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ANALYSING THE ANTIBIOTIC USE IN INFECTION CONTROL FOR CESAREAN SECTION OF POSTPARTUM SURGICAL SITE AT HUNG VUONG HOSPITAL - VIETNAM FROM 03/2015 TO 09/2015

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Abstract

The study was conducted at Hung Vuong Hospital in the south of Vietnam to describe the practice of prophylactic antibiotic for women undergoing cesarean section. In this cross-sectional study, 977 women undergoing cesarean deliveries and received multipledose antimicrobial prophylaxis during their hospitalization between 03/2015 and 09/2015 were recruited at Hung Vuong Hospital in Ho Chi Minh City. Three types of antibiotics were administered for infection control, including Beta-lactam combined with Beta-lactamase inhibitor, Cefazolin and Clindamycin. 72% of women received BetalactamBetalactamase inhibitor combinations. All women in the study were given 2 doses of these antibiotics on the day of their surgery to reduce the risk of postpartum infection, while 80% of them received extra doses of these antibiotics. Among them, only 80 women used more than 2 doses of antibiotics to treat the surgical site infections, whereas the rest received extra doses of antibiotics to prolong their effects. The median value of antibiotic cost was 413,100 VND (min: 38,400 VNDmax: 12,600,900 VND). The study indicated that 50% of women received different types of antibiotics or dosages, compared to the Antibiotic Prophylaxis Regimens and Drugs

Key words: prophylactic antibiotic, multiple-dose antibiotic, cesarean

for cesarean section at Hung Vuong Hospital. This result provided a general assessment of the antimicrobial prophylaxis use for cesarean section at Hung Vuong Hospital. This information will be valuable for better evaluation and management in order to have the antibiotic usage more pertinent.

1. Introduction

According to a survey conducted in 2010, the overall rate of cesarean section in Vietnam varied from 35-56% [1]. Women undergoing cesarean section have 5-20 times higher risk of infection including endometritis, urinary tract infection and surgical site infection compared with women who gave birth vaginally [2],[3]. In the US, postpartum infection after cesarean delivery was more common than those after other surgical procedures [4]. Evidence-based guidelines recommended that using antibiotic prophylaxiss prior to skin incision would reduce the incidence of surgical site infection [5],[6],[7]. However, antibiotic prophylaxis misuse had increased risks of drug resistance and limited the efficacy of antibiotic that led to worse outcomes in patients experienced postoperative surgical site infections. Although the appropriate use of perioperative antibiotics represented a low-intensity intervention to reduce infectious morbidity, prior studies showed that the incorporation of evidence-based guidelines into clinical practice was often slow [8],[9]. Currently, the appropriate use of antibiotic prophylaxis was one of the objectives of the Hospital Antibiotic Stewardship Programs in Vietnam.

Hung Vuong Hospital is a regional tertiary-level referral obstetric and gynecological hospital in Vietnam, with the annual cesarean section rate was approximately 40% each year from 2010 to 2015. Since 2010, use of antibiotic prophylaxis and control of surgical site infection were regularly conducted at Hung Vuong Hospital. The annual general statistic at the hospital showed the number of surgical site infection in pregnant women and their history of antibiotic use. However, this information could not provide enough evidence to help the hospital to evaluate and discover cases of the inappropriate antibiotic use. Understanding the characteristics of pregnant women and the detailed clinical information from the cesarean records would provide scientific evidence that helps medical official to assess accurately each case as well as determine the specific cases that did not follow the antibiotic regimen at the hospital. Thus this study was conducted on the use of multipledose antimicrobial prophylaxis in women undergoing cesarean delivery at Hung Vuong Hospital to provide initial evaluation for clinical effectiveness studies and consequently, would limit antibiotic resistance situation as well as reducing the drug cost.

2. Methods

In this cross-sectional study, data were collected from all medical records of pregnant women undergoing cesarean section in Hung Vuong Hospital from 01/03/2015 to 30/09/2015. The sample included 977 cases with more than 2 doses of antibiotics administration and completed their treatment during the period of study. The indications of antibiotic use for existing infection were excluded in this study. The information was collected from the medical records referred to the characteristics of pregnant women (age, weight, gestational age at delivery, PARA index, history of illness) and characteristics of surgery (duration of surgery; blood loss volume; classification of operation). Antibiotic usage was determined by the aims of using, types of antibiotic prophylaxis and the comparison with the regimen at the hospital. The inappropriate antibiotic used cases were determined through regimen, clinical characteristics and the aims of using. These characteristics were described by the frequency and percentages for categorical variables; by the mean (standard deviation) for quantitative variables. The comparison was tested by Chi-square test or ANOVA with TUKEY test, which was performed over a threshold of 5% significant and confident intervals and calculated delayed at 95%. We conducted our study using R statistical software (version 3.1.3).

3. Results

The total of 977 cases for cesarean delivery was identified. Among 977 women, mean (SD) maternal age was 30.4($\pm$5.3) years, mean (SD) maternal weight was 64.6 ($\pm$8.5) kg, mean (SD) gestational age was 37.9 ($\pm$2.1) weeks; 54.6% of women were first pregnant and 51 women had gestational diabetes.

