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Master's Thesis

**NURSING PROCESS IN THE PERIOPERATIVE PERIOD WITH
PERITONITIS**

Master of Science in Nursing

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MASTER THESIS ABSTRACT

Peritonitis may be caused by any microorganism that has entered the abdominal cavity. However, for each microbial species, there is a certain quantitative threshold and the conditions under which peritonitis may occur. Presently, peritonitis is usually caused by mixed microbial flora. The special etiological characteristics of the existing forms of peritonitis are mainly associated with the differences in sources of bacterial contamination and the stages of the course of peritonitis. A progressive development of suppurative process in a closed and anatomically complex abdominal cavity, the rapidly escalating intoxication and the resulting serious hemodynamic and respiratory disturbances, as well as a severely impaired metabolism, make the treatment of purulent peritonitis extremely difficult. This results in high mortality rates, which may reach up to 25-90% if not properly treated. Study objectives were to investigate the etiological factors and the pathogenesis of peritonitis and its diagnostic criteria. To characterize the principles of treatment for peritonitis and the modern techniques employed; to define the objective, the structure and the methods of implementation of nursing process in the perioperative period with peritonitis; to identify the typical problems in patients with peritonitis and to evaluate the quality of nursing care. The methods of study: epidemiological, statistical and clinical methods (observation, comparison and measurement). The results of the research study deepen the knowledge of the etiological factors and pathogenesis of peritonitis, its diagnostic criteria and principles of treatment. In course of the study, the investigator has defined the main objectives, structure and methods of nursing process in peritonitis in the perioperative period. The study has defined the typical problems of patients with peritonitis and conducted an assessment of their quality of life.

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LIST OF ABBREVIATIONS

IAI = intra-abdominal infection

ARICU = Anesthesia, Resuscitation and Intensive Care Unit

USE = ultrasonography examination

CT = computed tomography

MRI = magnetic resonance imaging

BP = blood pressure

CVP = central venous pressure

INTRODUCTION

Peritonitis is an inflammation of parietal and visceral peritoneal sheets, which is accompanied by a severe general condition of the patient [6]. This is one of the most severe complications that may occur in various abdominal disease and abdominal trauma [4].

The background of the study. Peritonitis may be caused by any microorganism that has entered the abdominal cavity. However, for each microbial species, there is a certain quantitative threshold and the conditions under which peritonitis may occur [21]. This premise is based on the existing bactericidal and immune properties of the peritoneum. Presently, peritonitis is usually caused by mixed microbial flora. The special etiological characteristics of the existing forms of peritonitis are mainly associated with the differences in sources of bacterial contamination and the stages of the course of peritonitis [36].

A progressive development of suppurative process in a closed and anatomically complex abdominal cavity, the rapidly escalating intoxication and the resulting serious hemodynamic and respiratory disturbances, as well as a severely impaired metabolism, make the treatment of purulent peritonitis extremely difficult [25]. This results in high mortality rates, which may reach up to 25-90% if not properly treated [36].

Epidemiology. Until now, purulent peritonitis remains one of the main causes of death in patients with acute surgical disease of the abdominal cavity. Approximately 15-20% of patients with acute surgical conditions of the abdominal organs are admitted to hospital surgical departments with signs of localized or diffuse peritonitis [6].

As for the direct causes of peritonitis, their frequency and structure has been fairly stable for a long time. Most frequently, diffuse purulent peritonitis develops as a result of delayed admission and treatment of patients with acute surgical disease of the abdominal organs [25]. According to the numerous available data, perforation of a hollow organ appears to be the most frequent cause of peritonitis in surgical disease: stomach and duodenum in approximately 30% of cases, destructive

appendicitis is more than 20% of cases, colonic lesions in 20-25% of cases and small intestine lesions in approximately 15% of cases [3 , 17, 19, 29, 38].

Males tend to be more frequently admitted with peritonitis (in approximately 60-65% of the cases). The typical age of the patients is within the range of approximately 15 to 88 years. The proportion of patients over 60 years of age is approximately 30–40% [36]. Patients over 65 years of age are at a three-fold risk of developing diffuse peritonitis and sepsis due to gangrenous perforated appendicitis or due to perforation of colon diverticula compared to younger patients [17, 35]. Overall, the available results of studies suggest that the host-related factors have a more significant impact on the outcome of the disease than the type and source of infection [30].

Despite the fact that for more than a hundred years the surgeons all over the world have paid substantial attention to the problem of peritonitis, the mortality in diffuse purulent peritonitis remains virtually unchanged and ranges from 4.5% to 58% [41]. In severe forms of peritonitis, the mortality may increase up to 30–50% [49]. A simultaneous development of sepsis, septic shock and multiple organ failure increases the mortality up to 70% and higher [35].

The diseases which may lead to peritonitis are quite different both in terms of clinical presentation and etiopathogenesis. They have one crucially important thing in common, i.e that they pose an immediate threat to life if treatment is delayed or in case of improper preoperative preparation by the nurse(s). This is why the nursing role in the perioperative period is extremely important. The outcome of the disease is largely dependent on the quality and the promptness of the patient's preparation to an emergency surgery. Functional assessments and laboratory tests are also very important in patient's preoperative preparation, where the nurse's involvement is very active.

The goal of the study

Based on global experience in treatment of patients with peritonitis, to provide scientific rationale for the principles guiding the organization of nursing process in this disease in the perioperative period, and the goals and structure of this process.

Study objectives

1. To investigate the etiological factors and the pathogenesis of peritonitis and its diagnostic criteria. To characterize the principles of treatment for peritonitis and the modern techniques employed.

2. To define the objective, the structure and the methods of implementation of nursing process in the perioperative period with peritonitis.

3. To identify the typical problems in patients with peritonitis and to evaluate the quality of nursing care.

The object of research

The nursing process in the perioperative period with peritonitis.

The subject of research

The factors that define the quality of nursing care provided in the perioperative period with peritonitis.

The methods of study:

Epidemiological, statistical and clinical methods (observation, comparison and measurement).

The scientific and practical value of the study.

The results of the research study deepen the knowledge of the etiological factors and pathogenesis of peritonitis, its diagnostic criteria and principles of treatment. In course of the study, the investigator has defined the main objectives, structure and methods of nursing process in peritonitis in the perioperative period. The study has defined the typical problems of patients with peritonitis and conducted an assessment of their quality of life.

CHAPTER 1.
ETIOLOGICAL FACTORS AND PATHOGENESIS OF PERITONITIS,
WITH SPECIFIC ASPECTS OF DIAGNOSIS AND TREATMENT
(REVIEW OF LITERATURE)

1.1. Etiology and pathogenesis of peritonitis.

Peritonitis may be caused by any microorganism that has entered the abdominal cavity. However, for each microbial species, there is a certain quantitative threshold and the conditions under which peritonitis may occur. This premise is based on the existing bactericidal and immune properties of the peritoneum [20].

Presently, peritonitis is usually caused by mixed microbial flora. The special etiological characteristics of the existing forms of peritonitis are mainly associated with the differences in sources of bacterial contamination and the stages of the course of peritonitis [4]. As for the direct causes of peritonitis, their frequency and structure has been fairly stable for a long time. Among surgical disease, perforation of a hollow organ is the most frequent situation leading to development of peritonitis. This group includes the patients with abdominal trauma, perforated gastroduodenal ulcers, perforated appendix vermiformis, perforated intestine and failure of gastrointestinal and inter-intestinal anastomoses [3, 6, 14, 29].

In purulent peritonitis, Gram-negative and anaerobic bacteria, including those of the intestinal flora, enter the abdominal cavity. The endotoxins produced by Gram-negative bacteria lead to the release of cytokines, which launch the cellular and humoral cascades resulting in cell damage, as well as in infectious shock and multiple organ failure in a number of patients [37]. In particular, abdominal sepsis is initiated by a component in the outer membrane of gram-negative microorganisms (e.g., by a lipopolysaccharide, lipid A or an endotoxin) or gram-positive organisms (e.g., by lipoteichoic acid, peptidoglycan), as well as by toxins from anaerobic bacteria [48]. This leads to the release of pro-inflammatory cytokines, such as tumor necrosis factor (TNF α) and interleukins 1 and 6 (IL-1/IL-6). They contribute to formation of toxic mediators, which leads to a complex and multifactorial syndrome of varying severity, and causes functional impairments in one or more vital organs and systems [35].

1.2. Classification of peritonitis

Currently, there are about 30 classifications of peritonitis in the world. Today, the following classification of peritonitis is generally accepted [36]:

1. Main diagnosis;

2. Type of development:

2.1. Primary;

2.1.1. Spontaneous peritonitis in children;

2.1.2. Spontaneous peritonitis in adults;

2.1.3. Peritonitis associated with certain diseases (tuberculosis, syphilis, gonorrhea);

2.2. Secondary;

2.3. Tertiary;

3. Expansion:

3.1. Local peritonitis (restricted to one or two anatomical regions);

3.1.1. Delimited (infiltration, abscess);

3.1.2. Not delimited;

3.2. Extensive peritonitis;

3.2.1. Diffuse peritonitis (restricted to three to five anatomical regions or to one “floor” of the abdominal cavity);

3.2.2. Generalized peritonitis (more than five anatomical regions or two “floors” of the abdominal cavity)

4. Effusion and its admixtures:

4.1. Nature of the exudate: serous, fibrinous, purulent, hemorrhagic (and combinations of those types)

4.2. Admixtures: intestinal contents, bile, urine and blood;

5. The severity of the patient’s condition depending on the intensity of systemic inflammatory response and multiple organ dysfunction (if possible, determined in points based on such scales as APACHE II, SAPS, MODS, SOFA, etc.):

	APACHE II	SAPS	MODS	SOFA
Absence of sepsis	<10	0 – 4	<8	<8
Sepsis	10 – 15	5 – 8	9 – 12	9 – 12
Severe sepsis	16 – 25	9 – 12	13 – 16	13 – 16
Septic shock	>26	>13	>17	>17

6. Complications:

6.1. Intra-abdominal: omentitis, unformed intestinal fistulas, abscesses of parenchymal organs, stress damage to the gastrointestinal tract, etc.;

6.2. Concerning anterior abdominal wall and retroperitoneal tissue: suppuration of the surgical wound, abdominal wall cellulitis, retroperitoneal cellulitis, eventration, etc.;

6.3. Extra-abdominal: deep vein thrombosis, pneumonia, pleurisy, mediastinitis, etc.

Currently, there is an international classification of intra-abdominal infection (IAI) suggested in 2009 by F. Menichetti and G. Sganga [20]. In terms of origin and extension, IAIs are divided into:

a) community-acquired and nosocomial (the latter category is subdivided into postoperative and non-postoperative IAIs);

b) complicated and noncomplicated.

In non-complicated IAIs, there are signs of involvement of one organ only, and the inflammation does not extend to the peritoneum. Examples of non-complicated surgical infection include acute appendicitis (without gangrene, perforation, abscess formation, or peritonitis) [17] and acute cholecystitis (with the exception of gangrenous perforated cholecystitis, gallbladder peritonitis, perivesical abscess, etc.) [19].

Complicated IAIs include localized (those forming 1 abscess) and diffuse focal lesions (peritonitis), the latter subdivided into primary, secondary and tertiary [40].

Primary peritonitis occurs in 1–5% of the patients, when the process is developing without compromising the integrity of hollow organs; the inflammation is the result of spontaneous hematogenous translocation of microorganisms into the peritoneal lining or extravasation of specific mono-infection from other organs [36]. At the same time, the literature distinguishes primary peritonitis in children as a separate nosology; it occurs in the neonatal period or at the age of 4-5 years [25]. Predisposing factors may include systemic disease (e.g. systemic lupus erythematosus) or nephrotic syndrome. In adults, primary peritonitis may occur after drainage of ascites in liver cirrhosis, with prolonged use of peritoneal dialysis and in female patients due to translocation of bacteria into the abdominal cavity from the vagina through the fallopian tubes [30].

