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The Relationship between the Duration of Sudden Abdominal Pain until Surgical Intervention and Gastric Perforation Patient Mortality Rate at RSUD Banten.

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ABSTRACT

Gastric perforation is caused by damage to the gastric mucosa, leading to peritonitis and requiring emergency surgery. This study aims to determine the relationship between the duration of sudden abdominal pain complaints and the timing of surgical intervention with mortality in patients with gastric perforation at RSUD Banten. The research method used analytical observational study with a cross-sectional design involving 110 patients selected through consecutive sampling. Data were obtained from patient medical records from January to December 2023. The result showed the mortality rate of patients with gastric perforation was 16.4%. Bivariate analysis indicated no significant association between the duration of sudden abdominal pain complaints until surgery (p=0.463) and intraoperative systolic blood pressure (p=0.187) with mortality. However, there was a significant relationship between patient age (p=0.004) and comorbidities (p=0.030) with mortality, where patients aged ≥60 years and those with comorbidities such as heart disease had a higher risk of death. This study highlights the importance of comorbidity management and special attention to elderly patients in order to reduce mortality in cases of gastric perforation.

Keywords : Gastric perforation, duration of abdominal pain complaints, mortality.

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INTRODUCTION

Gastric perforation is caused by injury or damage to the mucosal lining of the stomach wall, leading to disturbances in the gastrointestinal system. As a result, the contents of the gastrointestinal tract leak out and come into contact with the organs within the peritoneal cavity, triggering peritonitis—a serious and potentially life-threatening condition. [1]

The incidence of gastric perforation is estimated at 7–10 cases per 100,000 adults per year. [4] This condition carries a high mortality rate and requires emergency surgical intervention. [2] One of the most serious complications resulting from the spread of infection from gastrointestinal organs, including the stomach, is peritonitis. Peritonitis remains a significant health issue due to its high rates of morbidity and mortality, including in Indonesia. According to a World Health Organization (WHO) survey, deaths due to peritonitis reach approximately 5.9 million cases annually. The United States is the most affected country, with 1,661 reported cases. In Indonesia, about 9% of the population—roughly 179,000 people—are affected by peritonitis, with mortality rates reaching 60% or higher. [2]

Gastric perforation can occur either spontaneously or due to trauma, with most cases occurring spontaneously as a result of peptic ulcers.[3] Classic clinical manifestations in patients with gastric perforation include sudden-onset abdominal pain, fever, tachycardia, constipation, nausea, vomiting, and abdominal wall rigidity.[4] These symptoms typically appear within a few hours after the perforation and may lead to inflammation, infection, or abscess formation, depending on the cause, location, and extent of the injury.[1,5]

Abdominal pain is a consistent symptom experienced by patients with gastric perforation. In addition, many patients report difficulty in defecation due to abdominal inflammation, which causes pain and hinders bowel movement. Inadequate intervention and treatment may lead to fatal outcomes, underscoring the importance of timely surgical action before complications worsen. [4]

Four major factors significantly increase the risk of mortality: age over 60 years, delayed treatment (more than 24 hours), shock upon hospital admission (systolic blood pressure <100 mmHg), and the presence of comorbidities such as HIV/AIDS (with CD4 counts <200 cells/μL). The size of the perforation also influences degree of peritoneal contamination, which impacts the patient's prognosis.[6]

Several studies have identified various factors correlated with or affecting mortality rates in patients with gastric perforation, including perforation diameter, patient age, clinical condition, and the duration of abdominal pain symptoms before receiving medical intervention exceeding 24 hours. These findings form the basis for this study, which specifically aims to investigate the relationship between the duration of sudden abdominal pain complaints and the timing of surgical intervention in relation to mortality among gastric perforation patients at RSUD Banten. This research is particularly important due to the lack of studies focusing on the relationship between symptom duration and mortality, especially in populations with different characteristics such as those at RSUD Banten.

