VOLUME-9, ISSUE-3, MARCH-2020 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Surgery

THE MICROBIAL PATTERN OF COMPLICATED INTRA-ABDOMINAL INFECTIONS COMMUNITY IN H. ADAM MALIK GENERAL HOSPITAL MEDAN

Heri Gunanti Surbakti

ABSTRACT

Introduction: The principles management of complicated intra-abdominal infections are source control and antibiotic therapy. The main problem in its implementation is the slow handling time and inadequate antibiotic therapy, which leads in an increase in mortality in complicated intra-abdominal infections. Early empirical antibiotics are based on the pathological location and community microbial pattern. This study is aimed to evaluate microbial pattern at H. Adam Malik General Hospital between January 2017 and October 2019.

Methods: This is a retro-prospective observational descriptive study.

Results: There were 37 patients who met the inclusion criteria. The most common microbial pattern in this study was gram-negative bacteria, which was 62.1%. The most common gram-negative bacteria found were *E.coli* (32.4%), followed by *Klebsiella pneumonia* (24.3%). While the most common gram-positive bacteria found was *Staphylococcus haemolyticus* (8.1%).

Conclusion: The most common microbial pattern found in this study was gram-negative bacteria, where the most common gram-negative bacteria was *E. coli*. The most common gram-positive bacteria was *Staphylococcus haemolyticus*.

KEYWORDS : Intraabdominal infection, microbial pattern, antibiotic, resistance.

1. INTRODUCTION

The principles management of intra-abdominal infections are source control and antibiotic therapy. The main problem in its implementation is the slow handling time and inadequate antibiotic therapy, which leads in an increase in mortality in complicated intra-abdominal infections. Intra-abdominal infections are proven to be a cause of high mortality in the ICU (Weigelt JA, 2007).

Studies conducted by CIAOW in 2013 from 702 patients found that 87.60% patients suffered from complicated intra-abdominal infections (cIAI) were from community infections and the rest nosocomial infections. About 43.30% patients had diffuse peritonitis and 46.70% patients had local peritonitis, 15.95% were in critical condition and the number of deaths occurred was 10,1%. (Sartelli et al, 2013). The incidence of CIAI in six tertiary service centers Indonesia in 2017 were around 10% with a mortality of 16.6% (Nasution et al, 2017).

The principles of cIAI management are adequate surgery and empirically early antibiotics that are appropriate to the pathological location (upper or lower gastrointestinal perforation). Both of these principles management have been proven to reduce mortality by 78.6% (Shani et al, 2010).

Early empirical antibiotics are based on the pathological location and community microbial pattern. The microbial pattern profile determines the administration of empirical antibiotics. The microbial profile pattern will differ according to region and hospital institution. This study was aimed to evaluate microbial pattern at H. Adam Malik General Hospital between January 2017 and October 2019.

2. METHODS

This study took place from January 2017 until October 2019 at H. Adam Malik General Hospital. This is a retro-prospective observational descriptive study. Patients who were diagnosed with complicated intraabdominal infections community and who underwent microbiological culture examinations were included in the study. The data collected was secondary data based on medical records and culture results from the microbiology department. Univariate analysis was performed.

3. RESULTS

A total of 37 patients were included in this study. Distribution of subject characteristics was shown in figure 1 and 2.

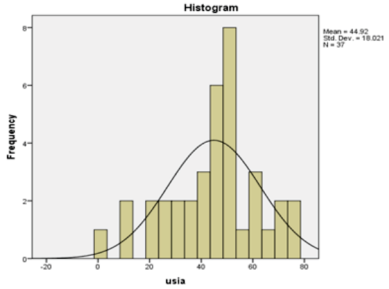

Figure 1. Distribution of cases by age.

The age distribution of patients did not follow the normal curve. Median age found was 48 years with a range of 1-78 years. In Figure 5.2 it could be seen that there were 19 men and 18 women who have been diagnosed with complicated intraabdominal infections community and have been cultured.

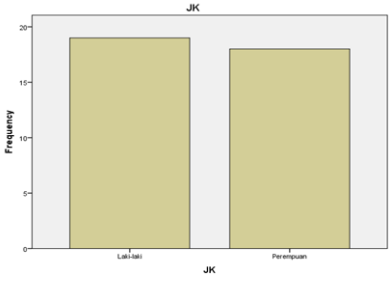

Figure 2. Distribution of cases by sex.

The microbial pattern found in all cases of complicated intraabdominal infections community was presented in Table 1 below.

Table 1. The microbial pattern in complicated intra-abdominal infections community.