Tuberculous peritonitis is a consequence of hematogenous contamination of the peritoneum in specific intestinal lesions, as well as in tuberculous salpingitis and tuberculous nephritis [25].

Secondary peritonitis is due to the penetration of microbial flora as a result of acute surgical diseases of the abdominal organs, such as acute appendicitis, cholecystitis, pancreatitis, acute intestinal obstruction and perforation of gastric and duodenal ulcers and ulcers in other parts of the intestine (of typhoid, dysenteric, tubercular, cancerous and any other origin), as well as in open and closed abdominal injuries [18].

Tertiary peritonitis is defined as a severe recurrent or persisting intra-abdominal infection occurring later than 48 hours after a successful and adequate surgical treatment of a source of secondary peritonitis [36]. Tertiary peritonitis is viewed as an inability of host defenses to wield an adequate response (both systemic and local) to the developing infectious process in the abdominal cavity [47]. Tertiary peritonitis is a condition when the patient has a persisting intra-abdominal infection, which is not manageable by previous surgical interventions [7]. The mortality due to tertiary peritonitis is very high, reaching from 30% to 64% [47].

ICD 10 coding [36]:

- K65.0 – Acute peritonitis (if necessary to identify the infectious agent, an additional code [B95–B97] is used)
- K65.8 – Other types of peritonitis;
- K65.9 – Peritonitis (adhesive) (with effusion) (fibrinous);
- K66 – Other disorders of peritoneum;
- K66.8 – Other specified disorders of peritoneum;
- K66.9 – Disorder of peritoneum, unspecified;
- K67 – Disorders of peritoneum in infectious diseases classified elsewhere;
- K67.0 – Peritonitis in chlamydia (A74.8*);
- K67.1 – Peritonitis in gonococcal (A54.8+);
- K67.2 – Peritonitis in syphilis (A52.7+);
- K67.3 – Peritonitis in tuberculosis (A18.3+);
- K67.8 – Other disorders of peritoneum in infectious diseases classified elsewhere.

1.3. Clinical presentation of peritonitis and special aspects of physical examination in peritonitis.

Clinical manifestations of extensive peritonitis are multiform and in most cases include the symptoms of the underlying disease and the juxtaposition of signs of peritoneal inflammation, abdominal sepsis or septic shock [25]. The most frequent complaints in the patients include abdominal pain, which may present as stabbing pain or dull pain. Initially, the pain may be weak and unlocalized, but later it progresses and increases with each movement (e.g., with cough, hip flexion) and with local palpation [22].

During collection of patient's history, the nurse should find out the duration of the disease, any changes in the nature and location of pain, the development of toxic manifestations with time and the signs of complications [6]. The history also includes the previous episodes of disease (e.g., diverticulitis, peptic ulcers, etc.) [3]. Anorexia and nausea are frequent symptoms that may precede abdominal pain. Nausea and vomiting are initially of a reflex-driven nature. Vomiting may also be caused by the

underlying visceral disease in the organ (i.e. the obstruction in various portions of the gastrointestinal tract) or be a secondary vomiting due to peritoneal inflammation as a result of intestinal paresis; an admixture of bile, followed by an admixture of small intestine contents, is adjoined [36]. Body temperature is usually subfebrile; it is infrequent for body temperature to reach high figures in this setting. There is a significant difference between axillary temperature and rectal temperature (this phenomenon is referred to as the Madelung symptom). Stool disturbances are not very typical. However, with progression of peritonitis and intestinal paresis, there may be a delay with bowel movements and passage of flatus [20].

In extensive peritonitis, the patients usually assumes a defense attitude (supine or lying on their side), with lower extremities flexed to the stomach (this is sometimes referred to as Rosanoff symptom). If the patient was sitting, an attempt to lie down increases abdominal pain and/or triggers pain in the shoulder girdle (Oehlecker symptom, i.e. irritation of the phrenic nerve) force the patient to return to the sitting position. This is the so-called “tilting doll symptom” [32]. The patient is inactive; the skin coloration is pale, with acrocyanosis [36].

In the vast majority of cases, the pulse is rapid, with small pulse volume. At early stages of peritonitis development, blood pressure usually remains normal. It is reduced in advanced forms of the disease [36]. Manifestations of toxic encephalopathy include both sluggishness (lethargy) and agitation or delirium. Skin pallor, especially skin mottling reflects a severe microcirculation disturbance [37].

The tongue is covered with a white plaque and dry. Often the abdomen presents with a marked flatulence and a diffuse tenderness in all of its parts. Auscultation findings include remarkably weak, often complete absence of intestinal sounds. Sometimes a dripping sound is heard on auscultation. Abdominal percussion in a patient with peritonitis often detects the signs that are important for diagnosis. First of all, this includes the absence of hepatic dullness and a high-pitched tympanitis over the liver (Spijarny-Clarke symptom). The percussion sound is irregular. Other percussion phenomena may include the “deadly silence” symptom, Lotheissen symptom (hearing respiratory and vascular sounds instead of intestinal sounds) and Skliarov symptom (the “splashing” sound). Signs of peritoneal irritation are the most

peritonitis-specific symptoms. As a rule, the abdomen is evenly inflated in a “ball-like” fashion (Mondor symptom) and does not participate in the breathing (Wynter symptom). All portions of the abdomen are tender to palpation, with tenderness likely to be more pronounced in the projection of the disease focus. The muscles of the anterior abdominal wall are tense [37].

The main peritoneal symptoms include the following [36]:

1) rebound tenderness (Blumberg's sign) is a discomfort/pain reported in manual application of tension to various areas of the abdomen. On the removal of the examiner's hand, the patient should be asked whether they are feeling any pain or significant discomfort. However, in board-like rigidity of the anterior abdominal wall muscles rebound tenderness may not be distinctly pronounced;

2) Mendel symptom: tenderness on percussion of the anterior abdominal wall;

3) Voskresensky symptom: sliding the examiner's hand along the tightly pulled shirt of the patient may trigger pain in the patient;

4) Bernstein symptom: as a result of inflammatory involvement of the peritoneum above the cremaster muscle, the testis is being pulled up to the external orifice of the inguinal canal.

Rectal and vaginal examinations reveal intense tenderness/pain in the anterior wall of the rectum or in the vaginal vaults (Kulenkampff symptom or the so-called "Douglas' cry"), which is explained by irritation of the pelvic peritoneum by peritoneal exudate. In a significant accumulation of exudate in the Douglas space, bulging of the anterior rectal wall can also be detected [36].

Detecting peritonitis is first and foremost a clinical diagnosis. However, due to the presence of a very diverse symptomatology and depending on the cause of peritonitis (especially in critically ill patients), there might be difficulties with timely diagnosis of the disease due to the presence of extensive wounds, acute respiratory failure, hemodynamic instability or the presence of comorbidities [48]. In this connection, it is recommended to resort to additional laboratory and instrumental diagnostic methods in addition to assessment for existing clinical symptoms [12].

1.4. Special aspects of laboratory tests and imaging in peritonitis.

In a setting of inflammation in the abdominal cavity, there may be changes in virtually all laboratory parameters depending on the severity of the process [36]. The recommended laboratory tests include: hematology and urinalysis, the levels of proteins in the blood (including albumin and C-reactive protein), blood sugar, liver function tests (including bilirubin, fibrinogen and lactate dehydrogenase) amylase/lipase, procalcitonin, interleukins 1, 6, 8, 10 and TNF, as well as hemostatic profile (activated partial thromboplastin time, international normalized ratio, etc.) [12].

Leukocytosis has been reported in the majority of patients (more than $11\ 000 \times 10^6$), with an increased proportion of immature forms. In severe forms of peritonitis and abdominal sepsis, some patients may not have either leukocytosis or leukopenia. The level of procalcitonin is a reliable factor for diagnosis of peritonitis and abdominal sepsis, namely: in purulent peritonitis, procalcitonin values are within 0.2 to 1.3 ng/mL, in sepsis they are within 1.3 to 5.9 ng/mL and in severe sepsis they are above 5.9 ng/mL. Significant changes have been found in the levels of interleukins 1, 6, 8 and TNF [36]. Thus, in order to clarify and confirm the diagnosis of purulent inflammation of the peritoneum it is recommended to use such biomarkers as procalcitonin, C-reactive protein, interleukins 1,6,8,10 and TNF in addition to assessing the generally accepted clinical and biochemical parameters of body fluids [12].

Ultrasonography (USE) is a preferred diagnostic modality in all patients admitted to the Anesthesia, Resuscitation and Intensive Care Unit (ARICU) with unstable hemodynamics who may not survive laparotomy and whose critical condition prevents them from leaving the ICU/ARICU for diagnostic procedures [11]. Mobile X-ray units may also be used in an ICU setting. An important advantage of abdominal ultrasound is that it may be useful in assessment of existing abdominal disease localized to the upper right quadrant (such as perirenal abscess, cholecystitis, pancreatitis, etc.), as well as the lower right quadrant and pelvic organs (e.g. appendicitis, tuboovarian abscess and Douglas abscess) [12]. Performing an USE sometimes limited due to severe pain, discomfort and/or flatulence in the patient. An

USE may detect an increased amount of peritoneal fluid, but only provided that the volume of peritoneal fluid is more than 100 mL. The diagnostic accuracy of USE in peritonitis is more than 85% [11].

Plain X-rays of the abdominal cavity (e.g. supine, upright and in a lateral decubitus position) are often the initial assessments performed in patients with peritonitis. Free air in the abdominal cavity can be found in most cases of gastric and duodenal perforation. However, this sign is much less frequent in perforations of small and large intestine and even less common in perforated appendicitis. It should be borne in mind that small amounts of free air may not be visible on plain radiographs [12].

In stable patients, computed tomography (CT) is recommended for diagnosis of most intra-abdominal inflammatory conditions [15]. A CT may detect even small amounts of fluid in the site of inflammation, as well as other gastrointestinal disease with very high sensitivity levels [11]. From the diagnostic viewpoint, CT has significantly higher accuracy and sensitivity (almost 100%) compared to ultrasound [12]. Magnetic resonance imaging (MRI) is a technology used mainly to diagnose intra-abdominal abscesses [37].

When CT and abdominal ultrasound are unable to provide the required information, diagnostic peritoneal lavage may be useful to diagnose peritonitis [12]. The obtained contents of abdominal cavity should be sampled for diagnostic tests, mainly for detection and identification of aerobic and anaerobic bacterial cultures using cytological and bacteriological express methods [20].

Diagnostic laparoscopy may be recommended as a diagnostic modality in patients with idiopathic abdominal sepsis [35]. Diagnostic laparoscopy is quite widely used to detect the cause of acute abdominal pain. It may also be accompanied by laparoscopic treatment when surgical disease is detected (appendectomy, cholecystectomy, suturing of perforated ulcers, etc.) [3]. The accuracy of diagnostic laparoscopy is very high (86–100%) [24]. This test is especially important in patients with pelvic disease and in suspected appendicitis [43].

