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Characteristics of Post-Surgery Treatment in Gastric Perforation Patient with Ceftriaxone and Metronidazole

Tommy Gunardi Santoso[1], Trully Deti Rose Sitorus[2], Reno Rudiman[3]

[1]Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia,
Raya Bandung-Sumedang KM 21 street, Jatinangor, Sumedang, Indonesia
Email: *tommy.gsantoso[at]gmail.com*

[2]Department of Pharmacology and Therapy, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia
Raya Bandung-Sumedang KM 21 street, Jatinangor, Sumedang, Indonesia
Email: *trullysitorus[at]yahoo.com*

[3]Department of Surgery, Faculty of Medicine, Universitas Padjadjaran/Hasan Sadikin General Hospital, Bandung, Indonesia
Professor Eyckman No. 38 street, Bandung 40161, Indonesia
Email: *renorudiman[at]yahoo.com*

Abstract: ***Background: Gastric perforation is one of the causes for acute pain abdomen with a high mortality rate of 10-40%. Surgical therapy and antibiotic therapy should be a part of management in these patients to reduce the number of mortality. Antibiotic therapy provided is a combination of ceftriaxone and metronidazole. Aim: The aim of this study is the characteristics of gastric perforation in patients using an antibiotic combination of ceftriaxone and metronidazole. Materials and Methods: A retrospective study design was used by collecting medical records of inpatient surgery between the January 2010 to December 2014 in Dr. Hasan Sadikin General Hospital, Bandung. The inclusion criteria included patients with or without comorbidities and initial antibiotic therapy using ceftriaxone and metronidazole. Patients who were forced to go home and did not complete therapy were excluded from the study. Parameters used in this study were characteristics based on gender, age, comorbidities, and duration of antibiotic therapy. Results: Based on sex, male frequency (86.7%) was higher than females (13.3%). The largest percentage based on age was in the age category of 55-64 years old (45,2%). 37.8% of patients with gastric perforation had one or more comorbidities. For duration of antibiotic between 5-7 days which was considered appropriate according to guideline showed only 32% patients from this study. In this study, patients with gastric perforation had a mortality of 9.4 %. Conclusions: Gastric perforation was more likely to occur in male and at an older age. Patient had a high chance of comorbid. Gastric perforation made inappropriate days of antibiotic therapy according to the guideline for intra-abdominal infections. Patients with gastric perforation also had a high mortality rate.***

Keywords: characteristic, ceftriaxone, metronidazole, perforation

1. Introduction

Gastric perforation is a sudden onset of severe epigastric pain. It usually occurs with abdominal rigidity caused by spasm and sepsis. It also requires immediate attention.[1] Perforation of the gastrointestinal tract is most commonly caused by peptic ulcers, inflammatory diseases, blunt trauma or penetration, iatrogenic factors, foreign bodies or neoplasm.[2] Peptic ulcer affects 4 million people worldwide. Complications occur in 10-20% of patients out of which 2-14% of patients with peptic ulcers experience perforation. Perforations dues to peptic ulcers are usually rare, but high mortality is reported at about 10-40% of cases.[3] Management of gastric perforation patient are surgical therapy and antibiotic therapy.[1]

Therefore, antibacterial therapy should be given as early as possible when the diagnosis has been established to control the source of the infection. Regiments of antibiotics to treat intra-abdominal infections in Asia, whether from the community or hospitals, is a combination of ceftriaxone and metronidazole.[4]

This antibiotic regiment is often used in Dr. Hasan Sadikin General Hospital Bandung as a form of therapy in patients with gastric perforation. In consequence, the author is interested in conducting a study on the characteristics of gastric perforation patients using ceftriaxone and metronidazole in Dr. Hasan Sadikin General Hospital between the years 2010 – 2014.

2. Aim and Objectives

The aim of this study is the characteristics of post-surgery treatment with antibiotic combination of ceftriaxone and metronidazole in gastric perforation patients

3. Materials and Methods

This was a retrospective study using secondary data. This study presented a quantitative descriptive data. All data were collected from medical records of inpatient surgery from Dr. Hasan Sadikin General Hospital, Bandung. This study has been approved by the Ethical Committee of Dr. Hasan Sadikin General Hospital. This study involved 98 medical records which were accessed via disease code K25.5, based on the International Classification of Disease 10, in the period of January 2010 – December 2014.

Samples were collected using the total sampling method. Samples that fulfilled the inclusion criteria were patients

diagnosed with gastric perforation with or without comorbidities and had initial antibiotic therapy of ceftriaxone and metronidazole in the period mentioned above. Patients who were forced to go home and did not complete therapy were excluded from this study.

