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Determinant of Abdominal Wound Dehiscence (AWD) in Post-Laparotomy Patients at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia

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A B S T R A C T

Introduction. Abdominal wound dehiscence (AWD) is a significant risk factor for mortality during the perioperative period. The high mortality rate, prolonged hospitalization, and increased incidence of repeat operations increase in hospital costs result in worsening the AWD problem itself. This study aims to determine the determinants of abdominal wound dehiscence in post-laparotomy patients at the Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia. **Methods.** This study is quantitative analytical research with a cross-sectional design to determine the determinants of abdominal wound dehiscence (AWD) in post-laparotomy patients based on secondary data from medical records at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia. A total of 161 research subjects participated in this study. **Results.** Emergency surgery patients are 0.4 times more likely to experience AWD than elective patients. Then, patients who experience hypoalbuminemia have 1.8 times the risk, those aged more than 60 years have 0.5 times the risk, sepsis has 1.5 times the risk, and trauma patients have 0.8 times the risk of experiencing AWD. **Conclusion.** Emergency surgery is the most influential determinant in the incidence of AWD at Dr. Mohammad Hoesin Palembang, Indonesia.

1. Introduction

Abdominal wound dehiscence (AWD) is a severe complication that can occur after surgery in the abdominal area. This complication occurs due to the separation of the abdominal lining resulting from the surgical wound before the surgical wound has healed completely. Wounds that have not healed completely fail to maintain tissue continuity and open due to the pressure in the wound. As a result, AWD can increase the risk of abdominal burst, the possibility of re-dehiscence in subsequent operations, infection of the surgical wound, evisceration of abdominal contents, and death. The global incidence of AWD in some literature ranges from 0.4% - 3.5%, with a mortality rate of up to 45%. In approximately 20% - 45% of cases, AWD is a significant risk factor for death during the perioperative period. The high mortality rate, prolonged hospitalization, and increased incidence of repeat operations increase in hospital costs result in worsening the AWD problem itself.[1-5]

One of the triggers for AWD itself is several risk factors directly related to AWD. Other studies mention several risk factors such as old age, male gender, the presence of chronic lung disease (COPD), ascites, jaundice, anemia, emergency surgery, type of surgery, coughing, and infection of the surgical wound as

causes of AWD (all p values< 0.05).[6,7] Other studies state that risk factors for AWD include ASA classification, shortness of breath, history of congestive heart failure, hypoalbuminemia, pneumonia, and postoperative heart failure.8 Other studies show that sociodemographic factors, preoperative sepsis, type of surgery, surgical wound infection, patient comorbidities, and emergency procedures are factors in AWD. AWD mortality is still very high, especially in developing countries. At the same time, much research is still conducted in developed countries and very little in developing countries, especially Indonesia. Meanwhile, the risk factors for AWD in Indonesia are not necessarily the same as in other countries, especially when compared to developed countries.[6-9] This study aims to determine the determinants of abdominal wound dehiscence in post-laparotomy patients at the Dr. Mohammad Hoesin General Hospital Palembang, Indonesia.

2. Methods

This study is quantitative analytical research with a cross-sectional design to determine the determinants of abdominal wound dehiscence (AWD) in post-laparotomy patients based on secondary data from medical records at Dr. Mohammad Hoesin General Hospital Palembang. A total of 161 research subjects participated in this study, where the research subjects met the inclusion criteria. The inclusion criteria for this study were patients who underwent laparotomy surgery in the digestive surgery department, patients aged 18 years and over, and had complete medical record data. This study has received ethical approval from the medical and health research ethics committee of Dr. Mohammad Hoesin General Hospital Palembang.

All determinants found in patients are age, gender, comorbidities including anemia, hypoalbuminemia, COPD, kidney failure, sepsis, diabetes mellitus (DM), as well as determinants related to surgery such as elective or emergency surgery, trauma or non-trauma patients, and type of incision. Secondary data is collected from medical records and then coded according to research needs, and data entry is carried out. The data was then analyzed using SPSS (Statistical Package for Social Science) software version 25. The data was then analyzed bivariate using chi-square. Then, the data was analyzed multivariate to determine the magnitude of the effect using logistic regression analysis.

3. Results

Table 1 shows that there are three significant determinants, namely hypoalbuminemia (p = 0.028), sepsis (p = 0.017), and emergency surgery (p = 0.017). This shows a relationship between hypoalbuminemia, sepsis, and emergency surgery with the incidence of AWD.

Table 1. Relationship between determinants and abdominal wound dehiscence (AWD).