1.5. Medical management of peritonitis.

Taking into consideration the serious condition of patients with peritonitis, there should be a short-term but intensive preoperative preparation, which includes infusion and transfusion therapy and perioperative antibiotic treatment [36]. The indications to such preparation include the severity of physical condition which exceeds 12 points on APACHE II and SOFA scales [32]. The time of preparation for surgery should not exceed 2–6 hours taking into consideration the individual differences due to the patient's age, body weight and the presence of any comorbidities. The general scheme of preoperative preparation, along with general hygienic measures includes the following: central venous access, catheterization of the urinary bladder, gastric tube insertion; intravenous administration of crystalloid solutions up to 1000–1500 mL; transfusion of 400–500 mL of colloidal solutions to replenish the volume of the circulating fluid; correction of hemodynamics and oxygen transport; intravenous use of broad-spectrum antibiotics. It is virtually impossible to achieve complete correction of homeostatic disturbances preoperatively; it suffices to achieve stabilization of systolic blood pressure (BP) above 90 mm Hg; central venous pressure (CVP) should be positive and urine output in the adult patient should exceed 30 mL/hour (or 0.5 mL/kg/hour) [37].

1.6. Surgical treatment of peritonitis.

The main stages of the surgical procedure include the following: elimination of the source of peritonitis; intraoperative lavage and rational drainage of the abdominal cavity; draining of the intestines (which are in a state of paresis in extensive peritonitis), the use of all the available means to eliminate the syndrome of dynamic intestinal insufficiency; selection of the option to complete primary surgery and determination of further patient management [6].

The surgical access of choice in extended peritonitis is midline laparotomy, which enable a full revision and lavage of all parts of the abdominal cavity. All other types of access (pararectal, transrectal, transverse and subcostal) are associated with the necessity to dissect large masses of fascial and muscular structures of the anterior

abdominal wall, which may entail the hazard of postoperative cellulitis of the anterior abdominal wall [36].

The key points of surgical interventions in any forms and types of peritonitis include radical elimination of the source of peritonitis (if possible), as well as lavage and drainage of the abdominal cavity [4].

Patients with acute appendicitis should have appendectomy. Patients with perforated appendicitis should be admitted for emergency surgical intervention. The recommended treatment of acute appendicitis includes both traditional appendectomy (open access) and laparoscopic appendectomy. The choice of appendectomy method should be based on the surgeon's experience and logistical support. [17].

Early diagnosis of gallbladder perforation and emergency surgical intervention is recommended in patients with acute cholecystitis. This may significantly reduce the frequency of complicated course and the mortality rates in destructive cholecystitis. Delayed surgical interventions are associated with greater numbers of complications (including peritonitis), which increase mortality rates and substantially prolong mean hospital stays, leading to additional financial burden on hospital systems. In various forms of peritonitis originating from acute cholecystitis, laparoscopic cholecystectomy is recommended [38].

Late hospitalization of patients with perforated gastroduodenal ulcers is leading to the development of peritonitis, which significantly reduces the efficacy of surgical treatment. In a perforated gastroduodenal ulcer, suturing of the perforation opening should be performed. A laparoscopic access is recommended in surgical treatment of ulcer perforations. In perforation of an ulcer localized in the stomach, it is recommended to dissect the edges of the ulcer to obtain the material for histological assessment [3]. In the postoperative period, all patients with perforated gastroduodenal ulcers should have tests to detect a *Helicobacter pylori* infection. If *Helicobacter pylori* infection is confirmed, eradication therapy is strongly recommended [37].

It is recommended that patients with perforated stomach cancer have resection of a part of stomach with the tumor even in a setting of active peritonitis, with the exception of cases with hemodynamic instability of the patient or when surgical

removal is not feasible. If it is not possible to perform partial resection of the stomach in patients with perforated gastric cancer, simple suturing of the perforation is recommended (if technically feasible) [29].

Damage to the hollow organs of the abdominal cavity is associated with high rates of complicated course and mortality. In this connection, promptly making the correct diagnosis and emergency surgical intervention are capable of improving prognosis in the patients. A penetrating wound of a hollow organ should be promptly managed by applying a manual or machine suture. In an apparent hazard of failure of anastomosis sutures and a generally severe condition of the patient, which does not allow performing the procedure in full volume, it is recommended intestinal resection with hermetically sealing the incoming and outgoing segments, while radical corrections (such as anastomosis, reconstruction and colostomy) should be delayed [14].

Postoperative peritonitis can be a life-threatening complication of abdominal surgery associated with high rates of organ failure and mortality. Ineffective control of the source of peritonitis is leading to a significant increase in mortality rates. The treatment of patients with postoperative peritonitis requires an intensive treatment for organ dysfunction, baseline infection management via a surgical intervention and/or paracentetic drainage technologies and antimicrobial therapy [20].

It is recommended to use percutaneous drainage for treatment of postoperative restricted intra-abdominal abscesses in the absence of symptoms of extensive forms of peritonitis [40]. Early relaparotomy is recommended for the management of postoperative peritonitis [42]. Lavage of the abdominal cavity is one of the most important and critical stages of the surgical procedure. The quality of this stage largely defines further development of the disease process as well as the need for additional treatments. To a large degree, successful treatment of peritonitis hinges upon intraoperative lavage [6].

Currently, there is a well-supported opinion that the main objective of lavage is a purely physical removal of toxins and bacteria, and that the use of any antiseptics in a setting of systemic antibiotic therapy is impractical for the following reasons: short exposure of the abdominal cavity to antiseptic solutions, high risk for local and

general toxic effect and impaired antibacterial action of the drug in the presence of peritoneal inflammation [4]. The recent decade saw a substantial reduction in the range of antiseptics used for lavage of the abdominal cavity, since many of those antiseptics fail to meet the applicable requirements. The lavage of the abdominal cavity should use a volume of fluid from 2 L to 6 L of the solution; the lavage should be performed until a clear rinsing fluid [6].

After the lavage, the issue of small intestine draining should be taken care of. This draining is indicated in manifest signs of paralytic ileus. In the presence of peritonitis, it is recommended to perform intestinal intubation with introduction of a probe into the ileum [31].

At the end of the surgical stage of peritonitis treatment, it is recommended to perform draining of the abdominal cavity. The quantity and the quality of the drainage tubes is defined by the extension and the nature of the inflammation [4]. The following types of drainages are distinguished: tubular drain; glove drain; glove-tubular drain; Penrose drain. In various forms of peritonitis, the use of glove drains is recommended, which provide for maximum outflow of exudate from the abdominal cavity. The standard points for drain insertion in diffuse peritonitis include: right subhepatic space and left subphrenic space, right iliac region and pelvic cavity [6].

Due to significant inherent shortcomings, peritoneal dialysis is used much less frequently in patients with peritonitis over the last years. Insertion of gauze sponges into the abdominal cavity is only recommended in the following cases: a) incompletely removed site of infection; b) lack of confidence in the soundness of sutures to a hollow organ, i.e. to limit possible entry of gastrointestinal contents into the free abdominal cavity; c) for the purpose of hemostasis with an ongoing diffuse bleeding [20].

Patients with extensive peritonitis and abdominal sepsis are admitted to ARICU for preoperative preparation and intensive therapy in the postoperative period [31]. The duration of preoperative preparation is usually determined by the severity of the patient's condition and is 2–6 hours on the average. In an ARICU setting, the severity of the patient's condition (including that in patients with peritonitis) is assessed by APACHE II and SOFA scales. Abdominal sepsis is diagnosed in case of infection

and organ dysfunctions. The latter are verified at the initial stages of hospitalization, using the quick SOFA (qSOFA) scale, which includes mental status disorders (less than 13 points on Glasgow coma scale), respiratory rate more than 22 per minute and a decrease in systolic blood pressure to and below 100 mm Hg. Organ dysfunction is diagnosed in a qSOFA score of >2 points [36].

Postoperative pain is a major factor that affects the duration of the patient's postoperative hospital stay. A multi-modal approach is recommended when conducting postoperative analgesia, with an integrated use of regional analgesia, neuronal blocks, combinations of acetaminophen and nonsteroidal anti-inflammatory drugs, which reduces the use of opioids and, consequently, their side effects [22].

Early oral hydration is recommended, i.e. consumption of more than 300 ml of fluid after the end of intravenous infusion therapy. In the presence of nausea and vomiting, pharmacological therapy is recommended (droperidol, anti-serotonergic drugs, low-dose opioid analgesia) [27].

Early ambulation is recommended, i.e. encouraging the patient to move as soon as possible. Prolonged bed rest aggravates muscle loss and weakness, impair lung function, predisposes to venous stasis and thromboembolism, as well as contributes to formation of postoperative fusions. Every effort should be made for early postoperative activation, which is made possible by adequate pain control [20].

1.7. Antimicrobial therapy of intra-abdominal infection.

Early diagnosis and timely antibacterial therapy of peritonitis can minimize the severity and the frequency of complications. Microbiological monitoring is very important. After the diagnosis of peritonitis is established, the recommended strategy for bacteriological culture and sensitivity assessment is to obtain exudate from the infection site (i.e. from the peritoneal cavity) and a sterility test of the blood taken from a peripheral vein [6]. Immediately after the end of the surgical intervention where a diagnosis of peritonitis has been established, samples of urine, sputum, and wound discharge (in presence of wounds) are obtained for bacteriological testing. Repeated daily samples are obtained at least every 7 days. If repeated laparotomies

are performed, the exudate from the peritoneal cavity for bacteriological testing is obtained at each relaparotomy [42].

Perioperative antibiotic prophylaxis is recommended prior to the surgical intervention. The optimal time for administration of the first dose of the antibiotic is a pre-narcosis administration; it is not recommended to commence perioperative antibiotic prophylaxis after suturing the wound [20].

The initial antibiotic treatment for IAI should be started as an empirical therapy, as soon as the diagnosis of peritonitis has been made. Baseline control of the IAI source is recommended as early as possible. In peritonitis and abdominal sepsis, intravenous administration of drug therapy is considered optimal. The choice of antibiotic treatment for IAI depends on multiple factors, the most important of which include the following [37]:

1. The source of peritonitis;
2. Local data on antibiotic resistance of microorganisms;
3. Comorbidities in the patient

Preferred antibacterial agents are informed by the likeliest suspected etiology of the infectious process. The principle of reasonable sufficiency is used, i.e the recommendations include the antibiotics with a more narrow range of antimicrobial activity [20].

In IAIs, the microbial landscape depends on the type of peritonitis. Recommended treatments for primary peritonitis include clavunalate-protected penicillins, third and fourth generation cephalosporins, fluoroquinolones, vancomycin, etc. [6]. Primary peritonitis includes the infections more frequently caused by a single-species bacterial agent (*E. coli*, *Enterobacter* spp., *Citrobacter freundii*, *Klebsiella* spp., *S. viridans*, *S. pneumoniae*, Group B *Streptococcus*; and *S. aureus* in rare severe cases) or in patients on peritoneal dialysis (coagulase-negative *Staphylococci*; *S. aureus* in the most severe cases; in case of nosocomial infection: *Enterococcus* spp., *P. aeruginosa*, rarely *Candida* spp., in female patients due to translocation of bacteria from the vagina into the abdominal cavity through the fallopian tubes (*Neisseria meningitidis*, *Streptococcus pneumoniae*, *Neisseria gonorrhoeae*, *Staphylococcus* spp., *Enterobacteriaceae* spp., *Streptococcus* spp).

Aerobes are infrequently isolated due to high oxygen content in the peritoneal fluid. In spite of the fact that staphylococci are rarely acting as the causative agents of peritonitis on the background of peritoneal dialysis, it is recommended that hospitals with high prevalence of methicillin-resistant strains include vancomycin into the schedules of empirical therapy [20].

