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Risk factors affecting the difference of surgery's wound after emergency laparotomy in H. Adam Malik Hospital Medan-Indonesia



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ABSTRACT

Background: Infections of surgery wound have big impacts on mortality, morbidity, including health care costs, patient discomfort and dissatisfaction of the surgery's result. Several factors affecting the risk of wound dehiscence are Gender, advanced age (> 50 years), emergency surgery, nutritional deficiencies, duration of surgery and the amount of intraoperative bleeding.

Methods: Prospective clinical trials conducted in the Emergency Room and Inpatient of H. Adam Malik Hospital in Medan between May to December 2016. The sample was selected by systematic random sampling. Data processed by descriptive and analytic with univariate, bivariate and multivariate analysis.

Results: Patient with wound dehiscence obtained at age 42.35 + 5.8 older than the findings from a patient without wound dehiscence

that occurred at age 29.93 + 11.05. The amount of bleeding of the Patient with wound dehiscence was 317.29 + 38.45 cc which more than the findings of patient without wound dehiscence as much as 89.58 + 39.74 cc. Age and obesity become, the more risk factors that play a role of wound dehiscence in patients with emergency laparotomy.

Conclusion: There is a difference between risk factors (age, sex, duration of surgery, the amount of bleeding, obesity and applied of subcutaneous drainage) with the occurrence of wound dehiscence in bivariate. Only, Age, and obesity Contributing to the occurrence of wound dehiscence in multivariate.

Keywords: wound dehiscence, Laparotomy, Risk Factor

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INTRODUCTION

Surgical site infection is one of the most common complications after surgery, at least 5% of all patients undergoing surgery and 30-40% of surgery in the abdominal region, depending on the level of contamination. The increased wound infections had a huge impact on mortality, morbidity, health care costs, patient discomfort and dissatisfaction with the surgery's results. Complications of the infection are a major cause of postoperative morbidity in abdominal surgery: The most common form is superficial wound infections that occur in the first week after surgery.¹

Seroma formation is one of complication that occur after abdominal surgery. Seroma may cause wound-related complications, such as formation of abscesses, calcification of seroma, poor cosmetic results, unsatisfactory results of the surgical scar.^{1,2} Abdominal wound dehiscence is one complication after abdominal surgery, wound dehiscence is the opening of the surgical wound layer. The main cause is an infection of the wound dehiscence and seroma formation.^{2,3}

The incidence of wound dehiscence/burst abdomen varies from one central to other central

worldwide. Meanwhile, recorded 1-3% in most centers, some centers in India recorded the incident burst abdomen as much as 10-30%. Burst abdomen is associated with a mortality rate as high as 45%.³

Data from Dr. Sarjito Hospital in Yogyakarta reported a total of 82 operations by emergency laparotomy for abdominal trauma with the mortality rate was 18.3% and an average Length of Stay (LOS) was 15.96 days. Data from Dr. Cipto Mangunkusumo Hospital (RSCM) in Jakarta from July to December 2004 suggest the existence of an emergency laparotomy surgery on 83 patients, with deaths up to 9 people (10.84%) and infections of the operative field more than 19 people (44.19%).

There are several risk factors that affect wound dehiscence. The risk factors include sex (men are more susceptible than women), elderly (> 50 years), emergency surgery, malnutrition, duration of surgery and the amount of intraoperative bleeding.^{4,5} On the basis of the relation of some risk factors to wound dehiscence in patients with post emergency laparotomy in H. Adam Malik Hospital can be assessed and the research like this has never been done, therefore the study was conducted.

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Table 1 Characteristics of Research Subjects

Characteristic	N	%
Age (Mean + SD)	34.52 + 10.7	
Sex		
Male	21	52.5
Female	19	47.5
Subcutaneous drainage		
Subcutaneous drainage (+)	20	50
Subcutaneous drainage (-)	20	50
Wound dehiscence		
wound dehiscence (+)	12	30
wound dehiscence (-)	28	70
Duration of surgery (Mean + SD) (minute)	141.55 + 56.6	
Amount of bleeding (Mean + SD) (cc)	182 + 38.6	
Obesity (+)	9	
Obesity (-)	31	

Table 2 Chi-square test on Risk Factors

	Wound Dehiscence (+)	Wound Dehiscence (-)	N	p
Male	6 (28,5 %)	15 (71,5 %)	21	0,048
Female	6 (68,4 %)	13 (31,6 %)	19	
Total	12	28	40	
Subcutaneous drainage (+)	3 (15%)	17 (85%)	20	0,038
Subcutaneous drainage (-)	9 (45%)	11(55%)	20	
Total	12	28	40	
Obesity (+)	7 (77%)	2 (23%)	9	
Obesity (-)	5 (16%)	26 (84%)	31	0.01
Total	12	28	40	

METHODE

Prospective clinical trials conducted to determine differences of surgical wound in patients undergoing emergency laparotomy with and without negative pressure subcutaneous drainage in H. Adam Malik Hospital in Medan.

