P-ISSN : 2527-4627
Warmadewa Medical Journal
Available online http://ejournal.warmadewa.ac.id/index.php/warmadewa_medical_journal

WMJ (Warmadewa Medical Journal), Vol. 10, No.2, November 2025, Page. 70-74

Clinical Profile and Outcomes of Gastric Perforation Patients At Tabanan Hospital, 2021–2022

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Abstract

Gastric perforation is a life-threatening surgical emergency that frequently arises as a complication of peptic ulcer disease and carries a high mortality rate. This study aimed to describe the clinical profile and outcomes of gastric perforation patients treated at Tabanan Hospital. A retrospective review of medical records was conducted for all gastric perforation cases from January 2021 to December 2022. Seventeen patients were identified. Most were older than 50 years (94%) and female (65%). More than half had no formal education and were unemployed. A history of nonsteroidal anti-inflammatory drug use was present in 59% of cases. Most patients arrived more than 6 hours after symptom onset, and many presented in critical condition, including shock (24%), tachypnea (76%), and acute kidney injury (53%). Intraoperatively, most perforations were located in the gastric antrum (65%) and measured 1–2 cm (82%). Postoperatively, hypoalbuminemia (94%), sepsis (35%), and pneumonia (24%) were common. The in-hospital mortality rate was 29%. In conclusion, gastric perforation at our institution predominantly affected elderly patients, with delayed presentation, severe initial clinical status, and high complication and mortality rates. Enhanced community awareness of ulcer symptoms, early referral, rational NSAID use, and timely surgical intervention are essential to improving outcomes.

Keywords: Gastric perforation, risk factors, clinical profile, complications, mortality

INTRODUCTION

Gastric perforation is a life-threatening surgical emergency and one of the most severe complications of peptic ulcer disease, occurring in approximately 2 –14% of ulcer cases and contributing significantly to morbidity and mortality worldwide.1 Although advances in medical therapy have reduced the incidence of peptic ulcer disease, perforation continues to occur and carries a reported mortality rate of 6–30%, which may rise to more than 50% in high-risk patients.(1, 2) Delayed presentation, advanced age, hemodynamic instability, and comorbid conditions remain key predictors of poor outcomes.(2, 3)

Peptic ulcer perforation most commonly occurs in the prepyloric region, duodenum, or antrum, with gastric carcinoma being an uncommon cause.(2, 4) NSAID use, Helicobacter pylori infection, and malignancy represent major contributing factors.(1, 2, 4) NSAIDs cause mucosal injury by inhibiting cyclooxygenase, reducing prostaglandin synthesis, and weakening the gastric mucosal barrier.(1) In Indonesia, peptic ulcer disease remains a significant health concern and is ranked among the leading causes of mortality in middle-aged men, (5) indicating a continued burden on the healthcare system.

Early diagnosis and prompt surgical intervention are essential to reducing mortality, as delays in treatment markedly worsen prognosis. Mortality rates approach zero when surgery is performed within 6 hours of symptom onset but rise to more than 25% when delayed beyond 12–24 hours, and become extremely high after 72 hours.(1, 3, 4) Simple closure with an omental patch remains the preferred operative technique for most cases.(3)

Despite the clinical importance of gastric perforation, local evidence from regional hospitals in Indonesia remains limited. Therefore, this study aimed to describe the demographic characteristics, clinical presentation, operative findings, and outcomes of patients with gastric perforation treated at Tabanan Regional Hospital in 2021–2022.

METHODS

Study Design and Population

This study employed a retrospective cross-sectional design and was conducted at Tabanan Regional Hospital, Bali, Indonesia. Medical records of all patients diagnosed with gastric perforation and treated between January 2021 and December 2022 were reviewed. The study design is also reflected in the manuscript title. Patients were included if they had a confirmed diagnosis of gastric perforation and complete medical record data, while those with traumatic gastric perforation were excluded. A total sampling method was applied, and all eligible cases were analyzed. Overall, 17 patients met the inclusion criteria, and no records were excluded due to trauma or incomplete data. A flow diagram illustrating the screening and selection process is presented in the Results section.

Data Collection

Data were collected from hospital medical records using a standardized data extraction form. Variables included demographic characteristics (age, sex, level of education, and occupation); risk factors such as smoking history and use of nonsteroidal anti-inflammatory drugs (NSAIDs); and pre-hospital clinical conditions, including the time between symptom onset and hospital arrival, presence of shock, respiratory status, level of consciousness, kidney function parameters (blood urea nitrogen and serum creatinine), and neutrophil-to-lymphocyte ratio (NLR). Intraoperative parameters, including the duration of surgery, perforation size, and perforation anatomical location, were also recorded. Postoperative outcomes were documented, including complications such as sepsis or pneumonia, serum albumin levels, and final patient outcome (recovered or died).