Isolate/Year	2017 (%)	2018 (%)	2019 (%)	Total
No Bacteria	1 (33.3)	4 (30.76)	3 (14.28)	8 (21,6)
Negative Gram				**25 (62,1)**
E. coli	2 (67.7)	5 (38.46)	5 (23.8)	12 (32,4)
K. pneumonia	-	3 (23.07)	6 (28.57)	9 (24,3)
V. fluvialis	-	-	1 (4.76)	1 (2,7)
K. oxytoca	-	-	1 (4.76)	1 (2,7)

P. aeroginosa	-	-	1 (4.76)	1 (2,7)
Burkholderiacepacia	-	-	1 (4.76)	1 (2,7)
Positive gram				**4 (10,8)**
S. haemolyticus	-	1 (7)	2 (9.52)	3 (8,1)
S. epidermidis	-	-	1 (4.76)	1 (2,7)
Total	3 (100)	13 (100)	21 (100)	

The most common microbial pattern was gram-negative bacteria, which was 62.1% of the total patients diagnosed with complicated intraabdominal infections community and have undergone culture. The most common gram-negative bacteria were *E. coli* (32.4%), followed by *Klebsiella pneumonia* (24.3%) . While the most gram-positive bacteria found were *Staphylococcus haemolyticus* (8.1%).

Recapitulation of antibiotic resistance were carried out according to the type of antibiotic and type of germ. The recapitulation results were presented in table 2 below.

Table 2. The microbial pattern of sensitivity to antibiotics.

Susceptibility			
Antibiotic	S (%)	I (%)	R (%)
Amoxiciline	36 (97,3)	-	1 (2,7)
Cefalexin	35 (94,6)	-	2 (5,4)
Cefuroxim	35 (94,6)	-	2 (5,4)
Mofifloxacin	35 (94,6)	-	2 (5,4)
Tigecycline	35 (94,6)	-	2 (5,4)
Cefepime	35 (94,6)	-	2 (5,4)
Trimethtopin	35 (94,6)	-	2 (5,4)
Cefuroxime	34 (91,9)	-	3 (8,1)
Clindamycin	34 (91,9)	-	3 (8,1)
Eritromisin	34 (91,9)	-	3 (8,1)
Ceftazidime	34 (91,9)	-	3 (8,1)
Cefazolin	33 (89,2)	-	4 (10,8)
Tmp-Smz	32 (86,5)	-	5 (13,5)
Doxycycline	32 (86,5)	-	5 (13,5)
Levofloxacin	31 (83,8)	-	6 (16,2)
Gentamycin	31 (83,8)	-	6 (16,2)
Aztreonam	31 (83,8)	-	6 (16,2)
Ceftriaxone	29(78,4)	-	8 (21,6)
Ciprofloxacine	14 (37,8)	-	23 (62,2)
Ampisilin	14 (37,8)	-	23(62,2)

Types of antibiotics that still have a sensitivity level > 50% were cefazolin, ceftriaxone, levofloxacin, amoxicillin, cefalexin, cefuroxim, clindamycin, erythromycin, gentamycin, TMP-SMZ ,tigecycline, ceftazidime, cefepime, trimethoprim, aztreonam, ciprofloxacin, doxycycline. As for those who have a sensitivity rate below 50% of them were ampicilline and ciprofloxacin with a percentage of 37.8% each. It could also be seen that the antibiotic with the highest sensitivity was amoxicillin.

4. DISCUSSION

The most common microbial pattern in this study was gram-negative bacteria, which was 62.1% of the total patients diagnosed with complicated intraabdominal infections community and had undergone culture. The most common gram-negative bacteria were *E. coli* (32.4%), followed by *Klebsiella pneumonia* (24.3%) . While the most gram-positive bacteria found were *Staphylococcus haemolyticus* (8.1%). Distribution of germ patterns per year also shows fairly consistent results, where *E.Coli* and *Klebsiella pneumoniae* were germs that were commonly found in cases of complicated intra-abdominal infections community. It was practically matched with previous study which the highest percentation of microbial pattern found in complicated intraabdominal infections was a gram-negative *E. coli* variant.

In this study it could also be seen that the type of antibiotics in complicated intraabdominal infections community that still have sensitivity rates> 50% are cefazolin, ceftriaxone, levofloxacin, amoxicillin, cefalexin, cefuroxim, clindamycin, erythromycin, gentamycin, TMP-SMZ ,tigecycline, ceftazidime, cefepime, trimethoprim, aztreonam, ciprofloxacin, doxycycline. As for those who have a sensitivity rate below 50% of them were ampicilline and ciprofloxacin with a percentage of 37.8% each. It could also be seen that the antibiotic with the highest sensitivity was amoxicilline with a percentage of 97.3%. These results were in accordance with previous studies such as research conducted by Bonauli Simanjuntak at the RSCM. In that study, the sensitivity of amoxicilline and vancomycin were 100%, and ampicilline had a very low sensitivity of 25%. But in that study it was found that the sensitivity of chloramphenicol was still above 50%.

5. CONCLUSION

- The most common microbial pattern in this study was gram-negative bacteria. The most common gram-negative bacteria were *E. coli* (32.4%), followed by *Klebsiella pneumonia* (24.3%) . While the most gram-positive bacteria found were *Staphylococcus haemolyticus* (8.1%).
- Types of antibiotics in intraabdominal infections community that still have a sensitivity level > 50% were cefazolin, ceftriaxone, levofloxacin, amoxicillin, cefalexin, cefuroxim, clindamycin, erythromycin, gentamycin, TMP-SMZ, tigecycline, ceftazidime, cefepime, trimethoprim, aztreonam, ciprofloxacin, doxycycline. As for those who have a sensitivity rate below 50% of them were ampicilline and ciprofloxacin.