METHODS

The method used in this study was an analytical observational approach with a cross-sectional design. The study population consisted of patients with gastric perforation at the Regional General Hospital (RSUD) Banten. This research was conducted at RSUD Banten and took place from January to May 2024. The sampling technique used was consecutive sampling, based on predefined inclusion and exclusion criteria. The data used in this study were secondary data obtained from patient medical records.

RESULTS

Respondent characteristics were categorized based on age group and gender. The distribution of these characteristics is as follows:

Table 4.1. Demographics of Gastric Perforation Patients at RSUD Banten

Demographics of Gastric Perforation Patients at RSUD Banten	Frequency	
	n	%
Age		
<60 years	90	81,8
≥60 years	20	18,2
Gender		
Male	76	69,1
Female	34	30,9

Based on the analysis of Table 4.1, a total of 110 patient medical records were included in this study. In terms of demographic characteristics, the highest proportion of patients fell into the age group of <60 years, totaling 90 individuals (81.8%). Meanwhile, the majority of patients were male, with 76 individuals (69.1%).

The following is the frequency distribution of the variables: “Duration of Sudden Abdominal Pain Complaints,” “Mortality of Gastric Perforation Patients at RSUD Banten,” “Preoperative Systolic Blood Pressure,” and “Patient Comorbidities.”

Table 4.2. Frequency Distribution Table

Variable	Frequency	
	n	%
Duration of Sudden Abdominal Pain Complaints		
≥24 hours	94	85,5
<24 hours	16	14,5
Mortality of Gastric Perforation Patients at RSUD Banten		
Yes	18	16,4
No	92	83,6

Systolic Blood Pressure		
<100mmHg	5	4,5
≥100mmHg	105	95,5
Comorbidities		
Present	5	4,5
Absent	105	95,5

The duration of sudden abdominal pain complaints was assessed based on the time recorded in the patient's anamnesis, starting from the onset of sudden abdominal pain due to gastric perforation until the initiation of surgical intervention. According to Table 4.2, 94 patients (85.5%) experienced a duration of ≥24 hours from the onset of pain to the surgical procedure. In addition, based on Table 4.2, it was found that 18 patients (16.4%) with gastric perforation died during the recovery phase (within 7 days post-surgery). Systolic blood pressure was assessed based on intraoperative blood pressure records documented in the patients' medical records. According to Table 4.2, 5 patients (4.5%) had systolic blood pressure <100 mmHg during surgery. Comorbidities were identified based on the patient's medical history recorded in their medical records. According to Table 4.2, 5 patients (4.5%) had comorbidities, which included hypertension and diabetes mellitus, while 105 patients (95.5%) had no comorbidities.

The findings regarding the relationship between the duration of sudden abdominal pain complaints and the timing of surgical intervention with mortality in gastric perforation patients at RSUD Banten are as follows:

Table 4.3. Bivariate Analysis of the Duration of Sudden Abdominal Pain Complaints

Duration of Sudden Abdominal Pain Due to Gastric Perforation Until Surgical Intervention	**Mortality in Gastric Perforation Patients**		**Total**	**p Value**	**OR**
	Yes	**No**			
≥24 hours	17 (18,1%)	77 (81,9%)	94	0,463[f]	3,312 (0,409-26,809)
<24 hours	1 (6,3%)	15 (93,8%)	16		
Total	**18**	**92**			

[f] = Fisher's Exact Test

Based on Table 4.3, it can be seen that among patients with a duration of sudden abdominal pain complaints lasting ≥24 hours, 17 out of 94 (18.1%) experienced mortality. According to the results of Fisher's Exact Test with a 5% level of significance, the p-value was 0.463. Since p = 0.463 > 0.05, it can be interpreted that there was no significant relationship between the duration of sudden abdominal pain complaints until surgical intervention and mortality in gastric perforation patients at RSUD Banten.