Operational Definitions

To ensure consistency, standardized clinical definitions were applied. Shock was defined as systolic blood pressure <100 mmHg; tachypnea as respiratory rate >22 breaths/min; and decreased consciousness as Glasgow Coma Scale (GCS) <15. Acute kidney injury was defined as blood urea nitrogen >24 mg/dL or serum creatinine >1.2 mg/dL; high NLR as a value >3; and hypoalbuminemia as serum albumin <3.5 g/dL.

Laboratory and Data Quality

Laboratory examinations were performed in the hospital's certified clinical laboratory as part of routine patient care. To ensure data accuracy and minimize misclassification bias, extracted information was independently cross-checked by two investigators. Only complete records were included, and no key variables had missing data.

Data Analysis

All data were analyzed descriptively using Microsoft Excel (version 2016). Categorical variables were summarized as frequencies and percentages, and results are presented in tables and figures where appropriate.

RESULTS

Seventeen patients met the inclusion criteria and were diagnosed with gastric perforation between January 2021 and December 2022. Most patients were older adults, with 94.1% aged >50 years. Females accounted for the majority (64.7%). More than half had no formal education (52.9%) and were unemployed (52.9%). A history of NSAID use was present in 58.8%, while smoking was reported in only 5.9% of patients. Patient demographic characteristics and risk factors are summarized in Tables 1 and 2.

Table 1. Patient Characteristics (n = 17)

Variable	Category	n	%
Age (years)	31–50	1	5.9
	51–70	8	47.1
	>70	8	47.1
Sex	Male	6	35.3
	Female	11	64.7
Education	No formal education	9	52.9
	Elementary school	4	23.5
	Junior high school	4	23.5
	College	0	0.0
Occupation	Unemployed	9	52.9
	Farmer	6	35.3
	Private worker	2	11.8

Table 2. Risk Factors

Variable	Category	n	%
NSAID use	Yes	10	58.8
	No	7	41.2
Alcohol	Yes	0	0.0
	No	17	100
Smoking	Yes	1	5.9
	No	16	94.1

Delayed presentation was common, with 82.4% arriving >6 hours after symptom onset. On arrival, 23.5% presented with shock, 76.5% had tachypnea, and 11.8% had decreased consciousness. High NLR was observed in 88.2%, and elevated kidney markers were present in 52.9%. Prehospital clinical characteristics are shown in Table 3.

Table 3. Pre-Hospital Clinical Status

Variable	Category	n	%
Time to hospital	<6 h	2	11.8
	6–12 h	8	47.1
	12–24 h	6	35.3
	>24 h	1	5.9
Shock (SBP <100 mmHg)	Yes	4	23.5
	No	13	76.5
RR >22/min	Yes	13	76.5
	No	4	23.5
GCS <15	Yes	2	11.8
	No	15	88.2
BUN >24 mg/dL	Yes	9	52.9
	No	8	47.1
Creatinine >1.2 mg/dL	Yes	9	52.9
	No	8	47.1
NLR >3	Yes	15	88.2
	No	2	11.8
Hemoglobin <10 g/dL	Yes	7	41.2
	No	10	58.8

1–2 cm (82.4%). Operative duration was predominantly 1–2 hours (88.2%). Intraoperative findings are presented in Table 4.

Table 4. Intraoperative Findings

Variable	Category	n	%
Duration	1–2 h	15	88.2
	>2 h	2	11.8
Size of perforation	1–2 cm	14	82.4
	>2 cm	3	17.6
Location	Antrum	11	64.7
	Pre-pylorus	5	29.4
	Cardia	1	5.9

Postoperatively, hypoalbuminemia was nearly universal (94.1%). Sepsis occurred in 35.3% of patients, and pneumonia in 23.5%. The overall in-hospital mortality rate was 29.4% (5 deaths). Postoperative outcomes are summarized in Table 5.

Table 5. Postoperative Outcomes

Variable	Category	n	%
Hypoalbuminemia	Yes	16	94.1
	No	1	5.9
Sepsis	Yes	6	35.3
	No	11	64.7
Pneumonia	Yes	4	23.5
	No	13	76.5
Outcome	Recovered	12	70.6
	Died	5	29.4

A flowchart showing patient screening and inclusion is provided in Figure 1.

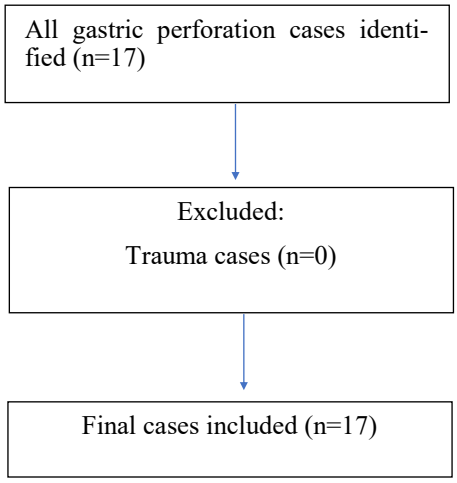

Figure 1. Flow diagram of patient selection. A total of 17 cases of gastric perforation were identified during the study period. No trauma-related cases or incomplete medical records were excluded, resulting in 17 cases included in the final analysis.

