Impact of irrational antibiotic therapy to hospital cost of care of pneumonia in patients in Dr. Sardjito Hospital

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ABSTRACT

Background: *The mortality rate from pneumonia remains very high, reaching 15% in the United States while in Indonesia pneumonia is the second leading cause of death. Antibiotics improve outcomes in those with bacterial pneumonia. Irrational antibiotic therapy impacts to bacteria resistance, potentially increasing side effects of drugs, prolonged patient's length of stay and higher total hospital costs.*
Aim: *This study aimed to improve the service quality by calculating the percentage of irrational antibiotic therapy based on Gyssens workflow and the additional total of consumables antibiotics costs.*
Methods: *The study design was retrospective, including 57 pneumonia inpatients in internal medicine department wards in Dr. Sardjito Hospital, from November 2011 to January 2012. Statistical analyses were conducted by using Mann-Whitney U test.*
Results: *From 57 pneumonia inpatients, irrational antibiotic therapy reached 68,4% (39 of 57 patients). Azithromycin was misused and overused antibiotic. Total excess cost of daily antibiotic were Rp 294,000.00 and consumables antibiotics were Rp 215,000.00*
Conclusion: *Irrational antibiotic therapy in pneumonia is associated with and an overall impacts on healthcare costs.*

Keywords: *irrational antibiotic therapy, health-care cost, and customer satisfaction.*

INTRODUCTION

The pneumonia mortality rate remains is very high, reaching 15% in the United States while in Indonesia as the second leading cause of death. An empirical antibiotic therapy is the primary treatment to decrease the mortality rate of pneumonia, as definitive therapy requires bacterial culture. Irrational empirical antibiotic therapy impacts to the bacterial resistance, potentially increasing side effects of drugs, prolonged patient's length of stay and higher total hospital cost. This study aims to improve the service quality by calculating the percentage of irrational empirical antibiotic therapy based on Gyssens groove in Dr. Sardjito hospital and excess of antibiotic costs and the associated additional costs.

METHOD

This study used secondary data of pneumonia patients admitted to Internal Medicine Ward Dr. Sardjito hospital from November 2011 to January 2012. Subjects were all patients with a diagnosis of pneumonia and admitted to Internal Medicine Ward Sardjito Hospital from November 2011 to January 2012. Patients hospitalized or died ≤48 hours, had incomplete medical records, and refer to intensive care unit were excluded. Demographic data, height and weight, vital signs, types of financing, type of antibiotic, duration, dose, route of antibiotics administration, co-morbid, laboratory data, bacterial culture, x-rays, patient financing and real data is per item, length of stay, and reason for discharge from the hospital. Qualitative assessment of the rationality of antibiotic is using Gyssens groove. Guidelines empirical antibiotic therapy on pneumonia is using ATS (American Thoracic Socciety) guidelines. Statistical analyses were conducted by using Mann-Whitney U test.

RESULTS

Baseline characteristics of fifty-seven patients with a diagnosis of pneumonia were summarized in Table 1.

The subjects predominantly male gender with 61.4% with 59, 6% were less than 60 years old. Length of stay more than 7 days was 73.7% and 43.9%. The type of insurance was Jamkesmas. Diagnosis of community acquired pneumonia were 82.5% (47 of 57 patients), and 61, 4% patient had > 4 co-morbidities.

Cephalosporin were used more than 50%, and were given intravenously, the irrational use of antibiotics is dominated by the use of azytromisin G2C (Gyssens 2c) or wrong route of administration (orally) (Table 2). Overall irrational use of antibiotics in Dr. Sardjito hospitals reached 68.4% (Table 3).

Table 4 show antibiotic costs per day have a minimum value of IDR 5025.00 while the maximum value reached IDR 1,847,870.86. Magnitude of

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Table 1. Baseline characteristic

Characteristics of Subjects	Count (N = 57)	Percentage (%)
Sex		
a. Male	35	61,4%
b. Female	22	38,6%
Age (Years)		
a. < 60	34	59,6%
b. ≥ 60	23	40,4%
Method of payment		
a. General	7	12,1%
b. Jamkesmas	25	43,9%
c. Jamkesda	6	10,5%
d. Mandatory health insurance	19	33,3%
Length of stay (days)		
a. < 7	15	26,3%
b. ≥ 7	42	73,7%
Reason for leaving hospital		
a. Permitted	31	54,4%
b. At his own request	13	22,8%
c. Died	13	22,8%
Count of co-morbidities		
a. 0	3	5,3%
b. 1-3	19	33,3%
c. 4-5	35	61,4%
Co-morbidities		
a. Malignancy	30	17,6%
b. *Chronic kidney diseases (CKD)*	24	14,1%
c. *Congestive Heart Failure (CHF)*	20	11,8%
d. Sepsis	22	12,9%
e. Diabetus mellitus	15	8,8%
f. Others	59	34,7%
Diagnosis		
a. Pneumonia community	47	82,5%
b. Pneumonia nosocomial	10	17,5%

