

Punctional-Draining Interventions Under Ultrasonic Navigation For Abscesses Of The Abdominal Cavity And Returnal Space

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ABSTRACT: *This article discusses the effectiveness of the application of the technique of puncture-draining intervention under ultrasound guidance and its relevance in the treatment of abscesses of the abdominal cavity and retroperitoneal space. The analysis of treatment of 72 patients in the period 2015-2020 was carried out with intra- and extraorgan abscesses of the abdominal cavity and retroperitoneal space. According to the indications, they underwent drainage interventions, during which the contents of the abscess cavity were examined to study its microflora and sensitivity to various groups of antibiotics. As a result of the study, in 86% of cases, the greatest sensitivity of the microflora to aminoglycosides of the III generation and drugs of the cephalosporin series of the III and IV generations was revealed, which proved the importance of these groups of drugs in conservative therapy in the diagnosis of abdominal abscesses. Drainage interventions were highly effective in 87.5% of all cases, the rest of the patients required a second intervention.*

Keywords: *Abdominal cavity, abscesses, surgical treatment, drainage of cavities, punctures, purulent contents.*

INTRODUCTION

Abscesses of the abdominal cavity and retroperitoneal space are among the most pressing issues in operative surgery. Mortality in this pathology reaches 10,5-26,1 % of all identified cases [1, 11]. Open classical methods of surgical treatment of patients with abscesses of the abdominal cavity and retroperitoneal space, in view of the high percentage of trauma, lead to adverse consequences in

the postoperative period. In recent decades, methods of low-traumatic, minimally invasive interventions in patients with this abdominal pathology have become widespread, one of which is the sanitation and drainage of purulent cavities under the control of an ultrasound sensor or computed tomography. A number of authors have revealed the advantage of carrying out such manipulations under ultrasound navigation in view of the fact that in this way the surgeon has the opportunity to visually control the entire course of manipulation [1, 4, 5]. In some cases, puncture aspiration is performed as a diagnostic intervention in doubtful cases, since it can be difficult to differentiate accumulations of blood, reactive effusion and pus according to computed tomography and ultrasound [1,2,4,5]. The effectiveness of percutaneous drainage depends on the localization of the purulent cavity: with abdominal abscesses, it reaches 74%, pelvic - 82% and retroperitoneal - 67%. Failures are observed with multiple abscesses and with purulent cavities that have a fistular connection with hollow organs [3, 6]. Patient management tactics are also determined by the size of the abscess. With small sizes of the purulent cavity, up to 5 cm in diameter, puncture and sanitation through a thin needle of 20-18 G with a solution of an antibiotic or antiseptic until a relatively clear wash water is obtained. For abscesses more than 5 cm in diameter, percutaneous catheter drainage of the cavity using single stylet - pigtail catheters of 7-14Fr caliber is indicated [7, 9]. After the installation of the catheter, the maximum removal of the contents from the abscess cavity is carried out and it is rinsed with a sufficiently large amount of antiseptic, followed by daily sanitation of the residual cavity. Complications when using the puncture-drainage technique for the treatment of intra-abdominal abscesses are observed in 9,6-15% of patients in the form of intestinal fistula formation, intra-abdominal bleeding, pneumothorax, obstruction and dislocation of the drainage tube [8,10]. The main indicators for the termination of catheter treatment is the complete disappearance of the residual cavity according to ultrasound observation and fistulography. An important role is played by the normalization of body temperature without the use of antibiotics, a persistent tendency to normalization of laboratory parameters in the postoperative period, the absence of purulent discharge when washing catheters, the disappearance of the existing reactive effusion in the abdominal or pleural cavities [12]. Minimally invasive interventions under the control of ultrasound examination, having a very limited range of contraindications, are performed regardless of the severity of the patient's condition, eliminating the need for more invasive interventions. The absence of the need for general anesthesia and the execution of an operating incision, the comparative safety of invasive interventions under the control of ultrasound examination, significantly better immediate results of treatment are a

significant advantage of puncture-draining interventions under the control of ultrasound navigation over classical open surgical treatment.