Recommended treatments for secondary peritonitis include clavulinate-protected penicillins, clavulinate-protected cephalosporins of the third and fourth generation combined with metronidazole and fluoroquinolones. In case of intolerance to beta-lactam antibiotics, aminoglycosides in combination with metronidazole may be prescribed. When there is a risk of presence of the bacteria producing extended spectrum beta-lactamases (ESBL), it may seem better to start with carbapenems without antipseudomonal activity, such as ertapenem [18]. In a high risk of infection with *Pseudomonas aeruginosa* or *Acinetobacter*, it is necessary to administer carbapenems with antipseudomonal activity (meropenem, imipenem, doripenem) or polymyxin. When the patient is at risk of having methicillin-resistant strains of staphylococci, it is recommended to include glycopeptides or oxazolidinones, or tigecycline into the treatment schedule [28].

The more frequent causative agent in secondary peritonitis is *E. coli*; less frequent causes of secondary peritonitis include *Klebsiella* spp, *P. aeruginosa*, *Enterobacter* spp., *Citrobacter* spp., *Serratia marcescens* and *Morganella morganii*. More often than not, patients with secondary peritonitis present with a mixed (aerobic-anaerobic) flora; moreover, the anaerobes are mainly represented by the *Bacteroides* spp. group, and, in a smaller degree, by *Clostridium* spp., *Fusobacterium* spp., *Peptostreptococcus* spp [18].

Recommended treatments for secondary peritonitis include carbapenems, clavulinate-protected cephalosporins, fluoroquinolones, third or fourth generation cephalosporins; combinations with metronidazole are possible. In a high incidence of methicillin-resistant *Staphylococcus aureus* (MRSA), linezolid or vancomycin should be added [7]. The causes of tertiary peritonitis include infecting the peritoneum by multi-resistant strains of coagulase-negative Staphylococci, other varieties of

Staphylococci, Enterococci, Enterobacteriaceae, Pseudomonas or Candida spp. fungi, which is typical for hospital-acquired infections [47].

Effective antibiotic therapy for tertiary peritonitis is a very challenging problem. Moreover, there is still no convincing evidence concerning the effect of systemic antibiotic therapy on therapeutic outcomes in this form of peritonitis [7].

Routine administration of antifungal drugs is not recommended. Therapeutic indications to the use of antifungal drugs includes isolation of fungi from normally sterile foci, i.e. from peritoneal transudate or blood. Isolation of Candida spp. from the fluids in the abdominal cavity and especially from drains in peritonitis is not an absolute indication for the use of antifungal therapy [4]. At the same time, in the absence of a clinical effect when prescribing an adequate antibiotic therapy regimen (subject to reliable control of the focus of infection), as well as in case of repeated intestinal perforations and laparotomies, the presence of risk factors for systemic mycosis (prolonged [>5 days] ARICU stay; the use of broad-spectrum antibiotics; prolonged [>5 days] use of central venous catheter; use of steroids or immunosuppressants, extensive [>2 loci] superficial Candida colonization, infected pancreatic necrosis, total parenteral nutrition, etc.), it is appropriate to consider empirical use of antifungal agents [6].

Immunocompromised patients are at higher probability of fungal etiology of peritonitis. When Candida albicans is isolated, fluconazole is the drug of choice. Other Candida species (such as C. crusei and C. glabrata) may be less sensitive or resistant to azoles (fluconazole); therefore, it is reasonable to use amphotericin B or voriconazole in this case [20].

In community-acquired peritonitis, the use of Class I carbapenems (ertapenem) is recommended. If local situation with antibiotic resistance is favorable, inhibitor protected beta-lactams or combinations of fluoroquinolones with metronidazole, or monotherapy with moxifloxacin can be recommended as alternative treatments [6].

The characterization of microbial landscape in peritonitis is directly dependent on whether the infection is community-acquired or has a hospital-acquired origin. In community-acquired origin of peritonitis, the spectrum of causative agents is sufficiently predictable and is limited to the representatives of the Enterobacteriaceae

family in association with anaerobes (mainly *Escherichia coli* and *Bacteroides fragilis*) [4].

In hospital-acquired origin of peritonitis and abdominal sepsis meropenem, imipenem, doripenem, as well as inhibitor protected antipseudomonal beta-lactams (cefoperazone/sulbactam, piperacillin/tazobactam) are recommended as treatments of choice [20]. Combination therapy is only recommended in a situation of multi-resistance/total resistance, neutropenia or a combination of respiratory failure and shock [35].

Upon receipt of culture and sensitivity results, it is recommended to start antibiotic therapy with broad spectrum drugs with subsequent deescalation. This allows for immediate and effective treatment of severe IAI, avoiding excessive use of antibiotics, lowering the potential for antibiotic resistance and reducing treatment costs [20].

To ensure timely and effective antibiotic therapy in critically ill patients, in addition to pathophysiological aspects of underlying disease it is recommended to take into account the immune status of the patient and the pharmacokinetic properties of the antibiotics used [6].

The duration of antibiotic therapy is determined by its efficacy; the recommended efficacy evaluation milestones are 24, 48 and 72 hours after the onset. The efficacy criteria of antibiotic therapy include the following: improvement in symptoms of abdominal infection; reduction in fever (maximum body temperature not higher than 38.9°C); and reduction in the severity of intoxication and systemic inflammatory response [48]. In the absence of a robust clinical and laboratory response to adequate antibiotic therapy during 5-7 days, additional assessment is recommended to identify complications or an infection focus of different localization [36].

CHAPTER 2.
MODERN PRINCIPLES OF NURSING PROCESS
IN THE PERIOPERATIVE PERIOD WITH PERITONITIS

All patients with peritonitis are subject to immediate hospitalization to a surgical department and require an emergency surgical intervention. This is why the nurse should prepare the patient for surgery skillfully and as soon as possible [5]. The sooner the operation for abdominal inflammation is performed, the lower are the odds of severe complications and lethal outcome [20].

Perioperative period is the time from the decision to perform a surgery to restoration of working capacity or persistent loss of the latter [8]. This larger period includes the following period:

- preoperative period;
- intraoperative period (the operation *per se*);
- postoperative period.

2.1. Special aspects of nursing care in the preoperative period with peritonitis.

Preoperative period is the time of patient's hospital stay from the moment of completion of diagnostic workup, established clinical diagnosis and the decision to operate on the patient to the onset of the procedure [20]. The goal of this period is to minimize potential complications and to reduce the risks to patient's life both during and after the procedure. The main objectives of the preoperative period include the following: precise diagnosis of the disease; identification of indications for surgery; the selection of adequate surgical and anesthetic methods; identification of existing comorbidities in other organs and systems and executing an action plan to improve the impaired functions of organs and systems in the patient; performing activities to reduce the risk for endogenous infection and the psychological preparation of the patient for the upcoming surgery [5]. The preoperative period includes the following two phases: the diagnostic phase and the preoperative preparation phase [34].

The recovery of the patient hinges not only on the properly performed procedure, but also on preoperative preparation. The health care personnel in the surgical department not only should know how to carry out the physician's order, but should also understand why the order was made, what is the positive effect of the procedure and what are the potential negative consequences of failure to carry out the order [27]. The physician, when ordering the plan of preoperative preparation, should explain to the nursing personnel the goals and the special aspects of preoperative preparation for each patient and monitor the correct fulfillment of physician's orders [44].

Nursing personnel and nursing aides are playing an important role in preparation of the patient for the surgery [26]. Preparing a patient for a surgical procedure involves recovery of vital organs, such as those of the cardiovascular system and the respiratory system, the gastrointestinal tract, the liver and the kidneys. Prior to the procedure, the nurse should teach the patient in proper breathing technique and coughing, and how to perform respiratory exercise for 10-15 min [46].

Preparation for an emergency surgery has its peculiar characteristic features. If the patient ate or drank before the surgery, it is important to place a gastric tube for evacuation of gastric contents. Cleansing enemas are contraindicated in this case. The patient should empty urinary bladder before the surgery; flexible catheterization of the urinary bladder may be used as an alternative [5]. As a rule, preanesthetic medication is given 30 to 40 min before surgery or on the operating table, depending on the urgency of the procedure [46].

Thorough cleaning of the patient's skin is an important step of preoperative preparation. Not only standard hygienic precautions, but also making sure there is no cutaneous infection and/or inflammation (even minor) is an important measure to prevent purulent inflammation in the postoperative wound. If body hair in and around surgical site may potentially interfere with the procedure, it should be removed. Shaving should be done immediately prior to surgery, using depilatory creams/gels or other methods, attempting to minimize compromising skin integrity as much as possible [5].

Problems that may occur in the patient during preoperative period include:

1. *Anxiety and fear of negative outcome of the surgery.*

Nursing actions:

- talk to the patient and introduce members of surgical/anesthetic team to the patient;
- convince the patient of professional expertise of the surgical team;
- explain the rules of preparing for the surgery.

2. *Knowledge deficit regarding behavior in the postoperative period.*

Nursing actions:

- teach the patient to use breathing and coughing techniques and relaxation techniques;
- provide recommendations concerning diet in the postoperative period.

When talking to the patient, the nurse should support the patient's confidence that owing to the highly qualified surgeons and anesthesiologists and effective medicines, the surgical procedure and the postoperative period will be successful. It is important to convince the patient of the success of treatment [44]. It is necessary to provide the patient with an opportunity to verbalize their concerns, doubts and fears, answer the patient's questions and provide the necessary explanations. Introducing the patient to patient support groups, where the patient may communicate with other patients who have had identical surgical interventions [13]. This is a significant challenge which requires an individual approach to the patient in each case. Regardless of the nurse's own mood, it is necessary to constantly maintain good spirits in the patient who is about to undergo surgery [33].

Since the patient usually has several problems, the nurse should define a system of priorities, distinguishing primary (first), secondary and intermediate priorities. First priority problems include such patient problems, which may have an adverse impact on the patient if left untreated. Intermediate priority includes the problems that are not emergencies and do not pose a threat to the patient's life. Secondary priorities include the needs of the patient, which are not directly related to the disease or prognosis [1].

2.2. Nursing process in the intraoperative period with peritonitis.

The nurse has the patient transported to the operating room along with the patient's medical records, x-rays and a test tube with blood to run a blood compatibility test for a potential transfusion. The nurse shall move the patients carefully, avoiding sudden and quick movements and pushes, on wheelchair or gurney. The patient is placed on the gurney; the hospital personnel will put a cap on their head and socks or disposable shoe covers on their feet [39].

In the pre-operating holding area, the patient will be transferred to the operating room gurney and taken to the operating room theater. Then the patient is placed on the operating table into a position required for a specific type of surgery given the nature of the procedure and the patient's overall health status. The patient's upper extremities and, when needed, lower extremities should be properly immobilized [5]. Special care should be taken when transporting and transferring patients with external drains, intravenous lines, and intubation tubes. In all cases, the nurse should receive clear instructions from the doctor about the scope and timing of expected work [9].

Operating suite is a suite of premises where surgical procedures and certain diagnostic procedures (e.g. laparocentesis, laparoscopy and endoscopy) are performed [34].

Operating suites have strict zoning of inside premises into the sterile area (operating rooms), controlled area (pre-operating holding area, storage rooms for sterile materials and other auxiliary premises), and general hospital area (airlock/slucice) [34].

Working conditions correspond to sanitary and hygienic standards for operating rooms. The microclimate is maintained with air conditioners and supply and exhaust ventilation, which purify the air from dust and bacteria, maintain the required temperature in the room during any season of the year, and prevent the accumulation of carbon dioxide and excessive humidity. The general lighting of the operating room is performed by ceiling-mounted and wall-mounted lamps [5].

Operating room is expected to have all the required equipment and instrumentation for performing surgical operations. There operating suite is always

maintaining order and high standards of work discipline. All items should be in their respective designated places (packages and sterilizing drums, instruments, solutions and drugs, etc.). The operating room should be ready for work at any time of the day [46].