Data collected were compiled based on sex, age, comorbidities and antibiotic therapy duration. Comorbidities were categorized as heart disease, kidney disease, respiratory disease, leakage, multiple organ failure, hypertension, encephalopathy, hypertension, cellulitis, submental abscess, necrosis of pulp, abscess on thorax wall and without comorbidities. The duration of therapy was observed through the days of therapy in days.

Data were processed by Microsoft Excel computer software. The results were presented in tables and fugures containing frequencies and percentages.

4. Results

The total number of medical records collected in this study was 98. However, only data of 53 patients with an outcome of death or recovery could be accessed. Some data could not be accessed due to lost medical records or patients that met the exclusion criteria. The death of gastric perforation were 5 patients out of 53 patients (9.4%).

Table 1: Gender of patients using Ceftriaxone and Metronidazole

Characteristic	Total number of patients with gastric perforation (percentage)
Sex	
• Male	46 (86,7%)
• Female	7 (13,3%)

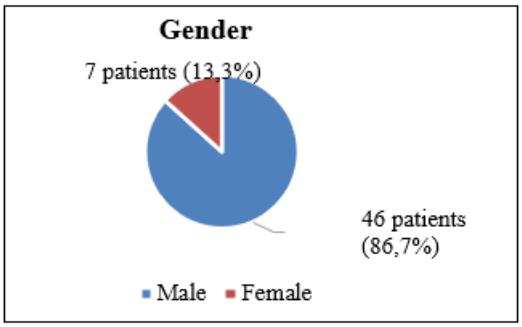

Figure 1: Graphical representation of gender distribution

Based on sex presented in **Table 1** and **Figure 1** , males (86.7%) were more susceptible than females (13.3%) with a ratio of 6.5:1.

Table 2: Age of patients using Ceftriaxone and Metronidazole

Characteristic	Total number of patients with gastric perforation (percentage)
Age	
• 0-14	0 (0 %)
• 15-24	1(1,8%)
• 25-34	1(1,8%)
• 35-44	4(7,5%)
• 45-54	11(20,7%)
• 55-64	24(45,2%)
• 65-74	9 (16,9%)
• 75-84	3(5,6%)

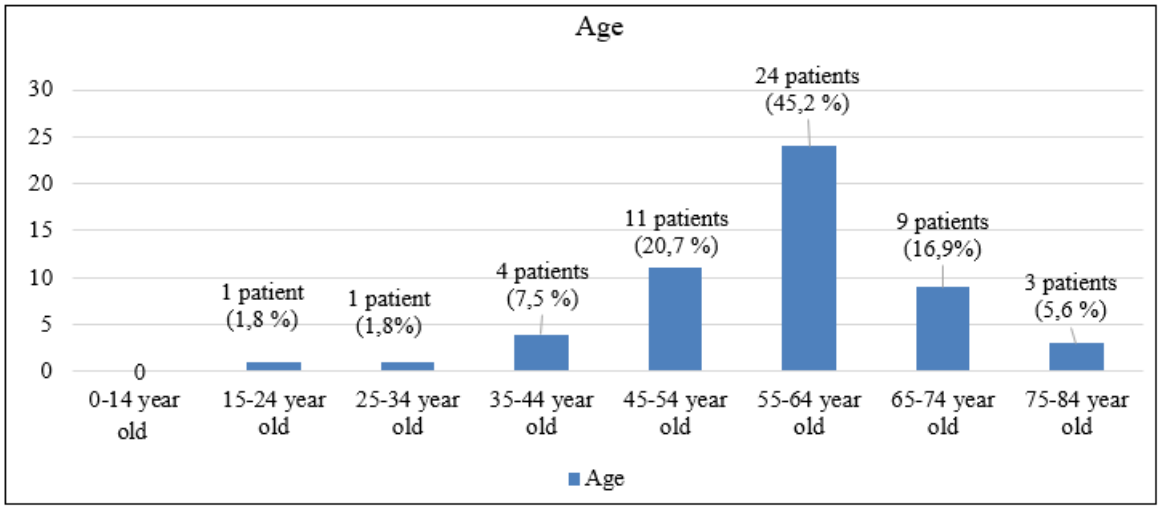

Figure 2: Graphical representation of age distribution

Age distribution were presented in **Table 2** and **Figure 2**. The frequency of patients with gastric perforation which had ceftriaxone and metronidazole therapy increased with age. The highest occurrence was seen in the age category of 55-64 years old with 24 patients (45,2%). There was a continuous decrease in frequency in the age category of 65-74 and 75-84 years old. The median age of patients was 58 years old between patients aged 24-81 years old. The average age of all patients was 58.2 years old.

