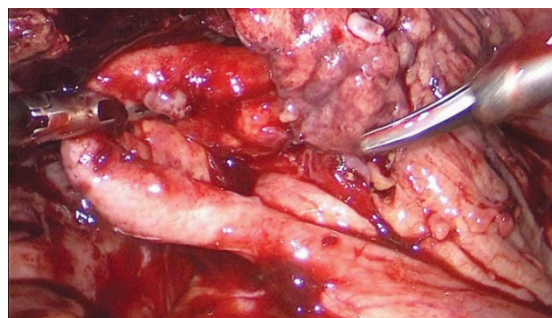


Fig. 3. Intraoperative photo: isolation of the involved abdominal organ (appendix)

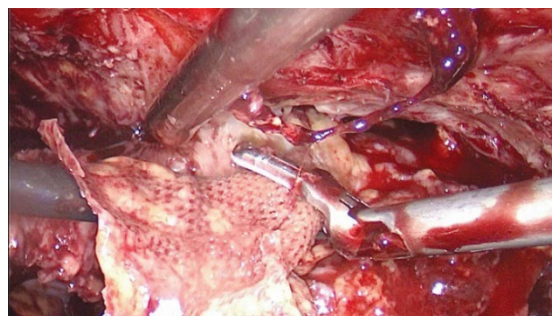


Fig. 4. Intraoperative photo of suppurating synthetic mesh prosthesis

The patient was hospitalized on emergency grounds due to the presence of an abscess in the area of a previously performed laparoscopic preperitoneal hernioplasty of the right IH to decide on possible surgical intervention tactics. It was decided to begin the operation using a laparoscopic approach, and in case of complications during the operation, convert it to laparotomy.

Description of the operation: a 10 mm trocar was inserted through an incision in the left mesogastric region using the *Hasson method*, carboxyperitoneum was applied. During overview laparoscopy: the liver, stomach, and duodenum are unchanged. The loops of the small intestine are not swollen, peristalsis is sluggish, their serosa is shiny. In the right iliac fossa, a pronounced adhesive process is determined; the ileal loop, a section of the greater omentum, the dome of the cecum, and the appendix are involved in the fused conglomerate of organs.

Two 5-mm ports were inserted in the right mesogastric region, a 10-mm port in the left mesogastric region. Using blunt and sharp methods, the ileal loop and the dome of the cecum were isolated from the infiltrate without damaging the intestinal walls; when isolating the dome of the cecum and appendix, phlegmonous changes in the vermiform appendix are determined, and a turbid exudate is released.

The omentum areas involved in the infiltrate were excised. The peritoneum was opened sharply along the lateral border of the infiltrate, the scar tissues together with the mesh implant were separated from the abdominal wall by step-by-step dissection, and an abscess cavity was opened by dissection along the lower edge of the mesh. After evacuation of the pus, the free edge of the mesh implant was found, which was isolated by step-by-step traction and removed from the abdominal cavity through a 10-mm port. The remaining scar infiltrated tissues of the peritoneal flap were placed in a container, which was left in the abdominal cavity.

The vermiform appendix measures 8.0×2.0×2.0 cm, its wall is bluish-purple, the mesentery is infiltrated, the base of the appendix is not thickened. The mesentery of the vermiform appendix is crossed with the Harmonic apparatus. The vermiform appendix is clipped three times with *Hemolock clips*, cut off, and then placed in a container. The right iliac fossa, the abscess cavity, and the small pelvis are carefully

sanitized with antiseptic solutions and dried. The abscess cavity is drained with a 24 Fr tube inserted through a trocar access in the right mesogastric region. The small pelvis is drained through a puncture from the left mesogastric region, the drainage is sutured to the skin. The duration of the operation is 1 hour 50 minutes.

Postoperative period: the patient was in the surgical department, where he received antibacterial, antispasmodic, infusion-corrective therapy and prevention of thromboembolic complications. The first two days the patient reported moderate pain in the area of postoperative wounds and in the right inguinal region. The drainage of the abscess cavity was washed for two days with *Sol. Dioxydini* 0.5% - 10.0 ml, on the 4th day the drainage from the small pelvis was removed, on the 6th day the drainage from the abscess cavity was removed. After control CT of the abdominal cavity and ultrasound of the abdominal cavity and pelvic tract on the 7th day after the operation the patient was discharged in a satisfactory condition with recommendations for observation by a surgeon at the place of residence, CT and ultrasound of the abdominal cavity with contrast are recommended in 1 month.

## RESULTS

Separation of the infiltrate, isolation of the involved internal organs from the infiltrative-inflammatory process, elimination of the purulent focus: opening, sanitation and drainage of the purulent cavity, removal of the infected foreign body (IFB) are mandatory stages of surgical treatment. Normalization of body temperature, reduction of pain syndrome and the results of dynamic CT of the abdominal organs and small pelvis with contrast and ultrasound of the abdominal cavity: the absence of limited fluid formations in the abdominal cavity and anterior abdominal wall, free fluid and gas, dilated intestinal loops are objective criteria for eliminating the pathological process and discharging the patient. Laparoscopic access helps to reduce pain syndrome, quickly restore working capacity, and reduce wound purulent complications. This clinical observation shows the possibility of IFB infection after *TAPP* with the development of a clinical picture of infiltration and abscess formation in the late postoperative periods. After removal of the infected mesh prosthesis, one-stage laparoscopic plastic surgery of the inguinal canal with a new SMP is contraindicated.

## CONCLUSION

1. Transabdominal preperitoneal plastic surgery is an effective, safe, minimally invasive operation for the surgical treatment of inguinal hernias using a synthetic mesh prosthesis.

2. Considering the minimally invasive nature of the access, postoperative infectious complications develop rarely.

3. However, there is an infection of the mesh prosthesis with the development of abscesses in this area, which leads to a significant deterioration in the patient's condition, the risk of developing sepsis, and creates significant difficulties in early diagnosis and surgical treatment.

4. Ultrasound examination and computed tomography with contrast of the abdominal organs of the pelvis are quite informative research methods for diagnosing abscesses associated with the implantation of a synthetic mesh prosthesis.

5. The optimal method of treating this complication turned out to be: laparoscopic access, separation of the infiltrate, adhesions, elimination of defects of the involved hollow organs, opening, sanitation and drainage of the purulent cavity with mandatory removal of the infected synthetic mesh prosthesis (foreign body), which significantly reduced the recovery time and reduced the likelihood of purulent complications in accordance with the principles of purulent surgery.

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## Editorial comment

The editors do not fully share the authors' point of view on the technology of destruction of the infiltrate with damage to hollow organs.