

Ceftriaxone induce immune hemolytic anemia in Sudanese patients

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Abstract

Ceftriaxone induced autoimmune hemolytic anemia (AIHA) is an immune –mediated phenomenon caused by ceftriaxone, leading to the destruction of red blood cells causing secondary anemia. The current study aimed to investigate the possibility of ceftriaxone drug as an etiology of immune hemolytic anemia among of Sudanese patients and explore the correlation to the duration of drug taken. 40 samples were taken from patients treated with the cefatraixone after surgery as antibiotic, 17 of them were females and 23 males, 10 samples from healthy persons used as control group. Direct and indirect coombs test were performed by manual method. The study results founded that the ceftriaxone drug has no effect on Sudanese patients ,it doesn't induce immune hemolytic anemia in our study population with $p.value > 0.05$ direct coombs tests indirect coombs tests were negative in all patients.

Key words: cefatraixone ,DCT,IDCT, immune hemolytic anemia, Sudanese

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Introduction

Autoantibodies represent one of the most common and harassing problems encountered in blood bank. Whereas alloantibodies are characterized by the fact that they are produced by individuals whose red cells lack the corresponding antigen, autoantibodies are formed in spite of the existence of the corresponding antigen on the individual's red cells certain drugs cause a positive direct antiglobulin test with or without attending hemolytic anemia by a mechanism that is not clearly understood(1) .drugs –induced antibodies can be drug – dependent or drug –independent .Drug –dependent antibodies (antibodies react in vitro with RBC,s only in presence of drug) are produced by antibodies like ceftriaxone and piperillin

acute hemolysis is rare side effect of ceftriaxone therapy associated with a high mortality rate(2).

Immune hemolytic anemia is the clinical condition in which IgG and or IgM antibodies bind to RBC surface antigens and initiate RBC destruction via the complement system and the reticuloendothelial system(3). Autoimmune hemolytic anemia include warm antibody AIHA (occurs when the patient own immune system produces anti red cell antibody that react effectively in laboratory at warm temperatures(37C), cold antibody AIHA(that leads to complement mediate hemolysis in the temperature range of 10 to 30C(4).

Second and third generation cephalosporins are by far the most common cause of drug induced IHA at present (5,6). About 30years ago methyldopa and pencillin were the two medications most commonly associated with DIHA. The first case of hemolysis induced by ceftriaxone was reported in 1991 by Garratty et al (7).

The antibody produced is mostly IgG(8).these drugs combine covalently with RBC membrane proteins ,and the antibody coated RBC are taken up by macrophages(9,10). Management generally consist of discontinuing ceftriaxone along with administration corticosteroid and or blood transfusion (11).

Material and methods

This descriptive study conducted in Khartoum state to determine if the ceftriaxone induced hemolytic anemia among Sudanese patients after surgery or not, during the period of August to April 2016 at Alribat hospital. 40 samples were collected from patients used ceftriaxone as antibiotic after surgery, and another 40 samples collected from healthy person as control.

The study Excluded patients have autoimmune disease, autoimmune hemolytic anemia, patient use other antibiotic and also who have blood transfusion as well as the pregnant women.

EDTA blood samples (2,5ml) and clotted blood sample (2,5ml) were collected from the participants, then antibody detected by direct coombs test and indirect coombs test, which performed using polyclonal anti IgG. The direct coombs test (DCT) tested by placing 2-3 drops of 5% saline suspension of red cell in tube for washing four times in large volume of saline, then one drop was added from antiglobulin reagent to the red cells and mixed well

centrifuged at 3400rpm for 15 second, the agglutination was examined using macro and microscopical examination and result recorded.

The indirect coombs test performed by placing 3 drops of patients serum in test tube added one drop of washed 5% O pooled cell and mixed well incubated at 37C for 15 minute and centrifuge immediately upon removal from incubator for 15 second at 3400rpm then washed three time and added one drop of antiglobulin reagent mixed well and centrifuged and examined for agglutination and record result .Data was collected by structured questionnaire then analyzed by statistical package for social sciences(SPSS).

