



# The Impact of Using of Immunosuppressive Therapy, Patient Sex and Smoking on the Occurrence of Dehiscence Laparotomy

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## Abstract

In this paper we analyzed the impact of using of immunosuppressive therapy, patient sex and smoking on the occurrence of dehiscence of laparotomy. In our research we examined 362 operated patients in the Clinic for General Surgery in Nis in the period from April 1, 2018 to June 30, 2019. In our study 6 patients had complication-dehiscence of laparotomy and 356 patients did not have dehiscence of laparotomy. Of the total of 6 patients with dehiscence of laparotomy, 4 patients were male or 66.6% and 2 patients were female or 33.3%. In our study is no statistically significant relationship between dehiscence of laparotomy and using of immunosuppressive therapy there is statistically significant association between dehiscence of laparotomy and patient sex and smoking.

**Keywords:** Dehiscence of laparotomy; Immunosuppressive therapy; Patient sex; Smoking; Wound

## Introduction

Dehiscence of laparotomy is a disorder of healing of the wound and may manifest in a different degree. Dehiscence of the wound after laparotomy he occurs in about 3% of operated patients [1]. High morbidity and mortality follow patients with dehiscence after wound laparotomy with percentage more from 40%. Smoking cause peripheral tissue hypoxia what is the risk for occurrence of dehiscence after wound laparotomy and presence of wound infection. Systemic connective tissue disease (lupus, RA) and collagen disease (Sy. Marphan, Sy. Oehler-Dunloss) are occurrence very rare, but in the fibroplasia phase in those patients exists significant disorder [2]. Patients who use of corticosteroid therapy as parts of these disorders reduce epidermis disorder and highlight collagen biosynthesis. Systemic steroid therapy reduces resistance to tearing, slows down angiogenesis and epithelization, especially when given prior to surgery or during the first three days after surgery. The steroid dosage need to be lower after operation in next few days while wound healing after laparotomy. In patient's smokers and in patients who use steroids if they use vitamin A and vitamin C tissue damages may be lower [3].

## Methods

In our prospective study we analyzed three risk factors: the presence of using of immunosuppressive therapy, patient sex and smoking on the occurrence of dehiscence of laparotomy. We first collected data from 362 operated patients at the Clinic for General Surgery in Niš from April 1, 2018 to June 30, 2019. In our research six operated patients had complication-dehiscence of laparotomy and 356 patients did not have dehiscence of laparotomy.

The results in our study are shown graphically. We used parametric tests (Student's t-test) and nonparametric Chi-square test. In our study we used the software package SPSS 14.0 and a Microsoft Office Word 2003.

## Research Results

About 1.6% or 6 patients from 362 investigated patients in our study had dehiscence of laparotomy (Figure 1).

Of the 362 patients examined, 29 took immunosuppressive therapy (Imuran and Cell Cept) or 8.0%. In our study exist no statistically significant correlation between dehiscence of laparotomy and using of immunosuppressive therapy ( $\chi^2=1.981$ ;  $p>0.05$ ). One patients who took immunosuppressive

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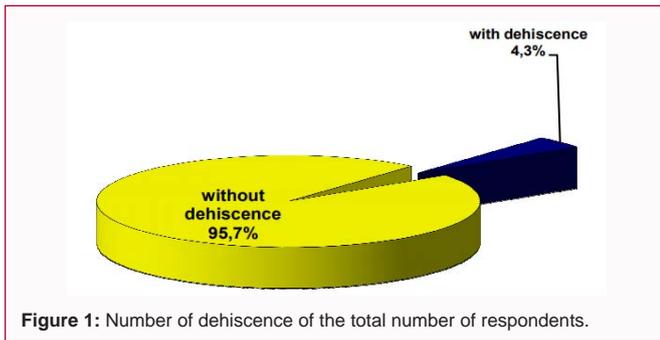


Figure 1: Number of dehiscence of the total number of respondents.