Table 3: History of comorbidities in patients with gastric perforation

History of Comorbidities	Total number of patients with gastric perforation (percentage)
• Heart disease	1 (1,8%)
• Kidney and respiratory disease	1 (1,8%)
• Respiratory disease	10 18,8(%)
• Leakage	2 (3,7%)
• Without comorbidities	33 (62,2%)
• Multiple organ failure	1 (1,8%)
• Multiple organ failure + respiratory disease	1 (1,8%)
• Respiratory disease + hypertension	1 (1,8%)
• Reponible hernia	1 (1,8%)
• Cellulitis, submental abscess, necrosis of pulp, abscess on thorax wall	1 (1,8%)
• Respiratory disease + encephalopathy	1(1,8%)

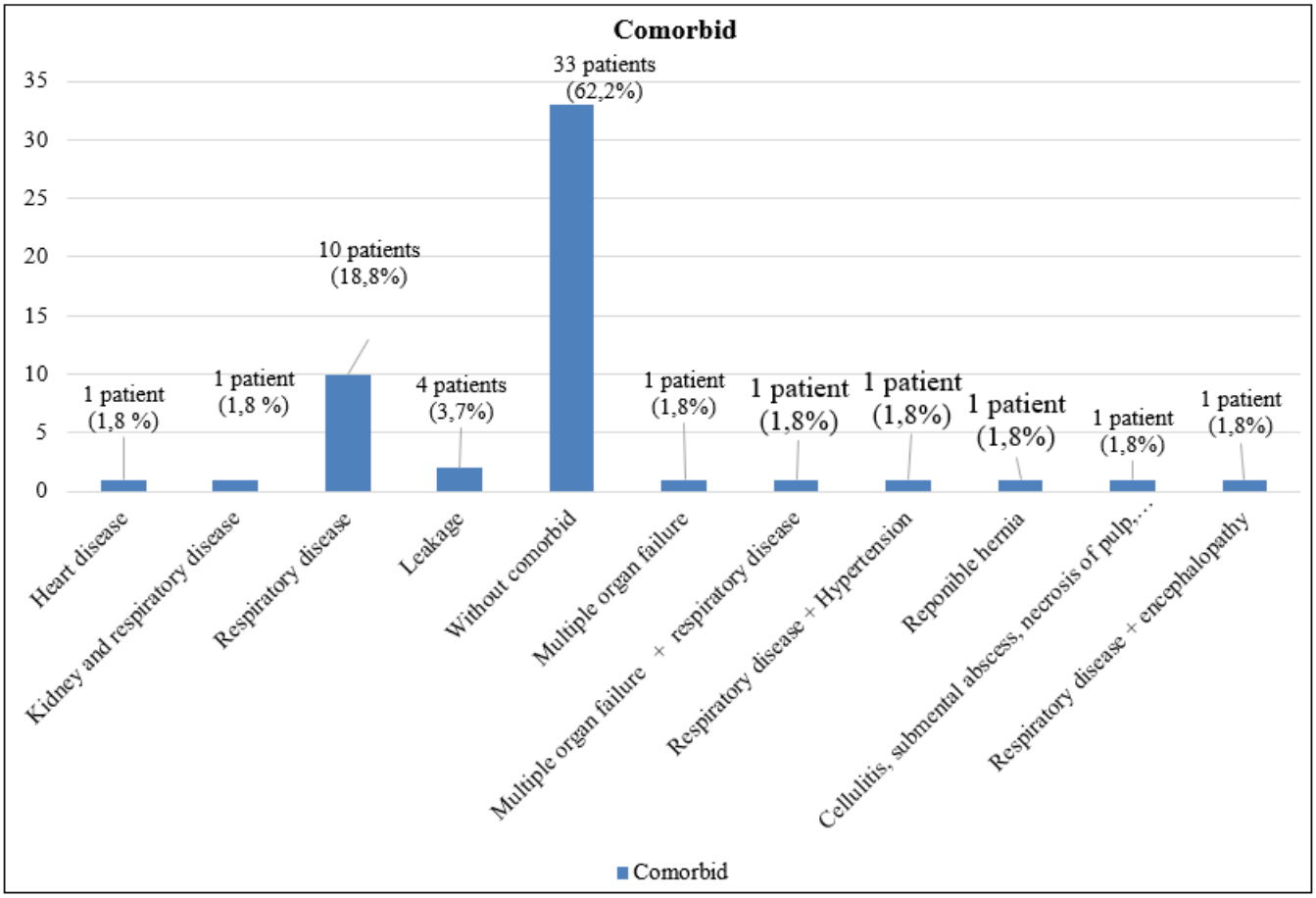

Figure 3: Graphical representation of comorbid distribution

This study also studied comorbidities in patients with gastric perforation. Comorbidities in patients showed in **Table 3** and **Figure 3**. The highest frequency was found in 33 patients without comorbidities. There were 10 patients with respiratory disease and 2 patients with leakage. There were only 1 patient each for heart disease, kidney disease with accompanying respiratory problems, multiple organ failure, multiple organ failure with accompanying respiratory problems, respiratory disease with accompanying hypertension, responsible hernia, respiratory disease with accompanying encephalopathy and cellulitis with accompanying abscess.

Table 4: Days of antibiotic therapy in patients with gastric perforation

Days of antibiotic therapy	Total number of patients with gastric perforation (percentage)
• 1-4	13 (24,5%)
• 5-7	17 (32%)
• 8-10	14 (26,4%)
• >10	9 (16,9%)

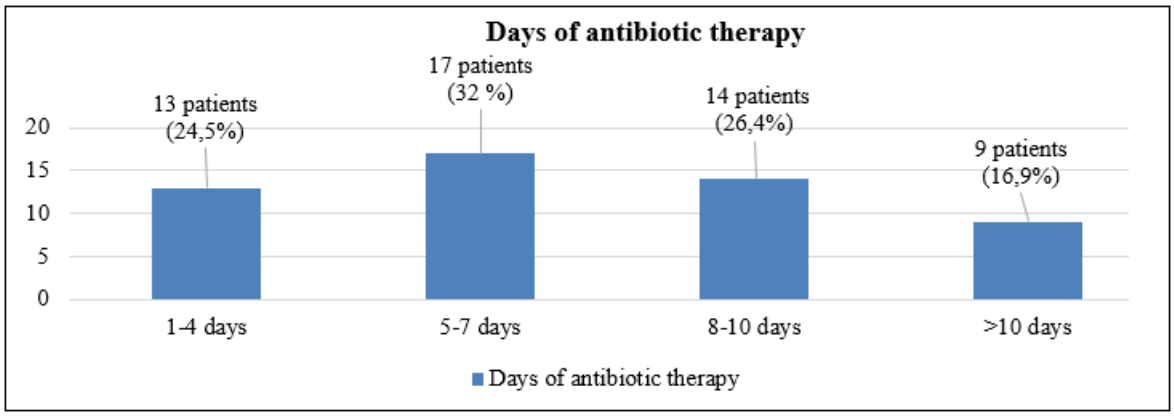

Figure 4: Graphical representation of days of antibiotic therapy distribution

The days of antibiotic therapy showed in **Table 4** and **Figure 4**. The days of antibiotic therapy in gastric perforation patients was in the highest in the category of 5-7 days (32%) with an average days of therapy at 7.5 days. The frequency of patients was lower in those receiving therapy between 1-4 days (24.5%), 8-10 days (26.4%) and >10 days (16.9%).