PURPOSE OF THE STUDY

As part of the study, the City Clinical Hospital named after N.I. Pirogova in the period 2015-2020 examined 72 patients with intra- and extraorgan abscesses of the abdominal cavity and retroperitoneal space. Of the operated patients, there were 48 men (66,6%), women – 24 (33,4 %). The age of the patients ranged from 24 to 78 years. All patients underwent a clinical examination, laboratory, instrumental and microbiological examinations were performed to verify the diagnosis, concomitant pathologies and to indicate indications for surgery. Concomitant pathology was present in 28 (38,8%) patients. In the structure of concomitant diseases, 7 (9,7%) patients had oncological diseases of the abdominal cavity organs, 5 (6,9%) patients had coronary heart disease, 1 (1,3%) patient with arrhythmias, 2 (2,7 %) patients with diabetes mellitus, 8 (11,1%) patients with HIV infection, 3 (4,1%) patients with liver cirrhosis, 2 (2,7%) patients with chronic renal failure.

Liver abscesses occurred in 22 patients (30,5%), subphrenic abscesses - in 32 patients (44,4%), subhepatic abscesses - in 5 examined patients (6,9%), retroperitoneal abscesses (including omental bursa) - in 13 (18,2%) subjects.

In all patients during the operation, material was collected from the abscess cavity to study the microflora, as well as the sensitivity of the seeded microflora to antibiotics. In the diagnosis of abscesses of the abdominal cavity and retroperitoneal space, ultrasound scanning of the abdominal cavity was used according to the standard protocol, with the study of parenchymal organs of the abdominal cavity and traditional zones of localization of free fluid in the abdominal cavity, ultrasound of the pleural cavities, retroperitoneal space, native multispiral 16-slice computed tomography (MSCT) abdominal cavity and abdominal MSCT with contrast according to indications. In five patients, abscesses of the abdominal cavity and retroperitoneal space were diagnosed using magnetic resonance imaging. Ultrasound examination was carried out using a Medison "SonoAse X8" diagnostic apparatus (South Korea) with 6 and 10 MHz sensors in B-mode (Fig. 1).



Fig. 1. Ultrasound examination of an abscess

For computed tomography, a multislice 16-slice computed tomograph (GE Bright Speed, General Electric Medical Systems, USA) was used. For contrast enhancement, X-ray contrast agents were used (Ultravist, Bayerpharma, Germany; Optiray, TycoHealthcare, Canada) (Fig. 2).

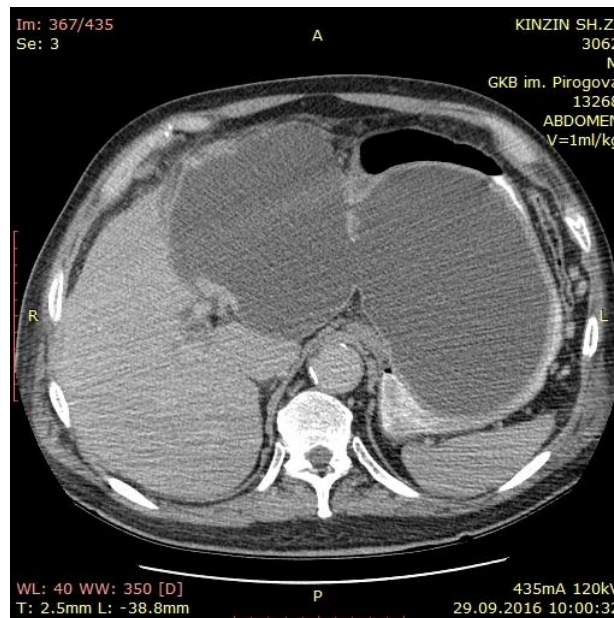


Fig. 2. CT scan. Verification of the abscess cavity.

All patients underwent conservative therapy and underwent puncture-drainage surgery under the control of an ultrasound transducer using the Medison "SonoAse X8" diagnostic apparatus (South Korea) with 6 and 10 MHz transducers in gray scale (B-mode) and color Doppler mapping. For drainage of abscesses, a device (needle with a diameter of 16-18 G, 37 cm long) and polyethylene curved drainage catheters with a fixing thread for percutaneous drainage of cavities from 9 to 14 CH from MIT LLC were used. Drainage was carried out using a one-step technique. Before surgery and in the postoperative period, all patients underwent detoxification infusion therapy using broad-spectrum antibiotics.