Table 2. Types of Antibiotics and Rationality Use by Gyssens

Antibiotics	Count	Percentage (%)
Ceftriaxone	G1,G1,G1,G1,G1,G1,G1,G1,G1 G1,G1,G1,G1,G1,G1,G1,G1,G1 G1,G1,G1,G1,G2b,G2b,G2b,G3a G3b,G4a,G4a,G4a,G4a,G5,-	33,3%
Azytromisine	G1,G2a,G2a,G2c,G2c,G2c,G2c,G2c G2c,G2c,G2c,G2c,G2c,G2c,G2c,G2c G2c,G2c,G2c,G2c,G2c,G3a,G3a,G3a G3a,G3a,G3a,G3b,G3b,G5,-	31,3%
Ceftazidime	G1,G1,G1,G1,G1,G1,G1,G1,G1,G1, G1,G1,G1,G2b,G3a,G3b,G3b,G3b, G4a,G4a,-	20,8%
Metronidazole	G1,G1,G1,G1,G1,-	5,2%
Ciprofloxascin	G1,G1,G1,G2b,-	4,2%
Cefotaxime	G1,G1,G3b,G4c,-	4,2%
Gentamisine	G1,G1,G1,-	3,1%
Imipenem	G1,G2b,G2b,-	3,1%

Information: G1: Gyssen 1; G2a : Gyssen 2a; G2b: Gyssen 2b; G2c: Gyssen 2c; ; G3a : Gyssen 3a; G3b: Gyssen 3b; G3c: Gyssen 3c; ; G4a : Gyssen 4a; G4c: Gyssen 4c; G5: Gyssen 5;

Table 3. Count of Rationality Antibiotic

Rationality	Count	Percentage (%)
Rasional (R)	18	31,6%
Irasional (I)	39	68,4%

Table 4. Cost of Antibiotics and Consumables Analysis

	N	Minimum	Maximum	Median ± SD	P
Cost of AB (IDR)	57	10.050,00	12.935.096,00	160.445,00 ± 32,00	0,354
Cost of HP (IDR)	57	220.633,80	9.531.362,00	824.060,00 ± 33,89	0,131
Cost of AB/days (IDR)	57	5.025,00	1.847.870,86	5.590,71 ± 36,56	0,328
Cost of HP/days (IDR)	57	35.095,00	943.638,25	31.094,50 ± 32,17	0,020

daily consumables cost has a minimum value and a maximum value of IDR 35095.00-IDR. 943,638.25. Mann-Whitney test p = 0.328 obtained figures on the cost of antibiotics per day the amount of IDR 294,000.00. Therefore, the value of p > 0.05 then there is no significant difference between the cost of antibiotics every day rational and the irrational. With the same test p = 0.020 obtained figures on the cost of consumables per day amounting to IDR 215,000.00. Where the value of p < 0.05 then there is a significant difference between the cost of consumables every day that rational and irrational.

DISCUSSION

Characteristics of the sample are dominated by male gender (61.4%), this corresponds to literature that smoking in men is a risk factor for pneumonia.[1,28] Most patients were <60 years (59.6%), contrast to the literature where older age were more at risk. This difference is caused by the first study conducted in a hospital, so the less reflect actual conditions, both community and hospital acquired pneumonia. Community acquired pneumonia is dominated by immune compromise patients so young age are particularly vulnerable to pneumonia.

Patients with co-morbid > 4 reached 61.4%, where count of co-morbidities is not directly proportional to the magnitude of mortality but rather is determined by its degree of severity of co-morbidity. Most co-morbid were malignancies (17.6%), followed by 14.1% CKD, 11.8% CHF and 8.8% DM in accordance with a PORT score system.

These results (68,4%) are not much different from the research conducted by Amrin at Dr. Soetomo hospital Surabaya in 2002 Surabaya in 2002 where the irrational use of antibiotics reached 55-80%.[15] Route of administration of drugs without azithromicin more appropriate than when given azithromicin.[11] According to the ATS 2001 azytromisin that should be given intravenously. Different dosing greatly affect the pharmacodynamics and pharmacokinetics of the drug,

so the drug target and effectiveness is diminished or not functioning.[10,17]

From an economic standpoint, the question is whether the cost or expense of profits. The meaning of the advantages of this study is to heal in a short time with an optimal tool. When the objective component, the time and the tools are not achieved regarded as waste. From the description above, the waste of irrational antibiotic for pneumonia who was admitted to the Internal Medicine ward DR Sardjito Rp 294,000.00 while the consumable waste reached Rp 215,000.00.

CONCLUSION

Irrational antibiotic therapy in pneumonia patients in Dr. Sardjito reached 68.4% with the excess cost of daily antibiotic expenditure were Rp. 294,000.00 while the consumables cost Rp. 215,000.00.

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