The results regarding the relationship between age and mortality in gastric perforation patients at RSUD Banten are as follows:

Table 4.4. Bivariate Analysis of Patient Age

Patient Age	Mortality in Gastric Perforation Patients		Total	p Value	OR
	Yes	No			
<60 years	10 (11,1)	80 (88,9)	90	0,004[f]	5,444 (1,757 – 16,186)
≥60 years	8 (40)	12 (60)	20		
Total	**92**	**18**			

[f] = Fisher's Exact Test

Based on Table 4.4, it can be observed that among patients aged ≥60 years, 8 out of 20 individuals (38.1%) experienced mortality. According to the results of Fisher's Exact Test with a 5% level of significance, the p-value was 0.004. Since p = 0.004 < 0.05, it can be interpreted that there was a significant relationship between age and mortality in gastric perforation patients at RSUD Banten.

The results regarding the relationship between comorbidities and mortality in gastric perforation patients at RSUD Banten are as follows:

Table 4.5 Bivariate Analysis of Patient Comorbidities

Patient Comorbidities	Mortality in Gastric Perforation Patients		Total	p Value	OR
	Yes	No			
Present	3 (60)	2 (40)	5	0,030[f]	0,111 (0,17 – 0,722)
Absent	15 (14,3)	90 (85,7)	105		
Total	**18 (16,4)**	**92 (83,6)**			

[f] = Fisher's Exact Test

Based on Table 4.5, it can be seen that gastric perforation patients with comorbidities experienced mortality in 3 out of 5 cases (60%). According to the results of Fisher's Exact Test with a 5% level of significance, the p-value was 0.030. Since p = 0.030 < 0.05, it can be interpreted that there was a significant relationship between patient comorbidities and mortality in gastric perforation patients at RSUD Banten.

Table 4.6. Bivariate Analysis of Preoperative Systolic Blood Pressure

Preoperative Systolic Blood Pressure	Mortality in Gastric Perforation Patients		Total	p Value	OR
	Yes	No			

< 100mmHg	2 (40)	3 (60)	5	0,187[f]	3,708 (0,573 – 23,981)
≥ 100mmHg	16 (15,2)	89 (84,8)	105		
Total	**18 (**	**92 (83,6)**			

[f] = Fisher's Exact Test

Based on Table 4.6, it can be seen that among gastric perforation patients with preoperative systolic blood pressure <100 mmHg, 2 out of 5 individuals (40%) experienced mortality. According to the results of Fisher's Exact Test with a 5% significance level, the p-value was 0.187. Since p = 0.187 > 0.05, it can be interpreted that there is no significant relationship between systolic blood pressure and mortality in gastric perforation patients at RSUD Banten.

DISCUSSION

This study was conducted in March and April 2024 at Banten Regional General Hospital, located in Serang City. The sampling method used was consecutive sampling, with medical records collected from January 1, 2023, to December 31, 2023. The research sample consisted of medical records of patients with gastric perforation who met the established inclusion and exclusion criteria. A total of 110 patient records were collected and analyzed.

Among the 110 recorded cases, 76 patients (69.1%) were male, and 34 patients (30.9%) were female. The findings of this study indicate that male patients experienced gastric perforation more frequently than female patients. This result is consistent with a study conducted by Erwin et al. in 2023 at Dr. Soetomo Hospital in Surabaya, which concluded that the proportion of male patients was higher than that of female patients. This is in line with the theory that estrogen hormones in women may offer protective effects.[7]

The results of the bivariate analysis using Fisher's exact test showed that the duration from the onset of sudden abdominal pain to surgical intervention had no significant association with the mortality rate of gastric perforation patients at RSUD Banten. Among patients with a duration of ≥24 hours, 17 out of 94 (18.1%) experienced mortality, while among those with a duration of <24 hours, only 1 out of 16 (6.3%) died. These findings are not consistent with a study conducted by Tas et al. in 2015, which investigated the relationship between the time from symptom onset to hospital presentation and mortality in gastric perforation patients. [8]

Similarly, the findings differ from a study by Idris et al. in 2022, which reported a significant relationship between the timing of surgery and patient mortality. Idris et al. concluded that patients who underwent surgery more than 12 hours after the onset of abdominal pain had a higher mortality rate compared to those who underwent surgery within 12 hours. This is because a shorter time interval between symptom onset and medical intervention is associated with a lower mortality rate. This interval reflects the progression of peritonitis and the degree of peritoneal contamination. The longer the delay, the more severe the inflammation becomes, increasing the severity of peritonitis. [7]

