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# The importance of the preoperative preparation guide for the prevention of surgical wound infection

## - clinical study -

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### ABSTRACT

Preoperative preparation is an important stage both for the patient who is to undergo a surgical intervention and for the medical staff. The way in which it is performed can influence the evolution of the healing process by avoiding a major complication: the surgical wound infection.

The study, conducted within the Department of General Surgery I of the Clinical Emergency County Hospital Galati, includes patients who underwent abdominal surgical interventions, from whom the batch of those who subsequently developed infections of the surgical wound was selected. For this purpose, the medical documents of the department were consulted, and a questionnaire with inclusion criteria regarding the patient, the surgical wound, as well as the medical care provided was applied at the same time.

76% of the patients with postoperative infections included in the study were emergency admittances in the general surgery department. The preoperative preparation of these patients was influenced by the necessity of immediate surgical intervention (32%), the preexisting pathology, with the predominance of gastric and intestinal pathology (40.35%), the predominant 3 and 4 anesthesia risk evaluation scores of the patients increasing the infection risk.

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The appearance of the surgical wound infection is influenced by the preoperative preparation of the patient, thus being imperative the adoption of standardized protocols applicable both in the elective and the emergency surgery, while guaranteeing a fair management of the surgical patient.

**Keywords:** preoperative preparation, abdominal surgery, surgical wound infection

### Introduction

Undergoing a surgical intervention represents a problem for any patient hospitalized within the surgery department, and both the rigorous preoperative preparation and the postoperative monitoring prevent the appearance of a major complication in the subsequent evolution: infection.

The infectious complication is the main postoperative morbidity cause in abdominal surgery. Within the general surgery department, the preoperative preparation of the patient targets the clinical and paraclinical examination, the psychological preparation and the preoperative diet.

In 1999, the "Guideline for the prevention of surgical site infection" was published by the National Center for Infectious Diseases, of the U.S. Centers for Disease Control and Prevention, and in 2003 a draft

measures was initiated regarding the improvement of medical care in order to prevent surgical infections (SCIP). In France, the recommendations of the French Society for Digestive Surgery establish precisely the preoperative, intraoperative and postoperative protocols. The duration of preoperative hospitalization, the preoperative antibiotic prophylaxis in digestive surgery, the evaluation of anesthesia risk and the choice of a certain type of anesthesia, the surgical site preparation and the preparation of the digestive tract, the digestive nasogastric aspiration, the postoperative abdominal cavity drainage, the urinary catheterization, the diet – all of these are elements which can influence the postoperative morbidity and mortality [1].

## Material and method

The study, conducted over a period of 24 months within the Department of General Surgery I of the Clinical Emergency County Hospital Galati, targeted emergency admitted patients who underwent abdominal surgery and subsequently developed surgical wound infections.

A working form was applied, containing the inclusion criteria (emergency boarding patient who underwent surgical intervention; the preoperative hospitalization period; the physical preparation of the patient; the presence of associated diseases; the presence of untreated focal infections; the lack of antibiotic prophylaxis / prolonged antibiotic therapy; the preparation of the surgical site; surgical intervention of contaminated type; the duration of the surgical intervention; the presence of drainage tubes), which was used along with other medical documents: general clinical observation sheets, operative protocol registers and the register of nosocomial infections. The data were centralized and processed using statistical methods, and in the establishment of surgical wound infection diagnosis met the CDC Atlanta classification and complied with the provisions of the Order of the Ministry of Public Health No. 916/2006.

## Results

The study included patients who matched the mentioned criteria; 76% of the patients who underwent abdominal surgery represented surgical emergencies, complicated with wound infections. The patients came both from urban and rural areas, which is the specific addressability of a surgery department in the Clinical Emergency County Hospital, 58% being male and 42% female.

The average age of the batch with surgical wound infection was 54.75, with a minimum of 10 and a maximum of 92. It was noticed that the patients in the age group 61-80 years old had the highest infection rates (Figure 1).

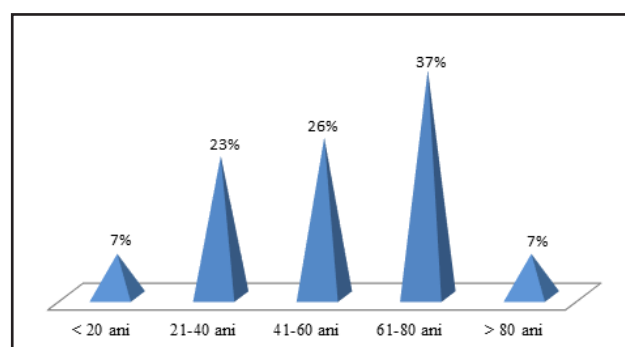


Figure 1 - Distribution on age groups of patients with SWI

32% of the cases required immediate surgical intervention, the average duration of preoperative hospitalization was 1.81 days and in 15.78% of the cases a re-intervention was necessary. These patients were given minimal preoperative care, including only the preparation of the surgical site by assuring the local hygiene and shaving the tegument to remove pilosities. The rest of the patients received preoperative preparation the night prior to the intervention: plain soap showering, hair removal and skin preparation, hospital sleepwear. Intraoperatively the skin was decontaminated using a povidone-iodine solution.