Among the 977 surgeries, 87.6% were clean-contaminated operations requiring antibiotic prophylaxis; 97.4% lasted less than 60 minutes; 5.2% experienced surgical site infections. In our study, antibiotics were administrated for 3 purposes: (1) only prevention of infection by >2 doses of antibiotics; (2) both prevention and treatment of infection by >2 doses of antibiotics; (3) prevention and treatment of infection by 2 doses of antibiotics.

There were 79.9% of women in our study used more than 2 doses of antibiotic prophylaxis to prolong prevention effect and others was completed preventive therapy with only 2 doses of antibiotic prophylaxis. Among 781 cases received prolonged antibiotic prophylaxis, 80 cases were treated with antibiotics for their infection. 3 antibiotics was administrated in our study, including Beta-lactam combined with Beta-lactamase inhibitor, Cefazolin, and Clindamycin (75.9%; 23.2%; 0.9%, respectively).

49.9% of 977 cases used antibiotic prophylaxis did not follow the regimen at Hospital. There were significant differences in the rate of appropriate antibiotic

use and the total antibiotic cost among 3 purposes of antibiotic use (p¡0.05). (Table 1)

Table 1. Describing antibiotic prophylaxis in cesarean section by the purpose of antibiotic use (n=977)

	Only prevention by >2 doses (n=701)	**Prevention & treatment by >2 doses** (n=80)	**Prevention & treatment by 2 doses** (n=196)	**Total** (n=977)	P
Types of antibiotic	n (%)	n (%)	n (%)	n (%)	
Cefazoline	91 (13.0)	11 (13.8)	**125 (63.8)**	227 (23.2)	
Beta-lactame+Beta-lactamase	**607 (86.6)**	**65 (81.3)**	70 (35.7)	**742 (75.9)**	
Clindamycin	3 (0.4)	4 (5.0)	1 (0.5)	8 (0.9)	
Adherence to regimen	n (%)	n (%)	n (%)	n (%)	
Following the regimen	307 (43.8)	49 **(61.3)**	133 **(67.9)**	489 (50.1)	< 0.001
Not following the regimen	394 **(56.2)**	31 (38.8)	63 (32.1)	**488 (49.9)**	
Cost (thousand VND)	Median (min-max)	Median (min-max)	Median (min-max)	Median (min-max)	
	255.8 (38.4-1572.0)	519.6 (223.1-10240.1)	395.8 (33.2-12600.9)	413.1 (38.4-12600.9)	< 0.001

4. Discussion

From 01/03/2015 30/09/2015, there were 977 cesarean section cases using antibiotic prophylaxis with more than 2 doses atHung Vuong Hospital. The study showed that the purpose of this usage was either treating or preventing infection. Among these, 72% of cases used the multi-dose antibiotics for prolonged prophylaxis after surgery but not for treating available or postoperative infections. 50% of cases used antibiotics differently from the regimen. Cefazolin, Beta-lactam combined with Beta-lactamase Inhibitor and Clindamycin were prescribed for cesarean section in the study following the recommendation of the Ministry of Health. Beta-lactam combined with Beta-lactamase Inhibitor was used frequently at Hung Vuong Hospital for prolonged prophylaxis after surgery, while the priority antibiotic prophylaxis for cesarean section recorded from the clinical guidelines and the previous studies was Cefazolin [3], [6], [10]. This result may may be caused by the high proportion of women in the study who had multiple risks such as intrapartum fever, emergency cesarean section,... should be indicated broad-spectrum antibiotics to prevent postoperative infections. Among the multi-dose antibiotic prophylaxis prescription in the cesarean section which did not follow the regimen of Hung Vuong Hospital, the study showed that the cases of prolonged antibiotic prophylaxis without treatment had the higher proportion than antibiotic prophylaxis with treatment. This record could help the hospital to design clinical studies which focus on the use of antibiotic without treatment to determine if the prescriptions of antibiotic follow the regimen or not, and optimize the management of antibiotic use in the hospital.

The study was performed in favorable conditions thanks to the information storage system for antibiotic prescriptions and the management software of the hospital. Therefore, we could gather the data for analysis in a short time and avoid errors due to data collection. Although a large amount of information related to pregnant women was directly recorded from the records, the study had been conducted on a large sample size (977 records) by total sampling method. Therefore, the assessment was representative and uncommon characteristics were recognized. The comparison between the results of this study and the review had some limits due to the differences in the sampling method and research design. This study initially surveyed the use of multiple-dose antibiotics in cesarean section, the reasons and other factors related to the nonadherence of antibiotics regimen were not included in this study. These results could be considered as one of the initial analysis and could be used as a reference for subsequent studies to compare and develop the in-depth analysis.

5. Conclusion

Until 2016, this was the first study in Hung Vuong Hospital at Ho Chi Minh city which surveyed the use of multi-dose antibiotic prophylaxis in cesarean section. The result of the study supplied the information relating to the use of antibiotic prophylaxis in the cesarean section at the hospital such as intended use, antibiotic groups, the cost of antibiotics, thus the assessment of the management of antibiotic use become more completed and accurate.

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