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Inappropriate use of vancomycin for preventing perinatal group B streptococcal (GBS) disease in laboring patients*

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Abstract

Objective: The 2002 CDC guidelines for the prevention of perinatal group B streptococcus (GBS) stipulate that vancomycin is reserved for penicillin-allergic women at high risk for beta-lactam anaphylaxis with resistance to clindamycin or erythromycin. Our objective was to evaluate practitioner adherence to these guidelines.

Methods: This is a retrospective chart review of patients admitted to labor and delivery who received vancomycin for GBS prophylaxis from January 1st, 2005 to June 1st, 2007. Identification and documentation of allergic reactions to beta lactams and performance of GBS sensitivities at the time of screening were recorded.

Results: Eighty-seven patients reporting a penicillin allergy received vancomycin during labor. In 71 patients screened at 35–37 weeks, sensitivities were not performed for 55 patients, of which 10 reported an anaphylactic-like reaction to penicillin. Of 15 patients who had sensitivities performed at the time of screening and were resistant to clindamycin and/or erythromycin, only two patients, however, described an anaphylactic-like reaction to penicillin. Fourteen patients received vancomycin due to an unknown GBS status at <35 weeks of gestation and only three patients from this group reported an anaphylactic-like reaction to penicillin. There were deviations from the CDC protocol in 82 (94%) of 87 patients who received intrapartum vancomycin there were deviations in the CDC protocol.

Conclusion: Most patients receiving intrapartum vancomycin for perinatal GBS prophylaxis either did not have a culture with sensitivities performed at the time of GBS screening due to a history of anaphylactic-like reactions to penicillin or received vancomycin for a mild or unknown allergy. Physician adherence to the CDC guidelines with regards to the use of vancomycin is far from optimal.

Keywords: Antibiotic prophylaxis; group B streptococcus (GBS); penicillin allergy; vancomycin.

Introduction

Due to increasing microbial resistance to antibiotics and its threat to public health and safety, adherence to the appropriate use of antibiotics in daily practice is needed by all practitioners. In obstetrics, the use of intrapartum antibiotics to prevent perinatal group B streptococcus (GBS) transmission has increased significantly since the center for disease control (CDC) issued revised guidelines for intrapartum antibiotic prophylaxis for GBS carriers in 2002 which in turn, has led to a 33% decrease in the incidence of early onset neonatal GBS disease [5].

Penicillin is the preferred antibiotic for intrapartum prophylaxis in those women who do not report an allergy to it or its analogues. A first generation cephalosporin, cefazolin, should be administered to women who report a history of penicillin allergy that is not manifested by immediate hypersensitivity reactions such as anaphylaxis, angioedema, or urticaria. Cephalosporins can be considered for patients with a penicillin allergy since patients with allergic-like events associated with penicillin have a low risk of anaphylaxis with cephalosporin use ($<0.001\%$) [1]. Vancomycin should, therefore, be reserved only for penicillin-allergic women at high risk for anaphylaxis when clindamycin and erythromycin are not options due to documented resistance.

The purpose of this study was to assess the degree of clinical adherence to these guidelines at our institution regarding the use of vancomycin to prevent perinatal GBS transmission.

Materials and methods

A review of pharmacy records identified all patients admitted to the labor and delivery unit at our hospital who received intravenous vancomycin for GBS prophylaxis from 1 January 2005 to 1 June 2007. The prenatal and hospital records of these patients and their neonates were reviewed. Identification and documentation by obstetric providers of allergic reactions to beta lactams at the time of screening, and in labor and delivery, and availability of clindamycin and erythromycin sensitivities at

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the time of admission to labor and delivery were recorded. The study was approved by our Institutional Review Board.

Results

During the study period, a total of 12,534 deliveries took place in our institution. The overall carrier rate for GBS in our population ranged from 16% to 20% per year during the study period. A total of 87 patients, who reported an allergic reaction to penicillin, received intravenous vancomycin for the purpose of GBS prophylaxis during labor. All 87 patients received regular prenatal care and were a combination of either service or private patients. A total of 32 different attendings were involved in the care of these patients.

Table 1 describes the clinical scenarios of all 87 patients who received vancomycin. Of the 87 patients, no patients had GBS bacteriuria during pregnancy or a prior neonate with invasive GBS disease. Two patients who received vancomycin and denied anaphylactic-like reactions to penicillin were inappropriately not screened during the current pregnancy due to a history of GBS colonization in a prior pregnancy. Of the 71 (82%) patients who were screened, 12 patients had a documented anaphylactic-like reaction to penicillin thereby calling for a culture and sensitivity to clindamycin or erythromycin to be obtained. However, in only two of these 12 patients were culture and sensitivity performed. The remaining 59 (68%) patients, who had no documented history of anaphylactic-like reactions to penicillin, were candidates to receive cefazolin in labor but instead, received vancomycin. Cultures and sensitivities were, therefore, not warranted on 14 patients.