Inclusion criteria: Patients who performed an emergency laparotomy in the Emergency Installation H. Adam Malik Hospital, also patients in the age group between 18 - 70 years. Excluded were patients had died before the time of the surgery's wound completed assessment to be done, patients who underwent stoma, patients with comorbid of diabetes mellitus, HIV, and lung tuberculosis, patient with malnutrition, patients with hemoglobin <10 g%, the blood albumin level <3.0 mg / dl.

Sampling was carried out between May and December 2016, were selected by systematic random sampling. Basic data collected (age, gender, operation time, intraoperative blood loss, obesity, wound state operation, applied of negative pressure subcutaneous drainage) processed by descriptive and analytic with univariate, bivariate and multivariate analyzes using SPSS 20.0.

RESULT

40 patients enrolled in this study between May and December 2016. The mean age of the study subjects was 34.52 + 10.7. The most subject of research based on sex were male with 21 subjects (70%). 28 subjects (70%) with wound dehiscence. The average duration of emergency laparotomy in the emergency installation of Haji Adam Malik Hospital in Medan was 141.55 + 56.6 minutes. The mean number of bleeding during the surgery period was 182 + 38.6 cc. On the subject of the study also determined thick subcutaneous fat. Showed that the average thickness of subcutaneous fat was 14:58 + 5.5 (Table 1).

Number of female compared to men who performed surgery of emergency laparotomy almost equal (19:21). The results of bivariate analysis using a chi-square test was $p = 0048$ ($p < 0.05$). The p-value implies that there are differences in the proportion of sexes and wound dehiscence (Table 2).

17 Patients with wound dehiscence (+) occurs in patients applied of subcutaneous drainage. Whereas in patients without applied of subcutaneous drainage obtained 9 patients with wound dehiscence (-). The results of bivariate analysis using a chi-square test was $p = 0.038$ ($p < 0.05$). The p-value implies that there was a difference between the applied of subcutaneous drainage and wound dehiscence (Table 2).

Patients with wound dehiscence (-) were more common in patients without obesity (26 research subjects), whereas 7 patients with wound dehiscence (+) occurs in patients with obesity. The results of bivariate analysis using Chi-Square

Table 3 Independen T-test on Risk Factors

	Wound Dehiscence (+)	Wound Dehiscence (-)	p
Age (Mean + SD)	52.35 + 5.8	29.93 + 11.05	0.027
Duration of surgery (Mean + SD)	170.53 + 52.48	119.39 + 32.22	0.032
Amount of bleeding	317.29 + 38.45	89.58 + 39.74	0.034

Table 4 levene's test of equality on Risk Factor

Faktor Risiko	P
Age	.013
Subcutaneous drainage	.058
Duration of surgery	.927
Amount of bleeding	.901
Obesity	.012
Sex	.067

p value = 0:01 (p < 0.05). The p-value implies that there was a difference between the thickness of the subcutaneous fat and the surgical wound (Table 2).

Patients with wound dehiscence (+) obtained at the age of 52.35 + 5.8 which is older than patients with wound dehiscence (-) which is at the age of 29.93 + 11:05. The results of the bivariate analysis using an independent T-test was p = 0.027 (p < 0.05). The p-value implies that there was a difference between age and wound dehiscence (Table 3).

Patients with wound dehiscence (+) occurred on the duration of operations with an average of 170.53 + 52.48 minutes, which is longer than patients with wound dehiscence (-) (the average duration of surgery: 119.39 + 32.22 minutes). The results of bivariate analysis using an independent T-test was p = 0.032 (p > 0.05). The p-value implies that there was a difference between the duration of surgery and wound dehiscence (Table 3).

