

A REVIEW ON THIRD GENERATION CEPHALOSPORINS

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Article Received on 13/06/2017

Article Revised on 03/07/2017

Article Accepted on 23/07/2017

ABSTRACT

Rational use of drugs refers as patients receive medicines according to their clinical needs at lowest cost. The beta lactam antibiotics alter cell wall biosynthesis. Cephalosporins belong to beta lactam antibiotics and classified into 1st, 2nd, 3rd, and 4th generation. If huge number of organisms are involved in diseases then generation wise cephalosporins are used. The beta lactam antibiotics are commonly used to cure after operation wounds due to its extended spectrum of activity and clinical effectiveness and high safety profile. The third- generation cephalosporins are widely used antibiotics in both males and females for treatment of different diseases and have lesser side effects as compared to aminoglycosides and polymyxins. For *Enterobacter aerogenes* the magnitude of susceptibility to third generation cephalosporins is higher than amikacin. Ceftriaxone is widely used third generation cephalosporins. Cefotaxime shows the effectiveness in uncomplicated urinary tract infection. Patients who are allergic to penicillins have more chances of adverse drug reactions to cephalosporins. Third generation cephalosporins show extensive resistance due to overutilization and improper utilization. The danger of third generation cephalosporins resistance was especially high in nosocomially-produced scenes of unconstrained bacterial peritonitis. There should be consistent surveillance, investigation and efforts to deal with resistance related problems.

KEYWORDS: Third-generation cephalosporins, Utilization, Resistance, Surveillance.

INTRODUCTION

Background

An antibiotic prescription was defined as “prescription of any drug in (Antibacterial drugs) of the British National Formulary, excluding anti-TB and anti-leprotic drugs, metronidazole and tinidazole because primarily interested in drugs prescribed for common infections, such as respiratory, urinary tract or skin infections”. The presence of other diseases raises the frequency of antibiotic order by more than one third.^[1] Rational use of drugs is defined by the World Health Organization as “patients receive medicines appropriate to their clinical needs, in doses that meet their own requirements for an adequate period of time and at the lowest cost to them and their community”.^[2]

The beta lactam antibiotics are very significant. This class possesses the beta lactam group. These alter cell wall biosynthesis. The cephalosporins belong to beta lactam antibiotics that obtained from fungus *Acremonium* which in previous time referred as “Cephalosporium”. Today, cephalosporins are divided into 1st, 2nd, 3rd & 4th generation. The procession from 1st to 4th generation is related with widening of Gram-negative anti bacterium spectrum. The penicillin use if less severe infection or minimum number of pathogens are involved. If huge numbers of organisms are involved

then generation wise cephalosporins are used. Firstly, treat with 1st generation if failed to produce its significant effects then move on 2nd generation further to 3rd and 4th generation. However, if infection is of minor type and direct use of 3rd generation cephalosporins then resistance produced and in future if we need to use 1st generation then no consequences will yield.^[3]

Utilization and Resistance

In 1948 the Cephalosporin was derived from the *Cephalosporium acremonium* from sea by Brotzu. The unrefined product from the contents of this fungus was obtained to suppress the growth of *Staphylococcus* (S.) *aureus* and treat the *Staphylococcal* infections and typhoid fever in humans. The mechanism of action of cephalosporins is the suppression of transpeptidation process and make the defective cell wall and finally start the stimulation of autolysin enzyme that causes the lysis of bacteria so cephalosporins are the bactericidal drugs. The prescription of patients having third-generation cephalosporins used and ceftriaxone widely used and less percentage prescribed by the generic name.^[4]

The beta lactam antibiotics are commonly used to cure after operation wounds due to its extended spectrum of activity and clinical effectiveness and high safety profile. Their extensive use leads to increase of resistance.

Modern antibiotics show extensive resistance including third generation cephalosporins due to overutilization or improper utilization.^[5]

For *Enterobacter aerogenes* the magnitude of susceptibility to third-generation cephalosporins is higher than amikacin.^[6] The extensive utilization of antimicrobial agents leads to bacterial resistance to these agents. The infection that caused by resistant pathogens relate to the greater number of morbidity and death rate. The correct utilization of ceftriaxone was found to be greater than incorrect utilization.^[7] The third-generation cephalosporins was found to be the mostly ordered antibiotic in various age groups of males and females for the cure of different diseases and contagion.^[8]

The gram-negative bacteria produce enzyme known as extended spectrum beta lactamases (ESBL) that involve in the resistance of antibiotics. These enzymes are involved in the production of organisms that relate to higher morbidity and mortality with large financial onus. The emergence of third-generation cephalosporins is found to combat against this enzyme that involves in bacterial resistance to antibiotics. When aminoglycosides, polymyxins and third generation cephalosporins are used for beta lactamase producing organisms then third generation cephalosporins has lesser nephrotoxic effects.^[9] The danger of third-generation cephalosporins resistance was especially high in nosocomially-produced scenes of unconstrained bacterial peritonitis, additionally happened in social insurance framework obtained cases. The degree of resistance and the sufficiency of exact anti-toxins significantly affected mortality alongside the patient's hepato-renal capacity.^[10]

A study was conducted to depict the pattern of antibiotics prescribing in European neonates and children and making of hospital-quality indicators for prescribing of antibiotics for children and finding its practicability. It was found that ceftriaxone highly used than cefepime and meropenem.^[11] In uncomplicated urinary tract infection cefotaxime showed the effectiveness but in major infections that present at other site remained unsuccessful to produce its effects.^[12]

The positive culture from blood or cerebrospinal fluid referred as invasive candidiasis. The association between candidiasis and third-generation cephalosporins solely and carbapenems solely was found.^[13] The preoperative prophylaxis with ceftriaxone brought about sufficient defensive levels in the mother and low fetal blood levels.^[14]

The patients who are allergic to penicillin administered the cephalosporins and it was found that there is larger number of chances of adverse drug reactions to cephalosporins present in patients who are allergic to penicillin.^[15] Third generation cephalosporins give lesser

side effects and allergic reactions as compared to penicillins.^[16] Antimicrobial resistance of therapeutically vital microscopic organisms is as yet a major issue. To deal with this issue, a consistent across the country observation and expanded examination and exertion have turned out to be critical.^[17]

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