RESULTS AND DISCUSSION

The study of the microflora of the abscess cavity in 72 patients made it possible to establish that in 18 (25%) pathogens were sown as monocultures (in 8 - *Kl. Pneumoniae*, in 5 - *E. Coli*, in 2 - *Enterococcus faecium*, in 3 - *S. aureus*), in 52 (72,2%) - in the form of microbial associations, in 2 (2,8%) microflora growth was not detected (most likely due to prolonged antibacterial treatment preceding surgical intervention). Associations *E. Coli* and *Kl. Pneumoniae* occurred in 15 cases (20,8%), with *Enterococcus faecium* in 7 cases (9,7%), with *Str. haemolyticus* in 8 cases (11,1%). Association *Kl. pneumoniae* and *Proteus mirabilis* in 5 cases (6,9%), with *Ps. aurogenosae* - in 3 (4,1%), with *Candida albicans* - in 7 (9,7%). As can be seen from the results of inoculation, the composition of pathogens in patients with intra- and extraorgan abscesses of the abdominal cavity and retroperitoneal space mainly depends on the microecology of the gastrointestinal tract. Before receiving data on the sensitivity of microflora to antibiotics, patients were prescribed antibiotic therapy according to the following two schemes. In cases of suspected exposure to anaerobic flora (abscesses in cancer of the abdominal organs, psoas abscesses in HIV-infected patients), the enterogenic therapy regimen included metronidazole in combination with III generation cephalosporins. In the case of the most probable effect of gram-negative flora (liver abscesses, omental bursa abscesses), ciprofloxacin was prescribed as antibiotic therapy in combination with III generation cephalosporins. The sensitivity of microflora to various antibiotics was determined by the diffusion method using discs soaked in various antibiotics. As a result, it was revealed that the isolated microflora in 86% of cases was sensitive to III generation aminoglycosides (amikacin, tobramycin) and cephalosporin drugs of III, IV generation, as well as to vancomycin, thienam, meronem and imipenem. In 8 cases strain *Kl. Pneumoniae* was inoculated not susceptible to any antibiotic (most likely a hospital strain). It was possible to suppress the infection in this group of patients only as a result of the use of Klebsiellosis bacteriophage. An abscess of medium size (3-5 cm) was detected in 10 patients, and a large abscess (more than 5 cm) in 62 patients. All puncture interventions were performed in the operating room, under aseptic conditions. The ultrasonic probe was sterilized with 0,1% chlorhexidine alcohol solution. The technique of puncture interventions was reduced to two main procedures, such as puncture of a volumetric or fluid formation and drainage of pathological cavities. In 10 cases (9,8%), in view of the average size of the abscess (3-5 cm), puncture was performed with evacuation of purulent contents and sanitation of the purulent cavity with 0,05% aqueous chlorhexidine solution. In all other cases, puncture drainage of the abscess cavity was performed under

the control of an ultrasound sensor, since their dimensions exceeded 5 cm. In 7 cases out of 62, two drainages were used for more adequate sanitation of the abscess. All operations were performed under local anesthesia. The catheter was fixed to the skin with two interrupted sutures. In all cases, intraoperative sanitation of the abscess cavity was carried out with a 0,05% solution of aqueous chlorhexidine with the introduction of a broad-spectrum antibiotic from the cephalosporin group. The average duration of operations was 20 minutes (Fig. 3).



Fig. 3. The course of the puncture-draining intervention for an abdominal abscess

Before the operation and in the postoperative period, intensive detoxification infusion therapy was carried out with the introduction of broad-spectrum antibiotics. The duration of the postoperative period averaged 14.5 bed-days. There were no complications during surgery, as well as after surgery. In the postoperative period, the abscess cavity was sanitized daily. Ultrasonography was performed every three days to assess the dynamics of cavity shrinkage. The drainage was removed if there was no discharge and the cavity was eliminated during control ultrasound. Seven patients were discharged with drainage under the supervision of a polyclinic surgeon. The drains were removed after two to three weeks. The need for repeated interventions arose in 9 patients: in 3 patients a repeated puncture was required as a result of drainage migration, in 6 due to massive sequesters in the purulent cavity - drainage of abscesses had to be performed from a minimally invasive approach under ultrasound guidance.

CONCLUSIONS

Puncture drainage under the control of an ultrasound probe is an effective method in the treatment of patients with abscesses of the abdominal cavity and retroperitoneal space. Practically no contraindications, the possibility of performing interventions under local anesthesia, the safety of the technique, the shortest terms of the operation, minimal trauma compared to open surgical interventions, as well as the minimization of the number of postoperative complications, makes it possible to activate the patient on the day of the operation, and significantly reduce the rehabilitation period for patients

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