Patients with wound dehiscence (+) occurred in the amount of bleeding 317.29 + 38.45 cc. Whereas patients with wound dehiscence (-) occurred in the amount of bleeding 89.58 + 39.74 cc. The results of bivariate analysis using an independent T-test was p = 0.034 (p > 0.05) The p-value implies that there was no difference between the amount of bleeding and wound dehiscence (Table 3).

Through bivariate analysis obtained that all risk factors have differences with the occurrence of wound dehiscence in patients performed an emergency laparotomy. Then we analyzed the multivariate linear regression with the results of levene's test of equality is only age, and obesity are risk factors were responsible to the occurrence of wound dehiscence in patients performed laparotomy emergency,

according to the formula of the possibility of wound dehiscence is "Y = 0.027 (age) + 0.423 (Obesity)" (Table 4).

DISCUSSION

The total number of research subjects is 40 people. Based on Table 1 it can be seen that the mean age of the study subjects who experienced wound dehiscence was 52.35 + 5.8. Similarly, research in RSCM which states that the average age of the wound dehiscence was 55.6 years old.

On the Table 1 shows that the study subjects based on sex which most were male with 21 subjects (70%). In the study of Shimizu states that men were more susceptible to the occurrence of wound dehiscence than women.⁶

For the results of research on the subject wound dehiscence found 28 research subjects (70%) experienced wound dehiscence with good results. WHO surveys show that the incidence of SSI in the world, ranging from 5% to 34%. The SSI of laparotomy surgery cases in the emergency installation of RSCM was 48.5% .17. One of the surgery procedure with a high enough frequency in the hospital is either elective surgery or emergency laparotomy.²

In addition, the average duration of emergency laparotomy that experienced wound dehiscence in Haji Adam Malik Hospital in Medan was 170.53 + 52.48 minutes. Duration of surgery is directly proportional to the risk of wound infection and exacerbate the risk of contamination. This study is consistent with research from Sumi Y, stating that wound dehiscence occurs frequently in patients with duration of surgery >160 minutes.⁷ Culver et al stated that the ongoing surgery of more than the 75th percentile, considered as a long surgery.⁸ The research in the emergency installation of RSCM reported that the number of SSI on the emergency laparotomy was 48.5%.²

The mean number of bleeding during the surgery period in patients who experience wound dehiscence was 317.29 + 38.45cc. This study is consistent with research from Sumi Y, stating that the wound dehiscence occurs frequently in patients with bleeding number > 300 cc during the surgery period.⁷

The results were obtained that the obese patients have a greater risk of wound dehiscence (5 patients of 9 patients with obesity). Hirose Y mentions that the average patient to the emergency laparotomy has a 17.9 mm thickness of subcutaneous fat. Subcutaneous fat thickness is directly proportional to obesity that make a difference in wound dehiscence.⁹

The main objective of this study is to assess the difference between the applied of subcutaneous drainage and wound dehiscence in emergency laparotomy. Table 2 shows that good result of wound dehiscence occurs in applied of subcutaneous drainage (17 research subjects). While on the subject without the applied of subcutaneous drainage showed poor result of wound dehiscence (9 research subjects). The results of the bivariate analysis using a chi-square test was $p = 0.041$ ($p < 0.05$). The p-value implies that there is a difference between the applied of subcutaneous drainage and wound dehiscence. This is consistent with research Sumi Y, that there was a difference between wound dehiscence and the applied of negative pressure subcutaneous drainage with $p = 0.0058$.⁷ The results also correspond with other research by Hirose Y, which states that the applied of subcutaneous drainage make a difference in the incidence of wound dehiscence ($p = 0.01$).⁹

Wound dehiscence is one of the complications of the wound healing process, defined as the state partially or fully reopening of the wound dehiscence. This situation, as a result of the failure of the healing process of the wound dehiscence.¹⁰

There is no previous research that assesses risk factors for wound dehiscence in multivariate. In this study, age and obesity contribute to wound dehiscence, if the overall risk factor was found in a patient.

CONCLUSION

In bivariate there were differences between risk factors (age, gender, length of operation, amount of bleeding, obesity and wound dehiscence) with the occurrence of wound dehiscence. In multivariate, only age and obesity risk factors that most contribute to the occurrence of wound dehiscence. Further studies should be done with the research methods

and instruments more accurate to control other risk factors to the occurrence of wound dehiscence and to control the other complications in patients undergoing emergency laparotomy.

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