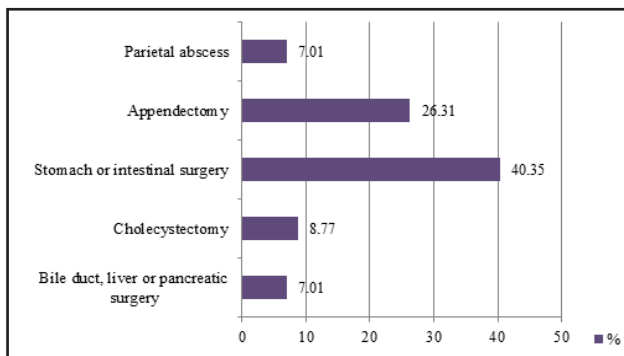
The surgical interventions under scrutiny represented digestive surgery, with a predominance

in the conducted study of the cases with clean-contaminated interventions, where cavity drainage was performed every time (Table I).

*Table I. Proportion of surgical interventions – Altemeier classification*

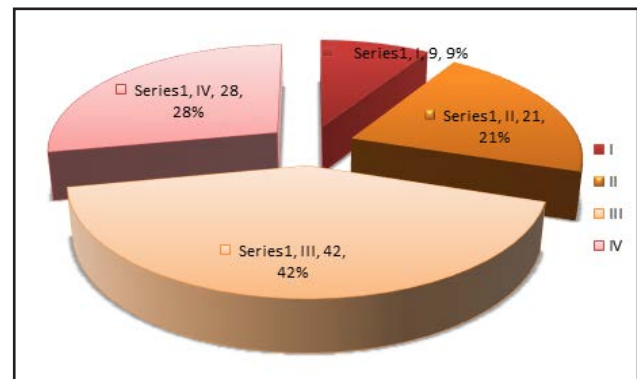
	Type of intervention	%
I	Clean interventions	5.26%
II	Clean-contaminated interventions	50.87%
III	Contaminated interventions	19.29%
IV	Dirty and infected interventions	24.56%

Gastric and intestinal surgery accounted for a majority of 40.35% of the cases, the contamination being the result of the contact with the intestinal contents, rich in aerobic and anaerobic germs (Figure 2).



*Figure 2 - Distribution of SWI cases according to the type of surgery*

Nasogastric aspiration was initiated and maintained for a few days postoperatively, which caused a delayed restart of the intestinal transit [2]. The patients who developed surgical wound infections had associated comorbidities, 42% of them suffering of severe systemic diseases (Figure 3).



*Figure 3 - ASA scores distribution in the selected batch*

In 96.49% of the cases the perioperative antibiotic prophylaxis with third-generation cephalosporins was applied, the treatment continuing, in some cases, until the patient's discharge.

Identified germs	%
Escherichia coli	22.80%
Escherichia coli+ Klebsiella	1.75%
Escherichia coli+ Pseudomonas	3.50%
Enterococcus	7.01%
Klebsiella	7.01%
Proteus	1.75%
Pseudomonas	3.50%
Coagulase-positive staphylococcus	5.26%
Coagulase-negative staphylococcus	7.01%

## Discussions

The preoperative preparation of patients generally complies with the procedures established by the staff of the general surgery department. According to the study conducted, it is confirmed that the patients admitted as emergency cases and undergoing immediate surgery did not receive proper physical preparation, compensation of the associated illnesses and treatment of focal infections,

which favored the emergence of the postoperative infection. Thus, the digestive tract could not be adequately prepared, the nasogastric suction tube was applied, the cleansing of the teguments consisted of plain soap showering, the pilosities of the surgical site being removed by shaving. The antibacterial soap showering can reduce the colonization of the tegument, and removing the hair with electric devices or scissors a short while before the surgical intervention is preferable, in order to avoid small skin injuries and bacterial invasion. For the other patients, the preoperative hospital stay varied between 1 and 9 days, which increased the risk of contamination with intra-hospital germs. The antibiotic therapy was initiated intraoperatively with third-generation cephalosporins, while in digestive surgery the ones in the first two generations are recommended [3]. The intraoperative sampling for bacteria tests (49.12%) allowed the subsequent establishment of targeted antibiotic therapy, the infections with *Escherichia coli* accounting for a significant 22.8% of the cases (Table II). For the drainage of the peritoneal cavity drain tubes were applied, sometimes multiple, although a limitation of this practice could simplify in some cases the evolution of the wound [2]. Is important the mentioning in the observation sheet of the ASA score, the classification of the intervention type, the time of the antibiotic prophylaxis administration and the dose, the evolution of the surgical wound, the presence of the drain tubes and the urinary catheter [4].

recommended antibiotic prophylaxis guidelines.

4. It requires rigorous bookkeeping maneuvers and evolution of surgical wound in the medical records.

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## Conclusions

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1. It is necessary the adoption of some standards to direct the preoperative preparation of patients, in order to increase the quality of medical care provided.

2. The initiation of some clear guides for the prevention, control and declaration of surgical wound infections is imperative.

3. The adequate antibiotic prophylaxis must be applied according to the type of surgery, as