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Anaphylaxis after the first dose of ceftriaxone injection

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Summary

Ceftriaxone is a third-generation cephalosporin used for the treatment of bacterial infections. In the literature there is only one pediatric case report of anaphylaxis after first exposure to ceftriaxone. Herein we report a 2 years old boy who developed anaphylaxis after receiving the first intravenous injection of ceftriaxone. Clinicians should be aware of the risk of anaphylaxis after the first dose of ceftriaxone. *(Turk Arch Ped 2011; 46: 79-80)*

Key words: Anaphylaxis, ceftriaxone, child

Introduction

Ceftriaxone is an antibiotic from the group of third-generation cephalosporins used for treatment of bacterial infections. While the incidence of allergic skin reactions related to ceftriaxone is between 1% and 3%, the incidence of anaphylaxis is lower (1). Although ceftriaxone is a frequently used antibiotic for treatment of pediatric patients, only one case of anaphylaxis occuring after the first dose of ceftriaxone has been reported in the literature (2).

Herein we report a case of anaphlaxis after the first dose of ceftriaxon.

Case report

A two years old male patient presented to the emergency department with fever, vomiting and abdominal pain. Personal and familial history revealed no drug allergy, atopic disease or previous use of beta-lactam antibiotics. The family started to give the patient oral cefuroxime axetyl treatment for pharyngitis.

Laboratory investigations were as follows: white blood cells 22811/mm^3, 80% segmented leucocytes, 14% lymphocytes, 6% monocytes on peripheral blood smear and CRP: 28.9 mg/L. Bacteremia was considered in the patient because of fever, leucocytosis, “shift to the left” on peripheral blood smear and high CRP. Blood culture, urine culture and urinalysis were performed.

Afterwards, 500 mg ceftriaxone containing active ingredient was reconstructed with water for injection supplied with the drug by emergency department nurse and diluted to 20 cc with 0.9 % NaCl (25 mg/cc). The solution reconstructed was attached to the infusion pump to be administered in 30 minutes (1.5 mg/kg/minute). Approximately one minute after intravenous infusion of ceftriaxone was started, anaphylactic shock developed accompanied by flushing, respiratory arrest, cyanosis, circulatory failure and hypotension. Positive pressure ventilation with baloon mask was administered to the patient who had a apical heart beat of 180/minute and capillary refill time of more than 2 seconds. 0.01 ml/kg (1:1000) adrenaline was given subcutaneously. 1 mg/kg pheniraminemaleat, 1 mg/kg ranitidine and 0.6

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mg/kg dexametasone were given intravenously. Circulatory failure and hypotension persisted despite 0.01 ml/kg (1:1000) adrenaline was administered three times subcutaneously. 20 ml/kg 0.9%NaCl was loaded and 0.1 mcg/kg/minute adrenaline infusion was started. Circulation improved after infusion of adrenaline and fluid load and infusion of adrenaline was stopped in the second hour. The patient was monitored in the intensive care unit for 24 hours. On improvement of the general state the patient was discharged with cure and with necessary recommendations for avoidance. EpiPen Jr (0.15 mf epinephrine) was prescribed to the patient and beta-lactam antibiotic usage was prohibited. Because of the development of the systemic reaction beta lactam skin test was not performed. Serum triptase and urinary histamin levels could not be measured because of unavailability in our hospital.

Discussion

Although allergic reactions related to ceftriaxone occur rather rarely, anaphylactic reactions developing after cephalosporin treatment with an aggresive prognosis which might have led to death have been reported in the literature (1). The incidence of anaphylaxis related to cepahalosporins reported in different studies ranges between 0.0001% and 0.1% (3,4). Altough the possibility of development of anaphylaxsis is so low, deaths following cepahlosporin treatment have been reported (5). The number of cases of anaphylaxis related to ceftriaxone treatment in children and newborns is rather lower compared to adults (2,6). Our patient is important as being the fist case reported to have developed anaphylaxis after the first dose of ceftriaxone in Turkey. Interview with Dr. Agop Çıtak revealed that the reaction which developed in their patient was severe hemolytic anemia rather than anaphylaxis and it occured after the 10th injection rather than the first injection as in our case (6).

In vitro studies have shown moderate allergic cross-reaction between cephalosporins and penicillins because of common beta-lactam ring (8). Cross-reaction between penicillins and cephalosporins generally involve first and second-generation cephalosporins (9). The possibility of development of cross-reaction against penicillins in patients with advers reactions solely against third-generation cephalosporins is lower compared to first-generation cephalosporins, since first-generation cephalosporins are structurally more similar to penicillins (10). The risk of allergic reactions related to ceftriaxone because of cross-reaction is expected to be higher in patients known to have a previous history of allergy against beta-lactam group of antibiotics.

The frequency of cephalosporin allergy decreases as the cephalosporin family expands (9). However, only one publication has reported development of anaphylaxis after the first dose of ceftriaxone (2). In our patient anaphylaxis also developed after the injection of first dose, although no ceftriaxone injection was administered before. Studies have shown cross-reactions between cephalosporins though with a low rate (11). Cross-reactions between cephalosporins are explained by the same (e.g. ceftriaxone and cefotaxim) or similar (ceftriaxone and cefuroxim) side chain they contain. We believe the fact that our patient had been using cefuroxim acetyl for one week could have led to cephalosporin and/or beta-lactam sensitivity and predisposition to anaphylaxis.

Children who have serious allergic reactions have to keep documents explaining their allergic conditions and also the drugs to be used urgently since these precautions could be life-saving. The first drug to be used for urgent treatment of patients with life-threatening allergic reactions is epinephrine. Since our patient developed anaphylaxis against antibiotic early in life, risk of future multiple antibiotic allergy was considered and EpiPen was prescribed to prevent recurrence of severe allergic reactions.

Consequently, it should be kept in mind that anaphylaxis may develop (even though rarely) after the first dose of ceftriaxone in children specifically who have received cefuroxim or cefotaxim and injection should be administered after taking the necessary precautions.

Conflict of interest: None declared

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