The operations of the operating suite are based on strict adherence to aseptic and antiseptic precautions, since the surgical wound is a high-risk site of entry for various infections. Successful strict adherence to aseptic rules depends on staff discipline and attention to detail both in preparation for and conduct of surgical procedures to a greater extent than on the use of antibiotics and complex equipment [34].

In the operating room, the nurse is taking part in proper positioning of the patient on the operating table, which is essential to improve the access to the organ operated upon. The positioning of the patient on the operating table may be different depending on the nature of the procedure; first of all, it should be physiological and provide protection in points of potential pressure and friction, prolonged tension, compression of nerve trunks and other injuries. Correct positioning of the patient on the operating table is an integral part of the scrub nurse's work [5].

Surgical procedure (operation) is an intervention carried out by mechanical effect on the tissues and organs of the patient with therapeutic and/or diagnostic intent [2].

During the procedure, the scrub nurse provides the surgeons with the required instruments, materials and equipment and keeps track of timely return of instruments and removal of dressing material from the wound, controls asepsis and takes appropriate measures when even the slightest deviations are detected, and keeps a strict record of napkins, needles, blades and other instruments preoperatively, before suturing the surgical wound and postoperatively [5].

The scrub nurse should know the course of typical procedures performed in the operating suite, which allows for a quick and correct selection of the required instruments and for promptly handing them to the surgeon [46].

The problems of patients that occur intraoperatively [34]:

1. ***The risk of surgical stress.***

Implementation of the plan of nursing intervention:

- The patient should be addressed by their formal polite name.
- Prior to anesthesia, the patient should be placed in a position, which is as comfortable as possible.
- As much as possible, loud conversations and clatter of instruments in the operating room should be avoided.
- The patient should not see the instruments and napkins, especially if they are stained with blood.

2. The risk of procedure-associated complications.

Implementation of the plan of nursing intervention:

- Prior to operation, the nurse should verify the patient's identity and his/her allergy history, including medication allergies and change the antiseptic for processing of skin (for instance, if the patient is allergic to iodine, alcohol-based antiseptics and iodine-free materials should be used).
 - Check the operation capability of the equipment used during surgical operations.
 - Establish and maintain optimal temperature and relative humidity of the air in the operating room by using ventilation system and air conditioning.

3. The risk of infection in the patient.

Implementation of the plan of nursing intervention:

- Provide the necessary instruments and equipment for the surgical intervention; conduct operational control of the sterilization cycle using various methods.
- Assess the preoperative condition of the skin for signs of compromised skin integrity and infection.
- Process the surgical site. When processing intact skin prior to surgery, each antiseptic should be applied in concentric circles from the center to the periphery. However, when a purulent wound is present, the antiseptic should be applied from the periphery to the center. The prepared site should be sufficiently large to allow extending the incision should a need arise and/or allow new incisions for drainage placement.

- The adherence to aseptic and antiseptic precautions should be monitored by all members of the operating team.
- Count the used instruments and napkins before, during and after the procedure.
- An aseptic dressing should be applied to the surgical wound.

4. Risk for pressure ulcers.

Implementation of the plan of nursing intervention:

- Reduced pressure on bony tissues, prevention of friction and displacement of tissue by proper positioning of the patient on the operating table using specialized accessories, pillows, rollers, etc.

The study has established that 75% of the nurse's work time is spent on direct participation in the operation. This finding indicates that nursing professional qualifications are in high demand in the operating suite. In the perioperative period, the scrub nurses are independently performing sanitary and anti-epidemic measures (20%) and auxiliary technical activities (5%) [5].

2.3. Organization of nursing care in the postoperative period in peritonitis.

Postoperative period is the period from the end of the surgical procedure to restoration of the patient's ability to work. During this period, medical professionals conduct a variety of therapeutic interventions aimed at prevention and management of complications, as well as the measures that facilitate restoration and adjustment of the body to the new anatomical and physiological realities created by the surgical intervention [37].

A distinction is made between the immediate and the remote postoperative period. The immediate postoperative period starts from the end of the operation and continues until the patient is discharged from the healthcare institution. The early period, i.e. the first 2-3 days after the surgery, is the most critical time. It is the time of the greatest manifestations of the changes in organs and systems that are the direct result of surgical trauma and anesthesia. The late period continues to the moment of the patient's discharge from the hospital. The remote postoperative period continues

from the moment the patient is discharged from the hospital until the patient's recovery [50].

The main objectives in the postoperative period include the following [37]:

- pain control using opioid and non-opioid analgesics;
- management of hypovolemia (using multicomponent infusion therapy);
- maintaining cardiac activity and systemic circulation and elimination of microcirculation disorders (the healthcare providers use cardiovascular agents, infusion therapy with low molecular weight dextrans);
- maintaining respiratory function and managing hypoxia (sufficient analgesia, oxygen therapy, breathing exercises and mechanical ventilation when required);
- management of impaired fluid and electrolyte balance and impaired acid-base balance;
- parenteral nutrition;
- detoxification therapy;
- supporting the function of the excretory system.

The scope of the above mentioned interventions depends on the duration and the extensiveness of the surgical procedure and on the associated surgical trauma [5]. The patient's restrictions and privileges depend on the nature of the surgical intervention. As a rule, bed rest is indicated for the first 2–4 days. In cases where ambulation is delayed for a particular reason, exercise therapy is used as a measure to prevent postoperative complications [46].

The special aspects of nutrition in the postoperative period greatly depend on the specific nature of the operation and on the patient's condition. The meals after the surgeries not involving incision into the lumen of the gastrointestinal tract usually include small servings of liquid foods on Day 2 postoperatively. Starting from Day 5-6 the patients may usually resume a conventional diet. If the operation is performed on the organs of abdominal cavity, oral feeding is started later, after restoration of the activity of the gastrointestinal tract [26].

Urinary retention is managed by urinary bladder catheterization, pharmacological stimulation (i.e. pyridostigmine) and applying therapeutic heat to the lower abdomen [39].

The uneventful course of postoperative period is characterized by a gradual improvement of the patient's condition. When this process takes longer than expected, the healthcare professional should primarily suspect the development of complications [34].

Problems of the patients in the postoperative period [34]:

1. Risk of vomitus aspiration.

Implementation of the plan of nursing intervention:

The patient brought from the operating room is placed in a supine position (unless the specifics of the procedure require otherwise) onto a flat or low Fowler bed (no pillows are used until the patient recovers from anesthesia). The patient is covered with a blanket; if needed, a heating pad is put on top of the blanket above the patient's feet.

After the surgery, the patient may have a nasogastric tube in order to evacuate stomach contents and gasses [5]. Abdominal surgeries are often accompanied by nausea and vomiting. However, antiemetics should be withheld until the cause has been established. Frequent findings may include flatulence due to aerophagy, lack of mobility, surgical interventions and adverse effects of drugs [34].

2. Pain at the surgical access site.

Implementation of the plan of nursing intervention:

Strong pain calls for injections of opioid analgesics, which can be used only as prescribed by the physician. After extensive or complicated surgeries, prescription analgesics may need to be used longer than usual but usually for not more than 3-4 days.

3. The risk for pulmonary congestion.

Implementation of the plan of nursing intervention:

Already on the first day after the surgery, the patient should make 3-4 deep breaths and full exhalations every 30-40 minutes. On Day 2 to Day 3, the exercise program is enhanced by more complex respiratory exercise in the supine position and

turning from one side to the other. Subsequently, as soon as the patient's condition permits, the patient will need to commence exercises in the sitting and, finally, in the standing position. In addition to early ambulation, these exercises are very important in prevention of pneumonia.

4. Urinary retention and the risk for paralytic ileus.

Implementation of the plan of nursing intervention:

A frequent postoperative finding includes urinary retention due to paresis of the urinary bladder or spasm of the sphincter; an alternative cause of postoperative urinary retention may involve not getting used to urinating in a supine position. Catheterization of the urinary bladder with a Foley catheter may be performed as required.

During the first days after laparotomy, retention of gasses in the intestine frequently occurs. In such cases, the physician may prescribe rectal suppositories and flatus tube, which is inserted into the anus to the depth of 15-20 cm and left for 4-6 hours. If these measures fail, a small enema with hypertonic (10%) sodium chloride solution (80-100 ml) may be used as required.

5. Knowledge deficit related to hydration and diet.

Implementation of the plan of nursing intervention:

The duration of the NPO ("nothing per os") period during which the patient is not allowed to take oral fluids and eat depends on the nature of the operation. After interventions on the stomach and the duodenum, the patient may not drink during the first day postoperatively. On the second day (provided there is no vomiting) the patient may have 300 to 500 ml of water given as one sup every 30-40 minutes. Fluid deficit is effectively replaced by intravenous drip infusions of solutions of sodium chloride, potassium chloride, glucose, etc. On the third day, the patient may take more oral fluid and liquid food is started.

The meals in the postoperative period should be highly caloric, rich in vitamins and readily digestible. At the same time, in the first days after the operation, it is necessary to limit oral food consumption, taking into account the nature of the intervention and the degree of surgical trauma to digestive organs.

6. The risk of shock conditions.

Implementation of the plan of nursing intervention:

During postoperative observation and care for the patient the nurse should have a careful approach to all the complaints of the patient and to be able to correctly evaluate the condition and the behavior of the patient, their breathing and pulse, and to monitor the correct position of the patient in the bed, the condition of the dressing and the underwear and bed linen. The nurse should report all alarming changes in the patient's condition to the physician.

7. Risk of postoperative bleeding.

Implementation of the plan of nursing intervention:

After operations with primary suturation and application of aseptic bandage, the wound requires little to no care. At the end of the operation, an ice pack may need to be placed over the bandage (pressure and cold prevent hematoma formation). When the dressing is profusely soaked with blood, the nurse should call the physician immediately. When the wound is healing by primary intention, the sutures are removed on Day 7-10, after which the immature scar is closed by an adhesive bandage for several days.

Among the potential complications in the postoperative period, bleeding from the wound is by far the most dangerous. Internal bleeding may develop after any operation on organs of the abdominal cavity due to slipping of the suture from the blood vessel. It is usually manifested by paleness of the skin and mucous membranes, shortness of breath, thirst and a rapid weak pulse. In cases of overt or suspected bleeding, the nurse should call the medical officer on duty immediately.

Dehiscence is the likeliest after a laparotomy with a large midline incision. In some cases, this complication is accompanied by eventration, i.e. prolapse of internal organs from the abdominal cavity (more frequently, greater omentum and intestinal loops) through the defect in the abdominal wall. An emergency repeated procedure is required in such cases.

8. The risk of wound infection.

Implementation of the plan of nursing intervention:

In the postoperative period, such purulent and septic complications may occur as suppuration of the postoperative wound. Suppuration of the surgical wound is usually manifest on Day 3-4. Under the dressing, the nurse may see swelling, hyperemia, local hyperthermia of skin around the wound and a tender induration (infiltration) of the subcutaneous adipose tissue. As a rule, in such cases the surgeon will need to remove the cutaneous sutures, dilate the wound edges widely to allow the outflow of pus and drain the wound.

The nurse should monitor the status of the postoperative suture and ensure the adherence to aseptic and antiseptic precautions when performing dressing changes.

Therefore, the process of nursing care embraces preoperative, intraoperative and postoperative periods. The role of the scrub nurse (operating room nurse) in the perioperative process is especially important, since it is he/she who prepares the dressing material and instruments for operation, performs sanitary and anti-epidemic activities and establishes friendly, benevolent and ethical relationships between the nurse, the surgeon and the patient, and also acts as a mentor for the nurses being trained in surgical nursing [5].