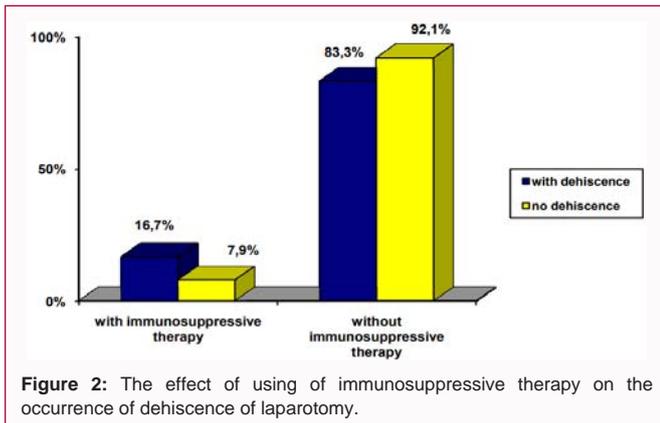


Figure 2: The effect of using of immunosuppressive therapy on the occurrence of dehiscence of laparotomy.

therapy, had dehiscence of laparotomy or 16.7% and 28 patients with immunosuppressive therapy did not have dehiscence of laparotomy or 7.9% (Figure 2).

Of the total 6 patients with dehiscence of laparotomy, 4 patients were male or 66.7%, while only 2 patients were female or 33.3%. In our study exist a statistically significant relationship between dehiscence of laparotomy and male sex ( $c^2=31.482$ ;  $p<0.01$ ). Of the patients who did not have a dehiscence of laparotomy 258 patients were male or 72.5% and 98 patients without dehiscence of laparotomy were female or 27.5% (Figure 3).

Of the 362 patients examined, 38 were smokers or 10.5%. There is statistically significant correlation between dehiscence of laparotomy and smoking ( $c^2=4.613$ ;  $p<0.05$ ). Five smokers had dehiscence of laparotomy or 13.2% and 33 smokers did not have dehiscence of laparotomy or 86.8%. Of the patients who did not have a dehiscence of laparotomy 33 patients were smokers or 9.3% and 323 patients without dehiscences of laparotomy were not smokers or 90.7% (Figure 4).

## Discussion

In few last year's surgeons use modern technologies and materials, but dehiscence of laparotomy appear in the high percentage, in more of 3% operated patients. In Spain's study 57 patients or 0.45% had dehiscence of laparotomy from 12622 patients. In study by Rodriguez-Hermosa J and all from patients who had dehiscence laparotomy were 45 male and 12 female patients [4]. In study from Rajindra Hospital in Patiala in India from 50 patients with dehiscence of laparotomy 37 were male patients [5]. Our study show that dehiscence of laparotomy occurred in 1.6% of the total investigated patients. In relation with patient sex from 6 patients with dehiscence of laparotomy, 4 patients were a male. We find a statistically significant relationship between dehiscence of laparotomy and male gender ( $c^2=31.482$ ;  $p<0.01$ ).

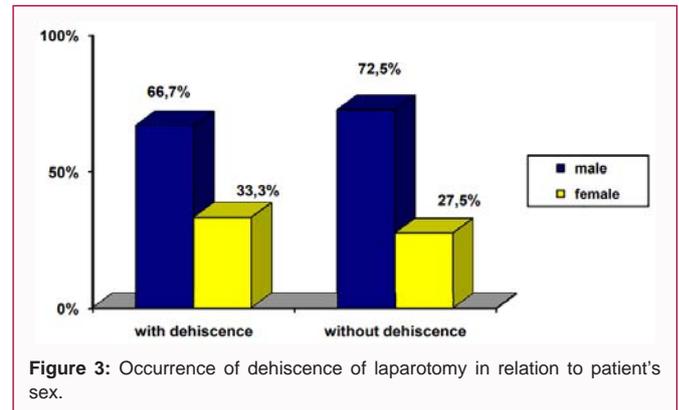


Figure 3: Occurrence of dehiscence of laparotomy in relation to patient's sex.

