Research Article

A Multicenter Surveillance and Reporting of Antimicrobial Resistance: Focus on Ceftriaxone-Resistant *Escherichia coli* in the Year 2012 and 2013

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ABSTRACT

Introduction: Bacterial resistance to commonly prescribed antibiotics is increasing both in developing and developed countries. Resistance to more potent antimicrobial agents has also emerged. The present study aims to report information concerning *Escherichia coli* resistance to ceftriaxone from clinical specimens from three hospitals in Bandung, Indonesia. Method: A total of 234 specimens in 2012 and 601 specimens in 2013 were collected from all three hospitals. The results were processed to obtain the profile prevalence ceftriaxone-resistant *E. coli* and the distribution on infected specimens. Result: Increasing number of ceftriaxone-resistant *E. coli* were observed in two hospitals, hospital A from 35.38% to 43.02% and hospital C from 43.9% to 52.6%. The source of clinical specimen of E. *coli* resistant to ceftriaxone was varied in all hospital. In hospital A, pus and faeces were the predominant infected specimens. Meanwhile in hospital B, sputum was the predominant infected specimen, and in hospital C urine was the most common specimen infected by ceftriaxone-resistant *E. coli*. Conclusion: The high and increasing rate of ceftriaxone-resistant *E. coli* indicate that it is imperative to rationalize the use of antimicrobials in hospitals, use them prudently and also mandate our attention, and periodic monitoring of the trend of the resistance is crucial. A team-based approach to patient care is needed between pharmacist and prescriber to combat antibiotic resistance.

Keywords: *E. coli*, ceftriaxone, resistant, specimen, hospital

INTRODUCTION

Antibiotic resistance has reached crisis point in many hospitals around the world. Multi-drug resistant (MDR) *E. coli* exhibits a high rate of resistance to various antibiotics and increases the cost of treatment, morbidity, and mortality. *Escherichia coli* is one of the most frequent causes of many common bacterial infections, especially health care-associated infections (HAIs)[1,2]. The main factor that causes increasing antimicrobial drug resistance rates is irrational antimicrobial drug usage[3]. One class of antibiotics that bacteria have increased resistance rates towards is the cephalosporin. Bacterial resistance to cephalosporin generally arises from three main mechanisms i.e. reduced cell wall penetrability, altered penicillin binding proteins and the production of beta lactamases enzyme which can hydrolyze the beta lactam ring[4]. Ceftriaxone is a broad spectrum antibiotic belonging to the third-generation cephalosporin class used to treat HAIs caused by *E. coli*[5]. *E. coli* remains relatively susceptible to third generation cephalosporin, but various studies have shown that the prevalence of ceftriaxone-resistant *E. coli* strain is higher in many countries. However, there is little information regarding the resistance pattern of *E. coli* against ceftriaxone in

Indonesia. The present study was undertaken to assess the current antibiotic resistance pattern in the common pathogens isolated in three hospitals in Bandung, Indonesia, with a special emphasis on ceftriaxone.

METHOD

This hospital record based cross-sectional study was conducted in three hospitals located in Bandung, Indonesia. The analysis was done on all isolates obtained from all specimens among hospital inpatients, admitted during the period of January to December 2012 and January to December 2013. The study was conducted on results of cultures of urine, blood, sputum, faeces, pus swab and others (eye discharge and pleura discharge). As well as *E. coli* isolates and antimicrobial susceptibility data were collected from the registration records using a standard data collection form. The microbial identification of patients' specimen based on standard microbiological methods and microbial antibiotic sensitivity test performed using the Kirby Bauer method. The results were interpreted in accordance with the guidelines on Clinical and Laboratory Standards Institute[6]. Ethical permission was not needed in this study because hospital patients were not used directly. Comparison between the rate of

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