During the conduct of the surgical procedure, the clarity of communications and mutual understanding between the members of the operating team is playing a decisive role. The benevolent and positive attitude of the nurse to a large degree determines the general mood and order in the operating room. The nurse needs to be thoughtful and proactive, be responsible for his/her actions, be intellectually inquisitive and always willing to learn [45]. The rapid pace of scientific developments and the introduction of new technologies and modern equipment into surgical practice require that scrub nurses be highly professional and seeking continuous improvement. The theoretical knowledge, the sufficient practical experience and the high qualification of the scrub nurse are optimal conditions for the successful course of the perioperative process [46].

The main objective of the nursing personnel in the remote postoperative period is to help the patient resume their normal life [16]. However, even the

assistance of a psychologist is not always helpful. A patient may become withdrawn, start avoiding other people and maintain a virtually reclusive lifestyle. This is why adequate health services should never be discontinued as long as there are signs of depression [23]. Proper nursing care helps with a full-fledged rehabilitation of the patient. Often a desired effect is achieved not only owing to the surgical procedure, but also due to adequate selection and execution of patient care activities [10].

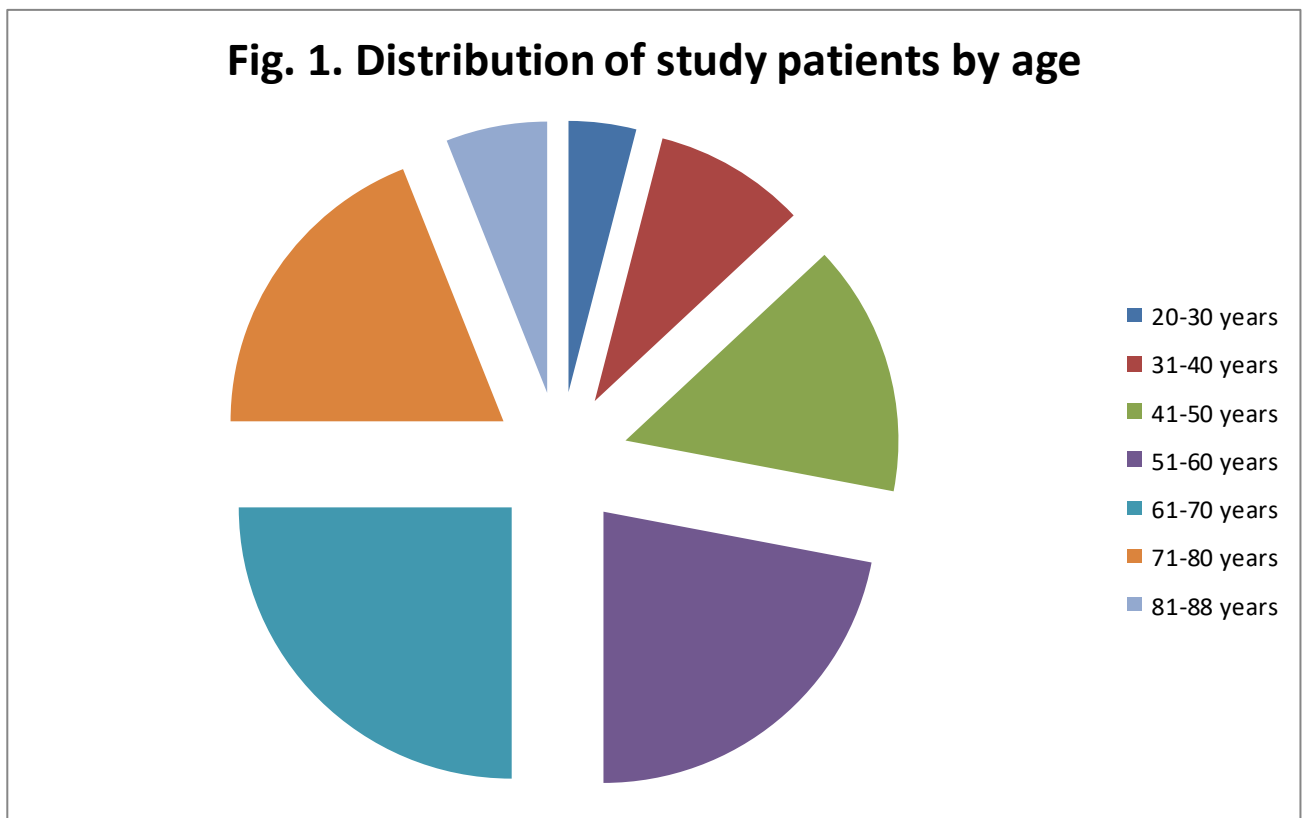
CHAPTER 3.
THE OBJECT AND THE RESULTS OF THE STUDY AND THEIR
ANALYSIS

3.1. The object of research.

The *object of research* included 100 patients 20 to 88 years of age admitted for inpatient treatment to an abdominal surgery unit.

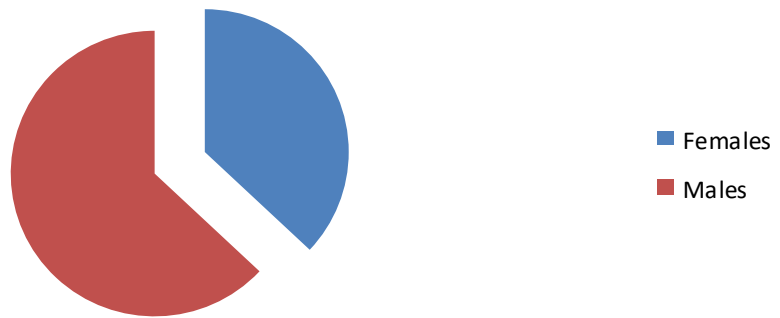
Our goal was to determine the problems in the patients admitted for inpatient treatment and diagnosed with peritonitis, as well as organization of their nursing care and evaluation of its efficacy.

1. *The distribution of study patients by age was as follows:* 20-30 years: 4 pts. (4%); 31-40 years: 9 pts. (9%); 41-50 years: 15 pts. (15%); 51-60 years: 22 pts. (22%); 61-70 years: 25 pts. (25%); 71-80 years: 19 pts. (19%); 81-88 years: 6 pts. (6%) (Fig. 1).



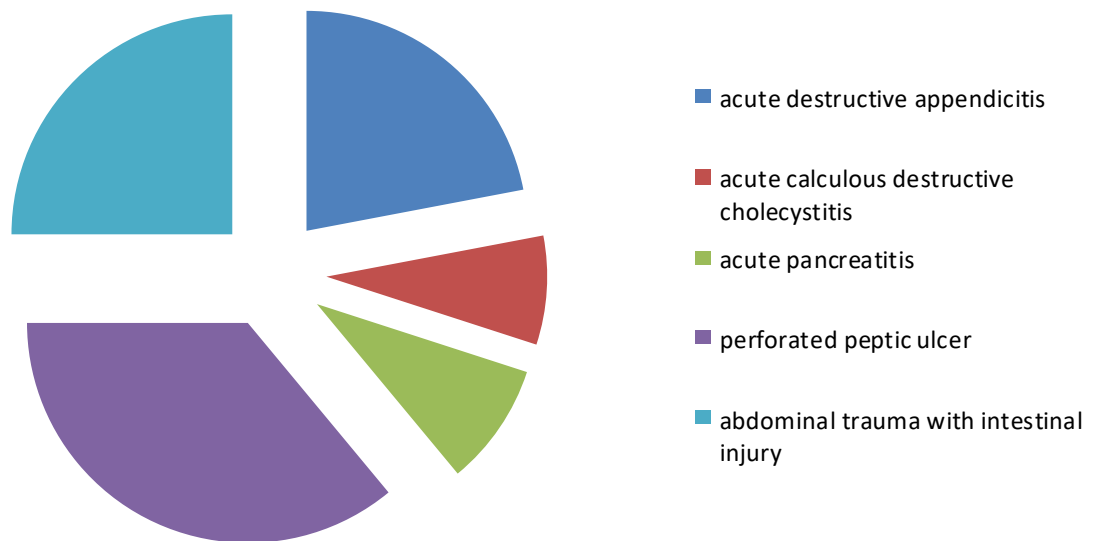
2. *The distribution of study patients by gender was as follows:* Among 100 study subjects, there were 37 females (37%) and 63 males (63%) (Fig. 2).

Fig 2. Distribution of study patients by gender



3. *The structure of disease in the study patients* was as follows: acute destructive appendicitis: 22 pts. (22%); acute calculous destructive cholecystitis: 8 pts. (8%); acute pancreatitis: 9 pts. (9%); perforated peptic ulcer: 36 pts. (36%); abdominal trauma with intestinal injury: 25 pts. (25%) (Fig. 3).

Fig. 3. The structure of disease in the study patients



3.2. Identification of problems in perioperative patients with peritonitis; implementation and efficacy of nursing interventions.

Nursing diagnosis was performed as part of nursing care process and was based on interviews, observations and physical examinations conducted over a 3-4 week period of inpatient treatment.

The main problems in patients with peritonitis *in the preoperative period* included the following:

No.	The main problems in the patients in the preoperative period	Total
1	Pain	100 pts. (100%)
2	Dyspepsia, nausea, vomiting	96 pts. (96%)
3	Feeling hot due to fever/chills	100 pts. (100%)
4	Fatigue, headache, malaise and decreased appetite, intoxication-related	100 pts. (100%)
5	Flatulence	95 pts. (95%)
6	Constipation, flatus	98 pts. (98%)
7	Depression, fear of negative surgical outcomes, anxiety, being concerned/restless	86 pts. (86%)
8	Knowledge deficit concerning postoperative period	84 pts. (84%)
9	Insomnia	90 pts. (90%)
10	Knowledge deficit related to the nature, causes and sequelae of the disease	88 pts. (88%)
11	Limited mobility and self care potential	97 pts. (97%)
12	Limited or loss of ability to work	99 pts. (99%)

The main problems in patients with peritonitis *in the intraoperative period* included the following:

No.	The main problems in the patients in the intraoperative period	Total
1	Fear of negative surgical outcomes, anxiety, being concerned/restless (risk for stress, surgery-related)	81 pts. (81%)

There also were problems (risks) associated with performing the surgical intervention:

No.	The main problems (risks) associated with performing the	Total
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	surgical intervention	
1	The risk of procedure-associated complications	95 pts. (95%)
2	The risk of infection in the patient	94 pts. (94%)
3	Risk for pressure ulcers.	75 pts. (75%)

The main problems in patients with peritonitis *in the postoperative period* included the following:

No.	The main problems in the patients in the postoperative period	Total
1	Pain	100 pts. (100%)
2	Dyspepsia, nausea, vomiting	94 pts. (94%)
3	Feeling hot due to fever/chills	95 pts. (95%)
4	Fatigue, headache, malaise and decreased appetite, intoxication-related	100 pts. (100%)
5	Flatulence	92 pts. (92%)
6	Constipation, flatus; urinary retention	98 pts. (98%)
7	Depression, fear, anxiety, being concerned/restless	72 pts. (72%)
8	Knowledge deficit regarding behavior in the postoperative period and regarding hydration and diet	70 pts. (70%)
9	Insomnia	84 pts. (84%)
10	Limited mobility and self care potential	99 pts. (99%)
11	Limited or loss of ability to work	99 pts. (99%)
12	Need to take medicines on an ongoing basis	98 pts. (98%)
13	Dressing becomes wet	75 pts. (75%)
14	The presence of a drain	98 pts. (98%)

The patients had the following **nursing diagnoses**:

1. Fever due to an infectious process.
2. Somnolence and weakness due to infection/intoxication.
3. Skin pallor, intoxication-related.
4. Reduced physical activity.
5. Fear, anxiety, depression and insomnia, intoxication- and surgery-related.
6. Poor appetite due to intoxication.
7. Abdominal pain due to underlying disease or surgical intervention.
8. Dyspepsia.

