



# The Influence of Infection, Diabetic Disease and Neoplastic Disease on the Occurrence of Dehiscence Laparotomy

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## Abstract

The aim of this paper is to determine the influence of infection, diabetic and neoplastic disease on the occurrence of dehiscence of laparotomy. In our prospective study we first collect data after surgery of 1063 patients in hospital in Serbia. The investigated patients were divided into two groups: a group of patients who had complications-dehiscence of laparotomy with 46 patients and a control group (patients who did not have dehiscence of laparotomy) with 1017 patients. The influence of infection, diabetic and neoplastic disease on the occurrence of dehiscence of laparotomy was analyzed. In our study is no statistically significant relationship between dehiscence of laparotomy and diabetic disease. There is statistically significant association between infection, neoplastic disease and dehiscence of laparotomy.

## Introduction

Dehiscence of laparotomy is a sudden partial or complete opening or tearing wounds, or the formation of cracks in the surgical wound sewing [1]. Complete wound disruption with evisceration of abdominal organs requires urgent reintervention. It occurs most often during the first week after surgery. It occurs in 0.5% to 3% of operated patients [2]. Dehiscence of laparotomy is accompanied by high morbidity and mortality that ranges up to 40%. The process of wound healing is a highly complex and dynamic set of cellular, biochemical and immunological processes, which depends on several factors. Infection of the surgical wound is one of the most important risk factor for dehiscence of laparotomy. Gastrointestinal surgery, emergency surgery, prolonged surgical time, and are associated with an increased risk of surgical wound infection. Wound infection defined as purulent secretion from the wound contents, regardless of the bacteriological findings [3]. It occurs in up to 15% of treated patients [4-6]. Diabetes is characterized by atherosclerosis, microangiopathy, and disorder of Hb dissociation and decreased chemotaxis and phagocytosis. Dehiscence of laparotomy is more common in patients with neoplastic diseases. Reasons are not entirely clear. It is assumed that the protein and calories lost in the tumor also has a premise that tumor cells secrete substances that interfere with wound healing [7]. The survey aims to determine the effect of the presence of infection, diabetes and malignant disease of the emergence of dehiscence of laparotomy.

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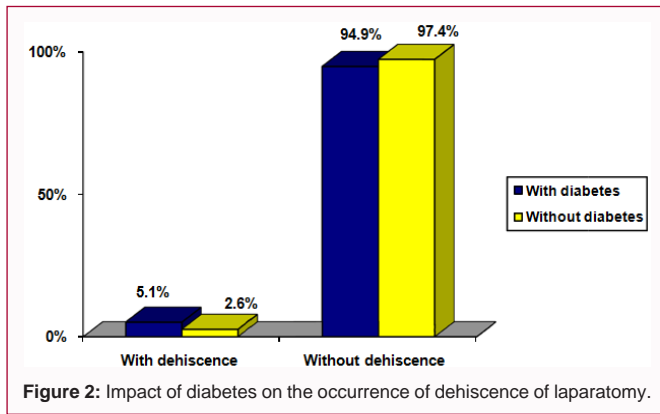
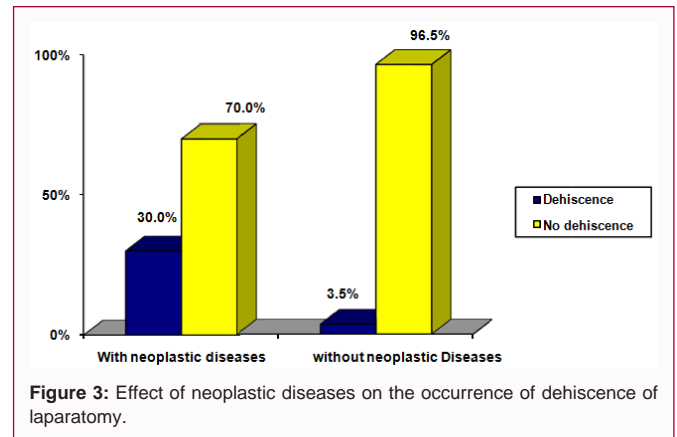
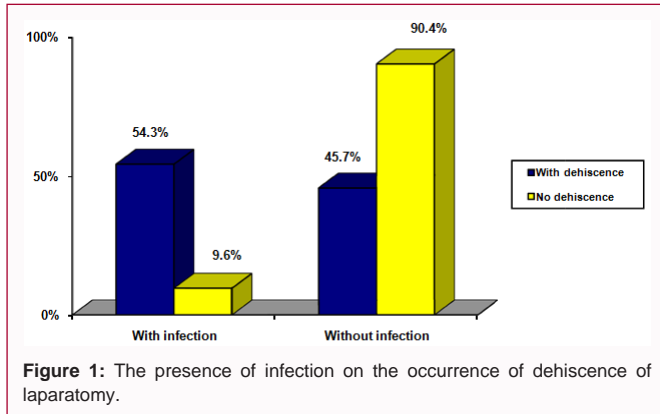
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## Methods

Research is organized by type of retrospective-prospective studies that have analyzed the following data as risk factors: the presence of infection, diabetes, and neoplastic diseases of dehiscence of laparotomy of 1063 operated patients at the Department of General Surgery of Niš from January 1, 2018 to June 30, 2019. Complication-dehiscence of laparotomy was found in 46 patients. Statistical sample size is determined by the statistical methodology to meet the basic principle of representativeness. The normogram was used to determine the optimal sample. In this paper, results are presented graphically. The statistical analysis using the methods of descriptive statistics (mean, standard deviation), parametric tests (Student's t-test) and nonparametric Chi-square test. For statistical analysis we used the software package SPSS 14.0, and the imaging table and a Microsoft Office Word 2003.