6. Suggestions

- More samples will certainly find more meaningful statistical results. A proper initial diagnosis should be made at the hospital and then a culture of germs is carried out to assess the pathogen that causes complicated intra-abdominal infections community.
- Amoxicilline has the highest sensitivity value in the antibiotic sensitivity test. The use of amoxicillin as an empirical therapy of complicated intra-abdominal infections community can be considered. Of course, with the use of metronidazole, because the antibiotic requirements for intra-abdominal infections must also include anaerobic bacteria.

REFERENCES

1. Carroll PJ, Gibson D, El-Faedy O, Dunne C, Coffey C, Hannigan A, et al. Surgeon-performed ultrasound at the bedside for the detection of appendicitis and gallstones: systematic review and meta-analysis. Am J Surg. 2013; 205:102–8.
2. Chong YP, Bae IG, Lee SR, Chung JW, Jun JB, Choo EJ, et al. Clinical and economic consequences of failure of initial antibiotic therapy for patients with community-onset complicated intra-abdominal infections. PLoS One. 2015;10:e0119956.
3. Davies HO, Alkhamesi NA, Dawson PM. Peritoneal fluid culture in appendicitis: review in changing times. Int J Surg. 2010;8:426–9.
4. de Ruiter J, Weel J, Manusama E, Kingma WP, Van der Voort PH. The epidemiology of intra-abdominal flora in critically ill patients with secondary and tertiary abdominal sepsis. Infection. 2009;37:522–7.
5. Dellinger et al. Surviving sepsis campaign: international guidelines for management of severe sepsis and septic shock. Crit Care Med.2008;36(1)
6. Doria AS, Moineddin R, Kellenberger CJ, Epelman M, Beyene J, Schuh S, et al. US or CT for diagnosis of appendicitis in children and adults? A metaanalysis Radiology. 2006;241:83–94.
7. Gaitán HG, Reveiz L, Farquhar C, Elias VM. Laparoscopy for the management of acute lower abdominal pain in women of childbearing age. Cochrane Database Syst Rev. 2014;5:CD007683.
8. Golash V, Willson PD. Early laparoscopy as a routine procedure in the management of acute abdominal pain: a review of 1,320 patients. Surg Endosc. 2005;19:882–5.
9. Hao WL, Lee YK. Microflora of the gastrointestinal tract, methods in molecular biology. Pub Health Microbiol. 2004;268:491-502. Dalam: Simanjuntak, Bonauli. Pola Kuman Pada Infeksi Intraabdomen Akibat Perforasi Saluran Cerna. Tesis FK UI. 2014.
10. Nasution, Safruddin, Lalisang, Toar JM, Usman, Nurhayat, Iswanto J, Handaya, Adeodatus Yuda,dkk. CPGs Infeksi Intraabdominal Komplikata di Indonesia. CPGs IIAK Indonesia. 2017.
11. Sartelli et al. Management of intra-abdominal infections: recommendations by the WSES 2016 consensus conference. World Journal of Emergency Surgery. 2017. 12:22.

12. Sartelli M, Abu-Zidan FM, Catena F, et al. Global validation of the WSES Sepsis Severity Score for patients with complicated intra-abdominal infections: a prospective multicentre study (WISS Study). World J Emerg Surg. 2015;10:61 p. doi:10.1186/s13017-015-0055-0.
13. Sartelli M, Catena F, Ansaloni L, et al. Complicated intra-abdominal infections in a worldwide context: an observational prospective study (CIAOW Study) WORLD JOURNAL OF EMERGENCY SURGERY. World J Emerg Surg. 2013;8:1 p. doi:10.1186/1749-7922-8-1.
14. Sartelli M, Catena F, Ansaloni L, et al. Complicated intra-abdominal infections in a worldwide context: an observational prospective study (CIAOW Study) World Journal Of Emergency Surgery. World J Emerg Surg. 2013;8:1 p. doi:10.1186/1749-7922-8-1.
15. Sartelli M, Catena F, Di Saverio S, Ansaloni L, Malangoni M, Moore EE, et al. Current concept of abdominal sepsis: WSES position paper. World J Emerg Surg. 2014;9:22.
16. Sartelli M, Weber DG, Ruppé E, Bassetti M, Wright BJ, Ansaloni L, et al. Antimicrobials: a global alliance for optimizing their rational use in intraabdominal infections (AGORA). World J Emerg Surg. 2016;11:33.
17. Sartelli M. A focus on intra-abdominal infections. World J Emerg Surg. 2010;5(1):9 p. doi:10.1186/1749-7922-5-9.
18. Shani V, Muchtar E, Kariv G, Robenshtok E, Leibovici L. Systematic review and meta-analysis of the efficacy of appropriate empiric antibiotic therapy for Sepsis. Antimicrob Agents Chemother. 2010;54(11):4851-63.
19. Weigelt JA. Empiric Treatment Options in The Management og Complicated Intra-abdominal infections. Cleve Clin J Med. 2007;74(4):29-37