9. Bleeding and bleeding-related anemia.
10. Flatulence and constipation, intestinal paresis-related.
11. Impaired urination.
12. Risk for dissemination of infection, risk for septicemia.

A list of intended nursing interventions was made, which included the following items:

1. Providing the patient with psychological support prior to treatment (surgery) in the postoperative period.
2. Conducting preoperative preparation of the patient.
3. Intraoperative nursing care.
4. Patient management in the postoperative period; monitoring regular drug treatment; fulfilling physician's orders.
5. Organization of the patient's routine.
6. Organization of clinical nutrition.
7. Reducing the risk for complications.

Nursing interventions were implemented according to the following algorithm:

Planning	Implementation
Providing the patient with psychological support prior to treatment (surgery) in the postoperative period	<ol style="list-style-type: none"> 1. A patient and gentle attitude toward the patient. Educating the patient about the causes of their complaints and condition. 2. Helping the patient develop a correct attitude to their disease for successful treatment and rehabilitation. 3. Explaining the goal and the course of upcoming treatment and the rules of preparation for surgery.
Conducting preoperative preparation of the patient	<ol style="list-style-type: none"> 1. Assessment of preoperative condition of the skin for signs of compromised skin integrity and infection. Advance preparation of surgical site. 2. Emptying the stomach. 3. Emptying the urinary bladder. 4. Emptying the intestines. 5. Preanesthetic medication. 6. Transporting the patient to the operating room.
Intraoperative nursing care	<ol style="list-style-type: none"> 1. Checking the operation capability of the equipment used during surgical operations.

	<ol style="list-style-type: none"> 2. Establishing and maintaining optimal temperature and relative humidity of the air in the operating room by using ventilation system and air conditioning. 3. Providing the necessary instruments and equipment for the surgical intervention; the operational control of the sterilization cycle using various methods. 4. Monitoring the adherence to aseptic and antiseptic precautions by all members of the operating team. 5. Counting the used instruments and napkins before, during and after the procedure. 6. Aseptic dressing on the surgical wound.
<p>Patient management in the postoperative period. Monitoring regular drug treatment. Fulfilling physician's orders.</p>	<p>According to Medication Administration Record:</p> <ol style="list-style-type: none"> 1. Monitoring the patient's condition. 2. Measuring blood pressure and pulse rate 4 times a day. 3. Measuring body temperature 2 times a day. 4. Administration of medications as ordered by the physician; monitoring compliance with medication schedule: <ul style="list-style-type: none"> ● pain control (using opioid and non-opioid analgesics); ● management of hypovolemia, infusion therapy; ● maintaining respiratory function and managing hypoxia (sufficient analgesia, oxygen therapy, mechanical ventilation when required and breathing exercises); ● maintaining cardiac activity and systemic circulation, elimination of microcirculation disorders (cardiovascular agents, infusion therapy); <ul style="list-style-type: none"> ● management of impaired acid-base balance and impaired fluid and electrolyte balance; ● detoxification therapy; ● supporting the function of the excretory system. 4. Identification of complications that may occur with parenteral administration of drugs. 5. Postoperative wound care: monitoring the dressing, dressing change, surgical drain care.
<p>Organization of the patient's routine.</p>	<ol style="list-style-type: none"> 1. Ensuring continuous supply of fresh air to the patient's room. 2. Bed rest for 1 to 3 days with gradual expansion of privileges. Help the patient assume a proper position in bed (taking into account the location of the lesion).

	<p>2. In cases where ambulation is delayed, exercise therapy is used as a measure to prevent postoperative complications.</p> <p>3. Sufficient duration of nighttime sleep (no less than 8 hours).</p>
Organization of clinical nutrition of the patient	<p>1. The first day: only fluids (warm plain water, still mineral water (not more than 200 ml per day).</p> <p>2. The feeding after restoration of activity of the gastrointestinal tract is usually started with small servings of liquid food. The patient may eat lean broths (beef, chicken). Dairy products, bread, sweets, vegetables and fruits should be initially restricted.</p> <p>3. Starting from Day 8-10, the patients may usually resume a conventional diet.</p> <p>4. Creating a quiet and favorable environment during the mealtime.</p> <p>5. Parenteral nutrition as required.</p>
Reducing the risk for complications	<p>1. Helping the patient develop a correct understanding of the sequelae of the disease and the essence of rehabilitation.</p> <p>2. Informing the patient about the need to change to a more healthy diet.</p> <p>3. Continuous watchful waiting of the patient's condition, providing the patient with additional support and escorting the patient to the sites where therapeutic and diagnostic interventions are performed.</p> <p>4. Continuous prevention of nosocomial surgical infections.</p> <p>5. Reducing the risk of congestion in the lungs and breathing exercises.</p> <p>6. Bleeding risk assessment.</p>

The outcomes and the efficacy of nursing interventions.

In course of observation and implementation of nursing care (over the course of inpatient treatment), the majority of patients reported the following:

- Reduced pain (in 89 pts., 89.0%);
- Reduced dyspepsia (in 74 pts., 74.0%);
- Body temperature returned to normal (in 85 pts., 85.0%);
- Intestinal function returned to normal (in 85 pts., 85.0%);
- Improved overall health (in 85 pts., 85.0%);
- Improved sleep (in 60 pts., 60.0%);

- Improved mental and emotional well-being (in 52 pts., 52.0%);
- Improved ambulation capacity and self care potential (in 75 pts., 75.0%).

These findings suggest a high level of professionalism of nursing personnel, their proper attitude to their professional duties and the high quality of their work.

CONCLUSIONS

1. The study has investigated the etiological factors and the pathogenesis of peritonitis, diagnostic criteria, therapeutic principles and modern treatment techniques. Thus, peritonitis develops as a result of delayed admission of patients with acute surgical disease of abdominal cavity; the causative situations include perforation of the stomach and duodenum, destructive appendicitis, colonic lesions and small intestine lesions. In peritonitis, Gram-negative and anaerobic bacteria, including those of the intestinal flora, enter the abdominal cavity. The endotoxins produced by Gram-negative bacteria lead to the release of cytokines, which launch the cellular and humoral cascades resulting in cell damage, as well as in infectious shock and multiple organ failure. The clinical manifestations of peritonitis are multiform and in most cases include the symptoms of the underlying disease and the juxtaposition of signs of peritoneal inflammation, abdominal sepsis or septic shock. The diagnostic workup involves conventional laboratory and imaging tests, including hematology and serum biochemistry, ultrasound, CAT scan, plain abdominal film, diagnostic laparoscopy. Preoperative medical treatment includes infusion and transfusion therapy and perioperative antibiotic therapy. The main stages of the surgical procedure include the following: elimination of the source of peritonitis; intraoperative lavage and rational drainage of the abdominal cavity; draining of the intestines, the use of all the available means to eliminate the syndrome of dynamic intestinal insufficiency; selection of the option to complete primary surgery and determination of further patient management.

2. The study has defined the special aspects, the objective, the structure and the methods of implementation of nursing process in the perioperative period in peritonitis. The main objectives of the preoperative period include the following: accurate diagnosis of the disease; establishing the indications for surgery; the choice of appropriate surgical and anesthetic methods; identification of existing comorbidities in other organs and systems and carrying out a set of measures to improve the impaired functions of organs and systems in the patient; performing activities to reduce the risk for endogenous infection and psychological preparation of

the patient for the upcoming surgery. Nursing personnel and nursing aides are playing an important role in preparation of the patient for the surgery. Preparing a patient for a surgical procedure involves recovery of vital organs, such as those of the cardiovascular system and the respiratory system, the gastrointestinal tract, the liver and the kidneys. As much as 75% of the nurse's work time is spent on direct participation in the operation. In the perioperative period, the scrub nurses are independently performing sanitary and anti-epidemic measures (20%) and auxiliary technical activities (5%). The nursing personnel ensures the following: checking the operation capability of the equipment used during surgical operations, maintaining optimal temperature and relative humidity in the operating room by using ventilation system and air conditioning, providing the necessary instruments and equipment for the surgical intervention, operational control of the sterilization cycle using various methods, monitoring the adherence to aseptic and antiseptic precautions by all members of the operating team and counting the used instruments and napkins before, during and after the operation. In the postoperative period, the nurse is monitoring the patient's health status, measures BP and counts pulse rate, measures body temperature, performs administration of medications as prescribed by the physician, monitors compliance with medication schedule, performs diagnosis of complications and care for the postoperative wound, including control of dressings, dressing changes and surgical drain care.

3. This work has defined typical problems in patients with peritonitis. Thus, the main problems in patients with peritonitis in the preoperative period included the following: pain in 100 pts. (100%); feeling hot due to fever/chills in 100 pts. (100%); fatigue, headache, malaise and decreased appetite, intoxication-related in 100 pts. (100%); limited or loss of ability to work in 99 pts. (99%); constipation, flatus in 98 pts. (98%); limited mobility and self care potential in 97 pts. (97%); dyspepsia, nausea, vomiting in 96 pts. (96%); flatulence in 95 pts. (95%); insomnia in 90 pts. (90%); knowledge deficit related to the nature, causes and sequelae of the disease in 88 pts. (88%); depression, fear of negative surgical outcomes, anxiety, being concerned/restless in 86 pts. (86%); knowledge deficit regarding behavior in the postoperative period in 84 pts. (84%). The main problems in patients with peritonitis

in the intraoperative period included the following: fear of negative surgical outcomes, anxiety and being concerned/restless (risk for stress, surgery-related) in 81 pts. (81%). There also were problems (risks) associated with performing the surgical intervention: the risk of procedure-associated complications in 95 pts. (95%), the risk of infection in the patient in 94 pts. (94%) and the risk for pressure ulcers in 75 pts. (75%). The main problems in patients with peritonitis in the postoperative period included the following: pain in 100 pts. (100%); fatigue, headache, malaise and decreased appetite, intoxication-related in 100 pts. (100%); limited mobility and self care potential in 99 pts. (99%); limited or loss of ability to work in 99 pts. (99%); need to take medicines on an ongoing basis in 98 pts. (98%); the presence of a drain in 98 pts. (98%); constipation, flatus; urinary retention in 98 pts. (98%); feeling hot due to fever/chills in 95 pts. (95%); dyspepsia, nausea, vomiting in 94 pts. (94%); flatulence in 92 pts. (92%); insomnia in 84 pts. (84%); soaked dressing in 75 pts. (75%); depression, fear, anxiety, being concerned/restless in 72 pts. (72%); and knowledge deficit regarding behavior in the postoperative period and regarding hydration and diet in 70 pts. (70%). The patients were found to have the following nursing diagnoses: Fever due to an infectious process; Somnolence and weakness due to infection and intoxication; Skin pallor, intoxication-related; Reduced physical activity; Fear, anxiety, depression and insomnia, intoxication- and surgery-related; Poor appetite due to intoxication; Abdominal pain due to underlying disease or surgical intervention; Dyspepsia; Bleeding and bleeding-related anemia; Flatulence, constipation and flatus, intestinal paresis-related; Impaired urination; Risk for dissemination of infection, risk for septicemia. The nursing interventions in the perioperative period were performed according to the plan, which included the following: providing the patient with psychological support before treatment (surgery) and in the postoperative period; conducting preoperative preparation of the patient; intraoperative nursing care; patient management in the postoperative period, monitoring regular drug treatment, fulfilling physician's orders; organization of the patient's routine; organization of clinical nutrition of the patient; reducing the risk for complications. In course of observation and implementation of nursing care (over the course of inpatient treatment), the majority of patients reported the following:

reduced pain (in 89 pts. [89.0%]); reduced dyspepsia (in 74 pts. [74.0%]); body temperature returned to normal (in 85 pts. [85.0%]); intestinal function returned to normal (in 85 pts. [85.0%]); improved overall health (in 85 pts. [85.0%]); improved sleep (in 60 pts. [60.0%]); improved mental and emotional well-being (in 52 pts. [52.0%]); and improved ambulation capacity and self care potential (in 75 pts. [75.0%]). These findings suggest a high level of professionalism of nursing personnel, their proper attitude to their professional duties and the high quality of their work.