5. Discussion

Based on sex, gastric perforation occurred more in males with a ratio of 6.4:1. A study in Nigeria, a developing nation, discovered similar results with a ratio of 5.3:1.[5] In an African study, male suffered more gastro-duodenal perforation than female. The gastro-duodenal perforation caused by smoking, alcohol consumption, and non-steroidal anti-inflammatory drugs.[6]

Based on the results of this study, the prevalence of gastric perforation increased parallel to age reaching a peak maximum at the age category of 55-64 (45.2%) years old with a median and average age of 58.2 years old and 58 years old respectively. These results were similar to that of a study in South Korea where the average age was 62.3 years old. Developing age is a high-risk factor for physiologic disturbance and an immunocompromised status. Older patients often have immunological problems and decreased immune function.[7] These results were not different to a study conducted in Africa which reported that a majority of cases with perforations occurred in older patients with a mean statistical average of 52.2 years old.[6]

This study revealed that gastric perforation had a high chance to occur with one or more comorbidities. 37.8% of patients had comorbidities such as respiratory disease (18.8%), leakage (3.7%), and other comorbidities. The remaining 62.2% of patients with gastric perforation who had undergone therapy did not have comorbidities. Respiratory disease is a common complication in intra-abdominal infections.[8] As an example, medical records from European countries showed that 22% of intra-abdominal infection cases experienced respiratory infections as a complication. The percentage reported were similar to a previous study by 66 medical institutions in Europe where cardiac comorbidities were a strong mortality threat (13.8%).[9] A study by John (2005) added that renal comorbidities were a risk factor for increasing mortality rates.[10]