The differences in research outcomes between the study conducted at RSUD Banten and those by Tas et al. at Dicle University Medical Faculty Hospital in 2015, as well as Idris et al. in 2022, may be attributed to several factors. Dicle University Medical Faculty Hospital holds international quality certifications such as the European Foundation for Quality Management (EFQM) Excellence Model-Based 2-Star Determination Certificate and is equipped with more comprehensive facilities and a wider range of specialties. In contrast, RSUD Banten is a type B hospital that may have more limited facilities, medical resources, and technology. Furthermore, the patient characteristics at Dicle University Medical Faculty Hospital are likely to be more diverse and complex compared to those at RSUD Banten. Clinical

practices and treatment protocols at Dicle University may also be more advanced due to its accreditation status, while RSUD Banten is more likely to be influenced by national guidelines and available resources. All of these factors may contribute to the variation in research findings between the two hospitals.

The results of the bivariate analysis using Fisher's exact test indicated that patient age was significantly associated with the mortality rate of gastric perforation patients at RSUD Banten. Among patients aged <60 years, 10 out of 90 (11.1%) experienced mortality, while among those aged ≥60 years, 8 out of 20 (40%) died. These findings are consistent with a study conducted by Sivaram et al. in 2017, which investigated the relationship between age and mortality in gastric perforation patients, and found that patients aged >65 years had a higher mortality rate. Sivaram's study reported a mortality rate of 23.8% in patients older than 65 years compared to 7.5% in those younger than 65 years. Patients over the age of 65 had significantly higher mortality rates following gastric perforation surgery, likely due to the more frequent presence of comorbid conditions.[9]

The results of the bivariate analysis using Fisher's exact test indicated that comorbidities were significantly associated with the mortality rate of gastric perforation patients at RSUD Banten. Among patients with comorbidities, 3 out of 5 (60%) experienced mortality, while among those without comorbidities, 15 out of 105 (14.3%) died. The comorbid conditions classified in this study included a history of heart disease, liver disease, kidney disease, and diabetes mellitus, as determined from the patient anamnesis and medical records. In this study, it was noted that there was 1 patient with diabetes mellitus and 4 patients with a history of heart disease. These findings are consistent with a study conducted by Tas et al. in 2015, which demonstrated that patients with comorbidities have a significant association with mortality in gastric perforation cases.[8] Patient general medical condition plays an important role in prognosis, as the presence of comorbidities can weaken the immune system and increase vulnerability to postoperative complications and the healing process.[10] In particular, the authors found that a history of heart disease was the comorbidity most strongly associated with mortality, with 60% of gastric perforation patients with a history of heart disease experiencing mortality at RSUD Banten.

The systolic blood pressure of gastric perforation patients was recorded based on intraoperative measurements during the surgical procedure. The results of the bivariate analysis using Fisher's exact test showed that systolic blood pressure was not significantly associated with mortality in gastric perforation patients at RSUD Banten. Among patients with systolic blood pressure <100 mmHg, 2 out of 5 (40%) experienced mortality, whereas among those with systolic blood pressure ≥100 mmHg, 16 out of 105 (15.2%) died. These findings are inconsistent with the study conducted by Erwin et al. in 2023 at Dr. Soetomo Hospital in Surabaya, which showed that patients in shock with systolic blood pressure <100 mmHg had a higher mortality rate.[7] The discrepancy may be attributed to differences in measurement methods: Erwin et al. recorded systolic blood pressure at the time of initial diagnosis of gastric perforation, as documented in the medical records, whereas in the present study, systolic blood pressure was recorded during the surgical procedure, based on operative reports. This variation in timing and context may have contributed to the inconsistent and statistically non-significant results in the present study.

CONCLUSION

The duration of sudden abdominal pain complaints and intraoperative systolic blood pressure were not significantly associated with mortality in gastric perforation patients at RSUD Banten. In contrast, patient age and comorbidities showed a significant relationship with mortality in gastric perforation patients at RSUD Banten.

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