REFERENCES

1. Ackley Betty Nursing Diagnosis / Ackley Betty, Ladwig Gail, Makic Mary Beth Flynn // Handbook. St. Louis, Missouri, 2017: Elsevier.
2. Agresta F. Peritonitis: laparoscopic approach / Agresta F., Ciardo L.F., Mazzarolo G. et al. // World J. Emerg. Surg. – 2006. – V. 24 (1). – P. 9-15.
3. Bertleff M.J. Laparoscopic correction of perforated peptic ulcer: first choice? A review of literature / Bertleff M.J., Lange J.F. // Surg. Endosc. – 2010. – V. 24 (6). – P. 1231–1239.
4. Bhandari T.R. Effect of early surgery on outcome in perforation peritonitis / Bhandari T.R., Poudel R., Chandra K.J. // Univers. Coll. Med. Sci. – 2017. – V. 5. – P. 12–16.
5. Bucher L. Medical Surgical Nursing / L. Bucher, I. Camera, Sharon et al. // St. Louis, Missouri: Elsevier/Mosby, 2015, P. 187.
6. Budamala S. Evaluation of Various Prognostic Factors in Perforative Peritonitis Management / Budamala S., Penugonda A., Prakash G.V. et al. // Journal of Evidence based Medicine and Healthcare. – 2015. – V. 2 (38). – P. 6027-6035.
7. Chromik A.M. Identification of Patients at Risk for Development of Tertiary Peritonitis on a Surgical Intensive Care Unit / Chromik A.M., Meiser A., Hölling J. et al. // Journal of Gastrointestinal Surgery. – 2009. – № 1. – P. 98-104.
8. Coccolini F. IROA: the International Register of Open Abdomen: An international effort to better understand the open abdomen: call for participants / Coccolini F., Catena F., Montori G. et al. // World Journal of Emergency Surgery. – 2015. – V. 10. – P. 37-42.
9. Colley S. Nursing theory: its importance to practice / Colley S. // Nurs. Stand. – 2003. – V. 17, № 46. – P. 33–37.
10. *Doenges Marilyn Nursing Care Plans: Guidelines for Individualizing Client Care Across the Life Span / Marilyn Doenges // Philadelphia. – 2014, F.A. Davis Company.*

11. Doria A.S. US or CT for diagnosis of appendicitis in children and adults? A meta-analysis / Doria A.S., Moineddin R., Kellenberger C.J. et al. // *Radiology*. – 2006. – V. 241. – P. 83-94.
12. Emmi V. Diagnosis of intra-abdominal infections: Clinical findings and imaging / Emmi V., Sganga G. // *Infez. Med.* – 2008. – V. 16 (Suppl 1). – P.19-30.
13. Erickson M. The Client-Nurse Relationship: A Helping Relationship / M. Erickson, J. Blazer-Riley // St. Louis, Missouri, Elsevier Mosby. – 2012. – In *Communications in Nursing, Seventh ed.* – P. 16-31.
14. Faria G.R. Prognostic factors for traumatic bowel injuries: killing time / Faria G.R., Almeida A.B., Moreira H. et al. // *World J. Surg.* – 2012. – V. 36 (4). – P. 807–812.
15. Foinant M. Impact of computed tomography on patient's care in non-traumatic acute abdomen: 90 patients / Foinant M., Lipiecka E., Buc E. et al. // *J. Radiol.* – 2007. – V. 88 (4). – P. 559-566.
16. *Hooks Robin Developing nursing care plans / Robin Hooks // Nursing Standard.* – 2016. – V. 30, № 45. – P. 64–65.
17. Hugh T.B. Appendicectomy-becoming a rare event? / Hugh T.B., Hugh T.J. // *Med. J. Aust.* – 2001. – V. 175, № 1. – P. 7–8.
18. Kiewiet J.J.S. Treatment of secondary peritonitis: slow progress / Kiewiet J.J.S., Boermeester M.A. // *Ned. Tijdschr. Geneeskd.* 2009; 153 p.
19. Lee J.G. Diagnosis and management of acute cholangitis / Lee J.G. // *Nat. Rev. Gastroenterol. Hepatol.* – 2009. – V. 6 (9). – P. 533–541.
20. Lopez N. Comprehensive review of abdominal infections / Lopez N., Kobayashi L, Coimbra R.A. // *World Journal of Emergency Surgery.* – 2011. – V. 6. – P. 7-15.
21. Malik M. Causes of acute peritonitis and its outcome in tertiary medical centre / Malik M., Iqbal M., Magsi A.M. et al.// *J. Liaquat. Uni Med. Health Sci.* – 2019. – V. 18. – P. 193–196.
22. Manterola C. Analgesia in patients with acute abdominal pain / Manterola C., Astudillo P., Losada H. et al. // *Cochrane Database of Systematic Reviews.* – 2007. – № 3. – P. 56-60.

23. Miller E. The nurse-patient relationship / E. Miller, G. Nambiar-Greenwood // In Nursing: Communication Skills in Practice. – 2011. – Oxford: Oxford University Press. – P. 20-32.
24. Peris A. Bedside diagnostic laparoscopy to diagnose intraabdominal pathology in the intensive care unit / Peris A., Matano S., Manca G. et al. // Crit. Care. – 2009. – V.13 (1). – P. 25-36.
25. Pieracci F.M. Management of severe sepsis of abdominal origin / Pieracci F.M., Barie P.S. // Scandinavian Journal of Surgery. – 2007. – V. 96. – P. 184–196.
26. Potter Patricia A. Fundamentals of Nursing (8 ed.) / Potter Patricia A., Perry Anne Griffin, Stockert Patricia A., Hall Amy M. // St. Louis: Mosby. – 2013. – 223 p.
27. Ranji S.R. Do opiates affect the clinical evaluation of patients with acute abdominal pain? / Ranji S.R., Goldman L.E., Simel D.L. et al. // JAMA. – 2006. – V. 296, № 14. – P. 1764–1774.
28. Robledo F.A. Open versus closed management of the abdomen in the surgical treatment of severe secondary peritonitis: a randomized clinical trial / Robledo F.A., Luque-de-León E., Suárez R. et al. // Surg Infect (Larchmt). – 2007. – V. 8. – P. 63-72.
29. Roviello F. Perforated gastric carcinoma: a report of 10 cases and review of the literature / Roviello F., Simone R., Marrelli D. et al. // World J. Surg. Oncol. – 2006. –V. 4. – P. 19–24.
30. Sartelli M.A. Focus on intra-abdominal infections / Sartelli M.A. // World Journal of Emergency Surgery. – 2010. – V. 5. – P. 9-17.
31. Sartelli M. The 2013 update of the World Society of Emergency Surgery (WSES) guidelines for the management of intraabdominal infections contains evidence-based recommendations for management of patients with intra-abdominal infections / Sartelli M., Viale P., Catena F. et al. // World Journal of Emergency Surgery. – 2013. – V. 8. – P. 3-10.
32. Sartelli M. The role of the open abdomen procedure in managing severe abdominal sepsis: WSES position paper / Sartelli M., Abu-Zidan F.M., Ansaloni L. et al. // World Journal of Emergency Surgery. – 2015. – V. 10. – P. 35-44.

33. Sheldon L.K. *Communicating with Different Age Groups and Families. Communication for nurses: talking with patients* / L.K. Sheldon // Sudbury, Mass: Jones and Bartlett Pub. – 2009, 158 p.
34. Shirley Martin *Minor Surgical Procedures for Nurses and Allied Healthcare Professionals* / Martin Shirley // England: John Wiley & Sons, Ltd. – 2007, 122 p.
35. Singer M. *The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)* / Singer M. // JAMA. – 2016. – V. 315 (8). – P. 801-810.
36. Skipworth R.J. *Acute abdomen: peritonitis* / Skipworth R.J., Fearon K.C. // Surgery. – 2008. – V. 26. – P. 98–101.
37. Solomkin J.S. *Diagnosis and management of complicated intra-abdominal infection in adults and children: guidelines by the Surgical Infection Society and the Infectious Diseases Society of America* / Solomkin J.S., Mazuski J.E., Bradley J.S. et al. // Clin. Infect. Dis. – 2010. – V. 50 (2). – P. 133-164.
38. Stefanidis D. *Gallbladder perforation: risk factors and outcome* / Stefanidis D., Sirinek K.R., Bingener J. // J. Surg. Res. – 2006. – V. 131 (2). – P. 204–208.
39. Taylor C.R. *Fundamentals of nursing: The art and science of nursing care* / Taylor C.R., Lillis C., LeMone P. et al. // Philadelphia: Lippincott Williams & Wilkins. – 2011. – P. 751.
40. Theisen J. *Current concepts of percutaneous abscess drainage in postoperative retention* / Theisen J., Bartels H., Weiss W. et al. // J. Gastrointest. Surg. – 2005. – V. 9 (2). – P. 280–283.
41. Torer N. *Prognostic factors of the mortality of postoperative intraabdominal infections* / Torer N., Yorganci K., Elker D. et al. // Infection. – 2010. – V. 38 (4). – P. 255–260.
42. van Rule O. *Comparison of On-Demand vs Planned Relaparotomy Strategy in Patients With Severe Peritonitis. A Randomized Trial* / van Rule O., Mahler M.W., Boer K. R. et al. // JAMA. – 2007. – V. 298, № 8. – P. 865-877.
43. Warren O. *Emergency laparoscopy – current best practice* / Warren O., Kinross J., Paraskeva P. et al. // World J. Emerg. Surg. – 2006. – V. 31(1). – P. 24.
44. Webb, L., & Holland, K. (Eds.) *Nursing: Communication Skills In Practice*. Oxford: Oxford University Press, 2011.

45. Weir-Hughes Dickon Nursing Diagnosis in Administration. Nursing Diagnoses 2009–2011, Custom: Definitions and Classification / Weir-Hughes Dickon John // Wiley & Sons. 2010. – P. 37–40.
46. Weiss A.J. Trends in Operating Room Procedures in U.S. Hospitals, 2001-2011 / Weiss A.J., Elixhauser A. // March 2014. HCUP Statistical Brief, 171. Rockville, MD: Agency for Healthcare Research and Quality.
47. Weiss G. Infectiological diagnostic problems in tertiary peritonitis / Weiss G., Meyer F., Lippert H. // Langenbecks Arch Surg. – 2006. – V. 391. – P. 473–482.
48. Weiss G. Peritonitis: Main reason of severe sepsis in surgical intensive care / Weiss G., Steffanie W., Lippert H. // Zentralbl Chir. – 2007. – V. 132. – P. 130–137.
49. Yamamoto T. Prediction of mortality in patients with colorectal perforation based on routinely available parameters: a retrospective study / Yamamoto T., Kita R., Masui H. // World Journal of Emergency Surgery. – 2015. – V. 10. – P. 24-30.
50. Yuan Y. Current status of the open abdomen treatment for intra-abdominal infection. / Yuan Y., Ren J., He Y. // Gastroenterol. Res. Pract. – 2013. – V. 53. – P. 20-13.