Ethical considerations

This study was approved by ethical committed of the faculty of medical laborator science Alneelain University and Alrabit hospital Adminstration consent also obtained from all participants before samples collection

Results

Totally 50 blood samples were collected for analyzing., 29(58%) male and 21(42%) female (figure 1), the age of patients was ranged from 12 to 72 years(table 1) .direct coombs test and indirect coombs test before and after antibiotic used is negative (table 2)

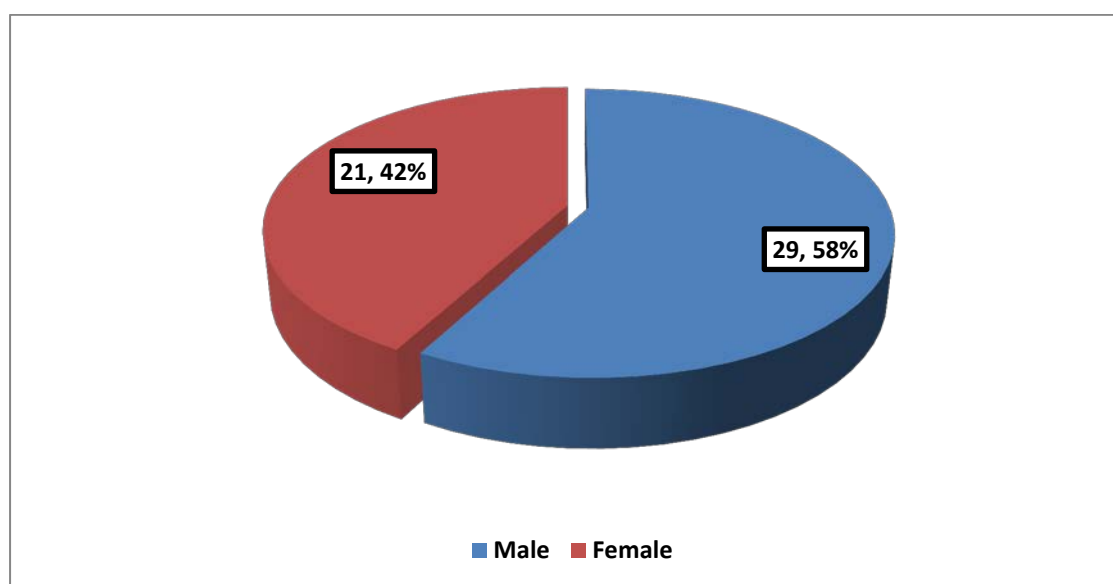


Figure (1): show distribution of patients and control according to sex

Table (1): distribution of participate Age

Age	Frequency	Percent
12.00 - 26.00	10	20.0
27.00 - 41.00	18	36.0
42.00 - 56.00	11	22.0
57.00 - 71.00	8	16.0
72.00+	3	6.0
Total	50	100.0

Table (2): DCT and IDCT before and after the antibiotic

Test	Frequency OF NEGATIVE	Percent
DCT Before	50	100%
ICT Before	50	100%
DCT After	50	100%
ICT After	50	100%

Discussion

Ceftriaxone third generation cephalosporin is being commonly prescribed since 1984 it use as antibiotic across almost specialties for various condition. ceftriaxone induce urticaria ,rash ,exanthem,and pruritus are the most common adverse effect and occurs in most patient(2) .Drug induce immune haemolytic anemia is rare but serious condition .this study investigated the possibility of ceftriaxone to cause autoimmune hemolytic anemia in Sudanese patients.

During this study observed that the ceftriaxone not induce autoimmune hemolytic anemia among study population P.value >0.05 (insignificant correlation between the drug and the tests), The result of this study is disagree with the previous study (Edeltraut Grabe et al 2011) (13) that report ceftriaxone was the second most frequent cephalosporin causing DIHA. Other previous studies (Northrop.et al 2015)(12) and Vivek.et al 2013)(2) that report immune hemolytic anemia is a rare adverse effect of ceftriaxone , this is agree with the present study, the protocol of this drug that used in hospital may effected our result.

Conclusion

In this study ceftriaxone was not considered as cause of drug induced immune hemolytic anemia as an adverse effect among the Sudanese patients

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