Duration of treatment was seen by the days of antibiotic therapy.[11] The effectiveness of a medication can also be seen by observing post-operative wounds however, this was not done in this study.[12] The results from this study proved that the highest frequency in the days of antibiotic therapy used was in the category of 5-7 (32%) days with an average 7.5 days. Other results (68%), reported that the days of therapy was inappropriate according to the guideline for intra-abdominal infections. Patients given antibiotic therapy for less than 5 days were categorized as inappropriate due to replacement of antibiotic or patient death. To determine a standard for the days of therapy, several factors were considered which include patient comorbidities, severity of organ failure, the time to return of bowel movements, and the quality of surgical procedures.[13] It is difficult to reduce the days of antibiotic therapy due to complications that arise from intra-abdominal cases. The complication is caused by the spread of infection from the initial source or from an ineffective control of the source of the disease. Drug resistance is another factor that can affect the days of antibiotic therapy. There is an increase of resistance from pathogens, especially in Asia, due to improper use and regulations of antibiotics.[4] Community acquired intra-abdominal infections may use a combination of levofloxacin and metronidazole as well as ciprofloxacin and metronidazole as an alternative. Single antibiotic agents can be used as an alternative in accordance with local community resistance towards amoxicillin, moxifloxacin, ertapenem, or meropenem.[4,14] When there is resistance towards a particular isolate in local area, it is recommended that a culture and susceptibility test be carried out. Based on the results of these tests, proper regiments of antibiotics can be administered. Culture tests should be performed from infected areas in patients known to have high risk, especially in patients who have consumed antibiotics previously. [11]

6. Conclusion

As a conclusion, the gastric perforation patient using ceftriaxone and metronidazole was more likely to occur in male. It happened at an older age. Gastric perforation had a high chance occurred with one or more comorbidities. Comorbidities had the potential to endanger patients with gastric perforation. Gastric perforation made inappropriate days of antibiotic therapy in hospitals with existing guidelines. Gastric perforation also had a high mortality rate.

Based on the results from this study, it recommend that future research links these results to sensitivity of ceftriaxone and metronidazole to determine drug resistance, especially in local districts. Drug resistance, culture and susceptibility tests are advised to be carried out. An excessive days in antibiotic therapy can be replaced with alternative antibiotics to prevent drug resistance.

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Author Profile

Tommy Gunardi Santoso received Medical Doctor Degree in Faculty of Medicine from Universitas Padjadajaran. Tommy served as medical service in Kupang, Nusa Tenggara Timur. He performed medical diagnosis, intravenous fluid insertion, circumcision, minor surgery, and pharmacology treatment in limited resource area. He presented two researchs in Asia Pacific Congress of Pediatrics. Now, he is a general practicioner in Kartika Pulomas Hospital, Jakarta. Tommy current position is member of Indonesia Medical Association West Jakarta.

Truly Deti Rose Sitorus, dr.,MSi.,SpFK, received Medical Doctor degree from Padjadjaran University. She completed Master of Pharmacology from Institut of Technology Bandung. She also completed Pharmacology Specialist from University of Indonesia. She works as teaching and research staff in Faculty of Medicine, Padjadjaran University. She also worked as staff of Clinical Pharmacology Department in Hasan Sadikin General Hospital, Bandung, Indonesia. Many researchs were published in national journal and international journal. She wrote book for Pharmacology Reference. She made practical guideline for medical doctor's prescription. She was awarded Hak Kekayaan Ilmiah from Ministry of Law and Human Rights, Indonesia Government.

Reno Rudiman is a Digestive Surgeon at the Hasan Sadikin Hospital in Bandung, Indonesia. Dr Rudiman completed his Master's degree at the University of Aberdeen, UK, and he was awarded his PhD from the Universitas Padjadjaran, Indonesia. Dr Rudiman has a special interest in minimal invasive surgery. He was the first to perform NOTES transvaginal cholecystectomy in Indonesia in 2008. He was among the first surgeons in Indonesia licensed to perform robotic surgery. Dr Rudiman is currently the president of Indonesian Metabolic and Bariatric Society. He is also a national faculty member of the Indonesian Society of Endolaparoscopic Surgery, and regularly teaches endolaparoscopy in national and international courses. Dr Rudiman current position is the Head of Department of Surgery Universitas Padjadjaran, Hasan Sadikin General Hospital Indonesia.