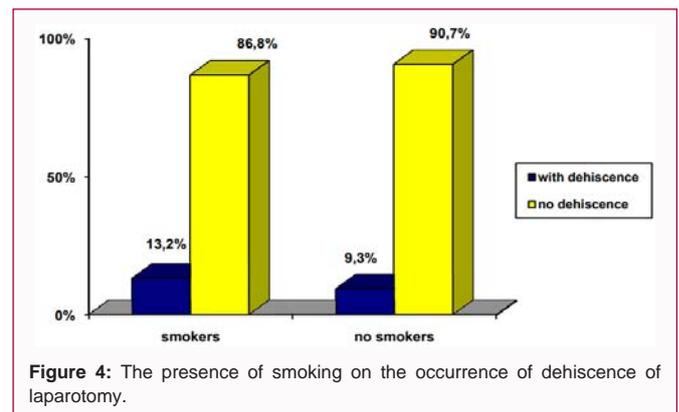


Figure 4: The presence of smoking on the occurrence of dehiscence of laparotomy.

Good preoperative preparation reduce the incidence of postoperative complications [6].

In the study of Akkus A et al. at the Kirikkale University Medical School in Turkey, proven that long-term use of corticosteroid therapy leads to a change in enzymes involved in the glycolysis process during wound healing. The study covered three groups. In Group A, eight patients received metilprednisolone seven days before surgery and after surgery to complete healing of the wound. In Group B, twelve patients received methylprednisolone seven days before laparotomy. After surgery, methylprednisolone injections continued, but immunosuppressive treatment with carnitine was also introduced to complete wound healing. In Group C, eight patients received no treatment. In half of the patients examined, wounds were healed within seven days after laparotomy. The remaining wounds were healed up to the fourteenth day after surgery. Tension on the wound line and the content of hydroxyproline are parameters whose values are monitored in all three investigated groups. The study found that there was no statistically significant difference in both parameters in all three groups on the seventh day after laparotomy. On the fourteenth day, both parameters showed a statistically significant difference between the group in which methylprednisolone and control groups were administered ( $p<0.05$ ). Tension values on the wavy line were lower in the group where carnitine was administered compared to the group where methylprednisolone was administered ( $p>0.05$ ). The use of carnitine led to an increase in the level of hydroxyproline in wounds in a group of patients receiving methylprednisolone and carnitine compared to the control group of patients ( $p<0.05$ ). The use of carnitine leads to a decrease in tension on the wound line in relation to the tension of the wound where only methylprednisolone is applied [7].

In the work of Akkus A et al. it has been found that the administration of carnitine helps to restore energy deficiency and create collagen during healing of the wound. There is no statistically significant difference between the group of patients administered by immunosuppressive therapy with carnitine and the control group in wound healing ( $p > 0.05$ ) [7]. Our prospective study confirms the positive impact of immunosuppressive therapy on wound healing. There is no statistically significant difference between the group of patients with dehiscence of laparotomy who were on immunosuppressive therapy and the control group of patients with dehiscence of laparotomy who were not on immunosuppressive therapy ( $c^2 = 1.981$ ;  $p > 0.05$ ).

Smoking increases the risk of occurrence of infection and wound dehiscence [8,9].

Few studies shown that smoking cause peripheral tissue hypoxia and reduce collagen synthesis [10,11]. In our study exist statistically significant correlation between dehiscence of laparotomy and smoking ( $c^2 = 4.613$ ;  $p < 0.05$ ), 5 smokers had dehiscence of laparotomy or 13.2%.

## Conclusion

In our study 1.6% investigated patients had dehiscence of laparotomy. In male patients and in patient's smokers, dehiscence of laparotomy is a common occurrence. In patients who used immunosuppressive therapy dehiscence of laparotomy is rarity.

If surgeon may identify patients with more from two risk factors, he may try to prevent complications in those patients. Therefore it is important to identify them early and treat those patients with care. Further, development of clinical pathways would prove valuable if the absolute risk of each patient could be estimated when planning surgery to specifically optimize the patient's preoperative condition to reduce the risk of complications.

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