Table 1 Characteristics of 87 patients with reported penicillin allergy who received intravenous vancomycin for the prevention of perinatal group B streptococcal (GBS) disease.

Patient characteristics	Number of patients
Preterm labor patients	14
Anaphylactic-like reaction	3
Non-anaphylactic-like reaction	11*
Term patients	73
Not screened (due to history of GBS)	2*
Anaphylactic-like reaction with documented resistance to clindamycin and/or erythromycin	2
Anaphylactic-like reaction with no sensitivity testing	10*
Non-anaphylactic-like allergic reaction with no sensitivities	45*
Non-anaphylactic-like allergic reaction with documented resistance to clindamycin and/or erythromycin	13*
Non-anaphylactic-like allergic reaction with no antibiotic resistance on sensitivity testing	1*

*Deviations from CDC protocol – 82 patients (94%).

In labor, vancomycin was appropriately administered to 2 (2.3%) patients with GBS colonization at 35–37 weeks with a history of anaphylactic-like reactions to penicillin and evidence of resistance to clindamycin and/or erythromycin. Another 3 (3.4%) patients appropriately received vancomycin due to a history of anaphylactic-like reactions to penicillin and unknown GBS status at the time of labor. In another 10 patients who reported a severe allergy, vancomycin was ultimately required because sensitivities were not done at the time of screening. Seventy (80%) patients with no documentation of anaphylactic-like reactions to penicillin received vancomycin, and another 10 may have been candidates for clindamycin if cultures had been obtained at the time of screening. No adverse events were noted with the use of vancomycin in our study cohort.

Discussion

There were deviations from the CDC protocol in 82 (94%) out of the total number of patients who received vancomycin for GBS prophylaxis in our study cohort.

Chemoprophylaxis for the prevention of neonatal GBS disease can prevent most cases of early onset neonatal GBS disease. Although obstetric patients receive antibiotics for this indication, the choice of antibiotics is not always consistent with the CDC guidelines. In a recent retrospective cohort study of GBS positive, penicillin allergic patients, adherence to the 2002 CDC guidelines for intrapartum GBS prophylaxis was far from optimal [3]. The authors addressed specific issues such as choosing an appropriate antibiotic as specific areas that need improvement. In our study group, only 5 (6%) of the patients who received vancomycin met strict criteria for its administration for the purpose of GBS chemoprophylaxis. Another 10 who reported an anaphylactic-like reaction to penicillin were appropriately prescribed vancomycin in labor, but may have been candidates for clindamycin or erythromycin if sensitivity testing had been performed at the time of screening. In this cohort of patients, an initial deviation in the CDC protocol (such as not screening or not performing a culture) led to further downstream deviations in choice of antibiotic for chemoprophylaxis.

Patients are sometimes unsure about their penicillin allergy and cannot clarify their exact reaction. This, in turn, may lead to prescribing of an antibiotic that is unrelated to the family of penicillins to avoid the possibility of a severe allergic reaction intrapartum. It is true, however, that self-reporting of penicillin allergy is often inaccurate. One study reported that up to 89% of pregnant patients who report a penicillin allergy at the time of GBS screening, have negative skin testing to penicillin and are candidates for narrow spectrum antibiotic treatment for GBS prophylaxis [4].

Vancomycin-resistant enterococci (VRE) were first reported in 1986. The primary inciting factor identified at

that time was likely the use of oral vancomycin for treating antibiotic-associated diarrhea in hospitals [2]. Antibiotics that are inactive against enterococci, such as the cephalosporins and vancomycin, favor colonization with high levels of VRE in the stool. The judicious use of vancomycin may limit the emergence and spread of VRE within hospitals. Although enterococcus is rarely reported to cause perinatally acquired neonatal infections, it is commonly isolated from women with post-cesarean endometritis and wound infections [6]. In this population, the inappropriate use of vancomycin could lead to increased incidence of VRE and failure of empirical treatment with vancomycin for such postpartum infections.

Limitations of vancomycin use remains at the cornerstone of the efforts to limit the spread of vancomycin resistant organisms. An effort by all practitioners to adhere to the CDC guidelines, in which narrow spectrum antibiotics should be used as first line prophylaxis if possible, is critical. Based on our data, significant improvements are needed. Further studies are warranted on the possible maternal and neonatal effects of vancomycin, such as increasing emergence of GBS bacterial resistance as well as differences in maternal and neonatal outcomes with the use of vancomycin compared to other antibiotics, when the adherence to the CDC antibiotic protocol for the prevention of perinatal GBS is not optimal.

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