DISCUSSION

This study demonstrated that gastric perforation predominantly affected older adults, particularly those aged >50 years. This pattern is consistent with previous literature showing that peptic ulcer complications occur more commonly in individuals over 40 years, with peak incidence between 55–65 years due to age-related reductions in mucosal defenses, accumulated comorbidities, and increased exposure to medications.(2,9) Older adults may also under-recognize early symptoms and delay seeking medical care, contributing to more severe clinical presentations.

Contrary to many studies reporting a male predominance,(3,9) most patients in this study were female. This may reflect demographic characteristics in the hospital's catchment area, where elderly women frequently use analgesics for chronic musculoskeletal pain. Low educational attainment and unemployment observed among many patients suggest socioeconomic vulnerability, which has been linked to poor nutritional status, lower disease awareness, and delayed presentation—factors that increase the risk of ulcer complications.(2,9)

NSAID use was identified as the most frequent modifiable risk factor. NSAIDs inhibit cyclooxygenase (COX) enzymes, reduce prostaglandin synthesis, and compromise the gastric mucosal barrier.(1,6,7) In Indonesia, NSAIDs are easily accessible without prescription, contributing to uncontrolled use and increased ulcer risk. Peptic ulcer disease remains the most common etiology of gastric perforation, whereas malignancy-related perforation accounts for only 6–14% of gastric ulcers and is rare in duodenal ulcers.(1,6,7) These findings underscore the importance of rational analgesic use and consideration of gastroprotective therapy in high-risk patients.

Most patients presented late, typically 6–24 hours after symptom onset. Although sudden severe abdominal pain and abdominal rigidity are classic signs of perforation,(6,7) delayed presentation remains common in peripheral settings due to low awareness, self-medication, and geographic barriers to emergency services. Prolonged peritoneal contamination leads to chemical peritonitis, systemic inflammation, fluid loss, hypovolemia, and organ dysfunction. Several patients in this study arrived in shock and respiratory distress, supporting the association between delayed intervention and hemodynamic instability.(6) Extended hypovolemia may precipitate acute kidney injury, which was also observed in this cohort.(6)

A high neutrophil-to-lymphocyte ratio (NLR) was observed in most patients. NLR is a simple, cost-effective inflammatory marker widely studied for prognostic assessment across various acute and chronic conditions.(10) Its elevation here reflects systemic inflammatory activation accompanying gastric perforation.

Most perforations were located in the gastric antrum and measured 1–2 cm, consistent with previous studies reporting the pre-pyloric/antral region as the most common perforation site.(2) Malignancy-associated perforation, reported in approximately 5% of cases and often located along the greater curvature,(2,5,6,7) was not identified in this cohort. Simple closure with an omental patch remains the standard

operative approach for benign perforations. (1,4)

Nearly all patients experienced post-operative hypoalbuminemia, reflecting severe inflammatory burden and nutritional compromise. Sepsis and pneumonia were also common. The observed mortality rate (~30%) aligns with the upper range of global mortality estimates (6–30%) for perforated peptic ulcer(1,3) and is strongly associated with delayed treatment. Mortality approaches zero when surgery is performed within 6 hours of onset, rises to 5–10% within 6–12 hours, increases to 25% within 12–24 hours, and becomes exceedingly high after 72 hours.(1,4) The high rate of delayed presentation likely contributed to the mortality observed in this study.

Study Limitations

This study is limited by its small sample size, retrospective design, and single-center setting. Evaluation of *Helicobacter pylori* status and nutritional parameters was constrained by incomplete documentation. Nevertheless, the findings are consistent with national and international literature and likely reflect patterns seen in other district-level hospitals in Indonesia, where NSAID self-medication and delayed care seeking remain significant challenges.

CONCLUSION

Gastric perforation at Tabanan Regional Hospital predominantly affected older adults and was strongly associated with delayed presentation and NSAID use. These factors contributed to severe postoperative complications and a high mortality rate. Strengthening community education on appropriate analgesic use, improving early referral pathways, and ensuring timely surgical management are essential to improving outcomes in similar regional healthcare settings.

ACKNOWLEDGEMENT

This research was financially supported by the Faculty of Medicine and Health Sciences, Universitas Warmadewa, under the *Penelitian Dosen Pemula* grant scheme for the 2023 fiscal year.

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