## Results

Dehiscence of laparotomy occurred in 4.3% of patients or 46 patients of the total 1063 respondents. There is a statistically significant relationship between dehiscence of laparotomy and infections ( $\chi^2=57.232$ ;  $p<0.01$ ). Infection was significantly more prevalent in patients with dehiscence of laparotomy. Of 46 patients with dehiscence of laparotomy they 25% or 54.3% had an infection and of the 1017 patients without dehiscence of laparotomy, infection had only 98 of them or 9.6%



(Figure 1). In the group of patients with dehiscence of laparotomy is more people with diabetes than in the control group, but this was not statistically significant ( $\chi^2=0.794$ ;  $p>0.05$ ). Patients with diabetes were 37 of them, or 5.1% in the group of patients with dehiscence of laparotomy, and 685 patients with diabetes were in the group of patients without dehiscence of laparotomy or 94.9%. In patients with dehiscence without diabetes was 2.6% or 9% patients, and without dehiscence of laparotomy and 332 patients without diabetes or 97.4% (Figure 2). There is a statistically significant relationship between dehiscence of laparotomy and neoplastic diseases ( $\chi^2=19.998$ ;  $p<0.01$ ). Of the 33 patients with neoplastic disease, 10 of them had dehiscence o laparotomy or 30%, and 23 patients had no dehiscence of laparotomy, or 70%. Without malignant disease were 36 patients with dehiscence of laparotomy, or 3.5%, and 981 patients without dehiscence of laparotomy or 96.5% (Figure 3).

**Discussion**

Despite major advances in the understanding of the process of wound healing physiology, surgical techniques and the application of modern technologies and materials in surgery, the percentage of impaired healing laparotomy is still high. Dehiscence of laparotomy occurs in approximately 3% of patients. In a retrospective study by Rodriguez-Hermosa Ji et al. [8] from Spain in 57 patients, or 0.45% of the total 12,622 patients who had undergone laparotomy occurred in dehiscence of laparotomy [8]. The Cracow study Konig J et al. with dehiscence of laparotomy occurred in 56 patients or 2.9% of our patients [9]. Our results show that dehiscence of laparotomy was present in 4.3% of patients and 46 patients of the total 1063 respondents. Preoperative preparation is an important stage in the treatment of surgical patients and the adequacy of preoperative depends on result of the operation, the incidence of complications

and mortality of patients. It is necessary that all the general condition of the patients preoperatively stabilized and carry a minimum of anesthesia and surgical preoperative whenever the patient’s condition allows [10]. Infection is extremely destructive effect on the wound healing process by increasing the production of cytokines and proteases, which disrupt the synthesis of fibroblasts, and the stability of the wound [11]. Our study confirms this claim, 54.3% of patients with dehiscence of laparotomy had infection. In Germany, a study was done by Fleischer GM and all, dehiscence of laparotomy occurs in 5% to 10% of patients with infection [12]. In our study, the percentage impact of infection on the occurrence of dehiscence much higher. In India’s study from Rajindra Hospital in Patiala only 4 (8%) of our wound dehiscenced patients were diabetics. These patients were given insulin [13]. Of all diabetics in our study does not receive any insulin therapy, and because we have this complication less pronounced. In patients with diabetes, dehiscence of laparotomy occurs more frequently but it is not statistically significant ( $p>0.05$ ). The five year prospective observational study was performed 7224 operations in 4197 patients in South Australia, 196 had diabetes patients (4.7%). The incidence of 2 patients with diabetes appeared and do not differ from those without dehiscence ( $p=90$ ) [14], which is concordant with our study. In our study group of patients with dehiscence of laparotomy is more people with diabetes than in the control group, but this was not statistically significant ( $\chi^2=0.794$ ;  $p>0.05$ ). Patients with diabetes were 37 of them, or 5.1% of the group of persons with dehiscence of laparotomy, and 685 patients with diabetes were in the group of patients without dehiscence of laparotomy or 94.9%. In patients with dehiscence without diabetes was 2.6% patients or 9% patients, and without dehiscence of laparotomy and 332 patients without diabetes or 97.4%. The presence of malignant disease is accompanied by intense tumor metabolism, malnutrition and disorders of absorption, all of which can disrupt the normal wound-healing process and therefore the more frequent occurrence of dehiscence. Many drugs, anti-tumor and anti-cancer drugs affect the various stages of wound healing, particularly in cell division [15]. Statistically there is a strong association between dehiscence of laparotomy and neoplastic diseases ( $\chi^2=19.998$ ;  $p<0.01$ ). Neoplastic diseases, in our material had 10 patients with dehiscence of laparotomy, or 30%. Studies worked in South Korea in 1987 to 2004 were included 8033 patients. Dehiscence of laparotomy occurred in 9.3% of treated patients with cancer [16]. Aksamija G et al. [17] who worked on the study in Clinic for abdominal surgery in Sarajevo in 1998. To 2002 dehiscence after laparotomy surgery colon cancer from 439 patients were observed in 10 patients, or 2.27% [17]. Comparing the results with the results of international studies in this paper comes to the conclusion that our

results are not worse than the results of the world's health task.

## Conclusion

Dehiscence of laparotomy occurred in 4.3% of operated patients. In the presence of infection and in patients with neoplastic diseases, dehiscence of laparotomy is common. Dehiscence of laparotomy is less common in patients with diabetes disease. The analysis of these three risk factors, the surgeon can identify patients at high risk and to take all measures that prophylaxis his disposal. Good preoperative preparation reduces postoperative wound complications.

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