Variables	AWD		p-value*
	Yes	No	
Gender			0,839
• Male	21 (21,6%)	76 (78,4%)	
• Female	13 (20,3%)	51 (79,7%)	
Age			0,214
• ≥ 60 years old	7 (14,9%)	40 (85,1%)	
• < 60years old	27 (23,7%)	87 (76,3%)	
Anemia			0,634
• Yes	13 (23,2%)	43 (76,7%)	
• No	21 (20%)	84 (80%)	
Hypoalbuminemia			0,028
• Yes	23 (28%)	59 (72%)	
• No	11 (13,9%)	68 (86,1%)	
COPD			0,842
• Yes	5 (22,7%)	17 (77,3%)	
• No	29 (20,9%)	110 (79,1%)	
Kidney failure			0,954
• Yes	10 (20,8%)	38 (79,2%)	
• No	24 (21,2%)	89 (78,8%)	
Sepsis			0,017
• Yes	22 (29,3%)	53 (70,7%)	
• No	12 (14%)	74 (86%)	
Diabetes mellitus			0,595
• Yes	6 (25%)	18 (75%)	
• No	28 (20,4%)	109 (79,6%)	
Surgery type			0,017
• Emergency	20 (30,3%)	46 (69,7%)	
• Elective	14 (14,7%)	81 (85,3%)	
Cathegory			0,224
• Trauma	5 (33,3%)	10 (66,7%)	
• Non-trauma	29 (19,9%)	117 (80,1%)	

*Chi-square test, p<0,05.

Five variables were subjected to multivariate analysis, namely age, hypoalbuminemia, sepsis, type of operation, and patient category. For these five determinants' the results of the multivariate analysis can be seen in Table 2.

Table 2. Multivariate analysis of determinants with AWD.

	RR	95% CI	p*
Age	0,574	0,22 – 1,499	0,257
Hypoalbuminemia	1,831	0,693 – 4,835	0,222
Sepsis	1,556	0,593 – 4,084	0,369
Surgery type	0,465	0,198 – 1,089	0,078
Cathegory	0,839	0,245 – 3,134	0,876

*Regression logistic test.

Based on the data above, it was found that the determinant of the type of surgery was the strongest variable that influenced the incidence of AWD, followed by hypoalbuminemia, age, sepsis, and the patient category. Emergency surgery patients are 0.4 times more likely to experience AWD than elective

patients. Then, patients who experience hypoalbuminemia have 1.8 times the risk, those aged more than 60 years old have 0.5 times the risk, sepsis has 1.5 times the risk, and trauma patients have 0.8 times the risk of experiencing AWD.

5. Discussion

Bleeding volume is not an accurate predictor of mortality in epidural hemorrhage patients undergoing surgery at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia.

In this study, there was a relationship between hypoalbuminemia and the incidence of AWD (p=0.028). This is in line with other studies showing the presence of hypoalbuminemia and AWD incidence at Dr. Mohammad Hoesin General Hospital, Palembang, also uses the same standard in determining hypoalbuminemia, namely below 3.5 g/dl. Other studies show that albumin below 3.5 g/dl indicates protein energy malnutrition in patients, so wound healing will be hampered due to the effect on fibroblast proliferation, collagen synthesis, and angiogenesis. This study also showed a relationship between sepsis and AWD (p=0.017). This is also in line with other research, which states a relationship between sepsis and the incidence of wound dehiscence. Infection will cause inhibition of collagen synthesis and increased collagenolysis, thereby interfering with wound healing. Excessive bacterial infection in sepsis conditions will trigger increased leukocyte and macrophage activity and neutrophil activation, increasing the degradation of matrix metalloproteinases (MMPs), which causes a decrease in wound tissue closure activity. Apart from that, the release of endotoxins from bacteria also causes the degradation of collagen fibers. Other studies also state that 105 organisms are found per gram of infected tissue, or potent bacteria such as Streptococcus beta hemolyticus are found. It is almost certain that the wound will experience problems in wound healing.[10-15]

Based on the bivariate analysis in this study, a relationship was found between emergency or elective surgery and the incidence of AWD (p=0.017), where emergency surgery carries a greater risk of patients experiencing AWD. This is also in line with other research stating that emergency patients undergoing laparotomy are more susceptible to AWD than elective procedures. This fact occurs because patients who undergo emergency surgery generally have worse nutritional and general health status than those who undergo elective surgery. In addition, the risk of contamination in emergency patients is higher, with the tissue damage experienced being worse than in elective patients, which also causes other complications such as sepsis. Apart from that, in emergency patients, the patient's comorbid conditions that occur in the patient are only treated as is because the patient requires quick surgery, and even the comorbid conditions that arise are sometimes only treated after surgery because the patient needs fast treatment, which can sometimes only be done with surgery.[16-20]

5. Conclusion

Emergency surgery is the most influential determinant in the incidence of AWD at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia.

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