Drug Utilization Evaluation of Ceftriaxone in A Tertiary Care Teaching Hospital of Karachi, Pakistan

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ABSTRACT

Introduction: Antimicrobial stewardship is centered at improving patient care and health care outcomes. Optimization of infectious disease treatment along with a reduction of adverse effects is an utmost important goal of antimicrobial stewardship. Unfortunately, irrational use of antibiotics has become a global concern, particularly in low income countries such as Pakistan where there are scarce health resources, less hygienic conditions and poor economical infrastructure. Moreover, irrational use of drugs eventually leads to high costs of treatment and more drastically, therapeutic failure which may even lead to fatal outcomes.

Ceftriaxone (J01DD04) is a broad spectrum third generation cephalosporin. It is commonly prescribed for the management of complicated and uncomplicated UTI, meningitis, pneumonia and septicemia. According to the World Health Organization (WHO), Ceftriaxone is classified as an access and watch group antibiotic. The WHO lays great emphasis on prioritization of the former and latter antibiotic group as key target for stewardship program and monitoring. Ceftriaxone has a high propensity for misuse because in clinical practice, it is utilized in high quantities and is prescribed in an uncontrolled manner in many countries including Pakistan. Moreover, in some countries empiric use of Ceftriaxone is estimated to be as high as 85% in hospitalized patients.

Objectives: Various studies have highlighted the problem of inappropriate and irrational use of all drug categories in Pakistan. However, as per the current reported literature, there is a growing trend of antibiotic resistance in Pakistan. A number of pathogens have become resistant to commonly used antibiotics such as Co-Amoxiclav, Ceftriaxone, and Ciprofloxacin etc. Ceftriaxone is a frequently prescribed drug in Pakistan. The objective of the present study was to assess the drug utilization pattern of Ceftriaxone in a tertiary care teaching hospital of Karachi, Pakistan and evaluate its rationality.

Methodology: A cross sectional study was conducted in a tertiary care teaching hospital of Karachi, Pakistan by reviewing medication records of patients receiving Ceftriaxone during hospitalization. Drug use evaluation was conducted to determine whether Ceftriaxone was being used appropriately based on six criteria namely indication for use, dosage, frequency of administration, treatment duration, culture/sensitivity test and drug-drug interactions,

Results: A total of 112 patients receiving Ceftriaxone were reviewed. The most common indications for Ceftriaxone use was found to be meningitis (35.8%) followed by vesicular calculus (25%). The daily dosage, frequency of administration and duration of treatment with Ceftriaxone were 2 g (62.5 %), once daily (52.5 %) and 5-7 days respectively. Initiation of Ceftriaxone therapy in absence of culture/sensitivity test was a dominant practice in all the patient cases. Of the 112 cases, (6.25%) had inappropriate dose along with 62.5% cases having wrong/missed frequency.

Conclusion: The present study revealed that Ceftriaxone is not being judiciously used. Irrational use of commonly prescribed antibiotics has led to the emergence of resistant strains of pathogen(s). As a consequence, compromised effectiveness and increased cost of therapy has become common. The absence of culture sensitivity test clearly indicates the inappropriate use of the Ceftriaxone. Not just treatment failure, inappropriate utilization of the antibiotic also impairs patient safety. The recent outbreak of the COVID-19 pandemic and emergence of the various strains of this deadly virus in a short span of time hints at limiting the injudicious of antibiotics. The utilization of Ceftriaxone should be limited by the prescribers, only for infections that are suspected or proven to be managed by the drug. The utilization of the drug must be in accordance to the standard treatment guidelines. In addition, the use of Ceftriaxone other than its primary indications should be avoided. There is a dire need of continuous drug use evaluation of the Ceftriaxone and other commonly prescribed antibiotics especially in Pakistan. This could be achieved by initiating antimicrobial stewardship program at different health levels. Moreover, educational programs regarding the subject and mutual working of the members of the healthcare fraternity i.e. prescribers, pharmacist and the nursing staff can assist in promoting the rational use of antibiotics in the society.

Keywords: artificial intelligence; convolutional neural network; coronavirus 2019; chest Xray; deep learning models; clinical informatics.

R E F E R E N C E S

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