Open Access Case Report

Do Cephalosporins have a role in causing death of a pregnant with urinary tract infection? A case report

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Abstract:

Background: Urinary tract infection is a highly prevalent disease all over the world and affects females more than males. In the former, it may complicate pregnancy to potentially lethal septicaemia. Therefore, the aim of the current case report was to show how misinterpretation of symptoms of septicaemia can lead to inadequate, and probably inappropriate, management with subsequent medico-legal consequences.

Methods: A case study of a young pregnant female who developed urinary tract infection and was treated with parenteral cephalosporins. The infection developed into septicaemia with subsequent miscarriage and death of the patient.

Conclusion: Urinary tract infection during pregnancy may progress to septicaemia. Therefore, early diagnosis and effective treatment may reduce potentially fatal outcomes.

Keywords: Cephalosporins, Death, Miscarriage, Pregnancy, Urinary tract infection.

Introduction:

Urinary tract infection (UTI) is a highly prevalent disease all over the world [1]. It affects females more than males [2]. In the former, pregnancy may complicate UTI leading to potentially lethal septicaemia [3].

Early diagnosis and treatment of septicaemia is vital to reduce morbidity and mortality rates. In addition, it has been stated that septicaemia is a "clinical syndrome"; therefore, its diagnosis is mostly clinical depending on signs and symptoms even when helpful imaging techniques and/ or laboratory facilities are limited or are not easily reached [4].

On the other hand, it was reported that prompt initiation of proper antibacterial medications in the early treatment of septicaemia would greatly reduce mortality rates from this condition. However, it is not always practical to start with empirical antibacterial therapy for septicaemia, because of the variability in the causative bacterial pathogens [5,6].

UTI is treated with antibacterial agents, especially third-generation cephalosporins. However, these agents may cause hypersensitivity reactions, which are notably less frequent with parenteral administration [7].

On the other hand, it is well-recognized that in Iraq, as in many other developing countries, patients can buy antibiotics without prescription.

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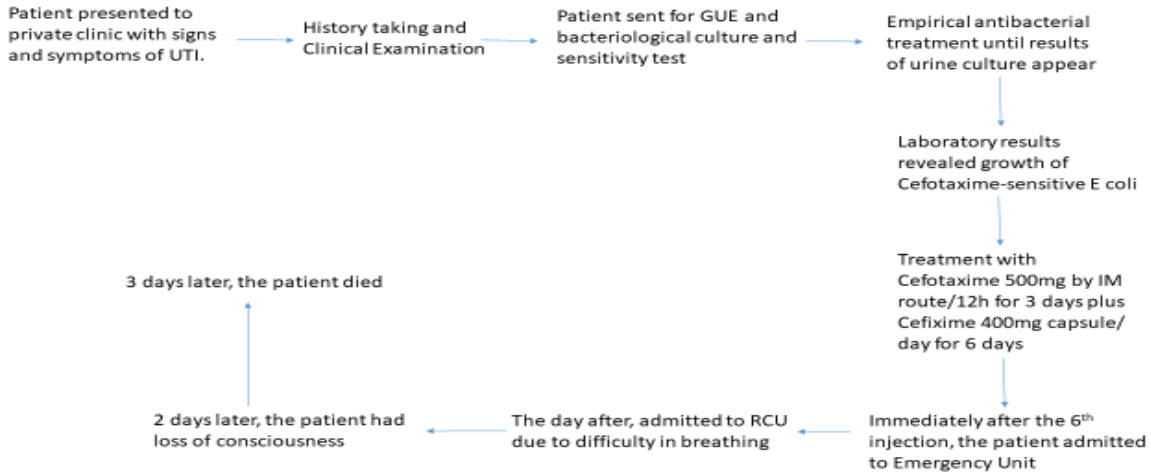
This has resulted in a higher percentage of people in those countries using antibiotics before visiting their doctors, whether in the clinic or the hospital. As a consequence, efficacy of antibacterial agents and sensitivity of bacteria in laboratory culture tests are becoming seriously questionable [4]. Moreover, symptoms of septicaemia, in UT-infected patients, might be misinterpreted by inexperienced doctors as hypersensitivity reactions to drugs used for treatment of UTI [8]. Furthermore, an autopsy report should involve information about cause(s) of death. However, this information should be obtained through different methods including blood tests, histopathological examination of tissue specimens as well as gross anatomical examination of body organs [9,10,11,12]. Therefore, the aim of the current case report was to show how such misinterpretation can lead to inadequate, and probably inappropriate, management with subsequent medico-legal consequences.

Case presentation:

A 14-year old female patient presented to the private clinic complaining of dysuria and bilateral loin pain with mild fever of few days duration. Clinical history taking revealed a 12-week pregnant young lady. She did not complain of lower abdominal pain, vaginal discharge or vaginal bleeding at the time of presentation. She did not complain of any symptoms related to other body systems. On examination, she was fully conscious, alert, oriented and not

dyspnoeic. Her vital signs evaluation revealed a body temperature of 38°C, blood pressure of 125/75 mmHg and a pulse rate of 82 beats/min with a good volume. The patient had no history of previous surgical operations, chronic illnesses, or a history of drug or food allergy. The patient was sent to the laboratory for general urine examination (GUE) and bacteriological culture and sensitivity tests. The picture of GUE was suggestive for the diagnosis of UTI. The results of urine culture took three days to be completed. Therefore, the patient was prescribed oral Amoxiclav® (Amoxicillin 500mg + Clavulinic acid 125mg) every eight hours and an antipyretic (Paracetamol 500mg) every eight hours for three days. The patient was instructed to drink lots of water and to be back after three days when the results of the urine culture and sensitivity were supposed to be ready. The bacteriological culture of the urine sample reported the growth of *E.coli* bacteria and the sensitivity test revealed high bacterial sensitivity to Cefotaxime. Therefore, on the basis of the presenting symptoms, GUE and urine culture and sensitivity tests, the patient was prescribed intramuscular Cefotaxime 500mg every 12 hours daily for three days in addition to oral Cefixime capsule 400mg once daily for 6 days. The patient, who was visiting the clinic with her husband, brought the Cefixime and two Cefotaxime vials and they said that they will take the other four vials later on. The patient was given the first injection by intramuscular route in the clinic (by the laboratory technician because there was no nurse in the clinic) so as to exclude potential anaphylactic reaction to Cefotaxime. Since nothing unusual happened for her approximately 45 minutes after taking the injection, the patient and her husband went home. At home the patient was given the Cefotaxime injections by her husband's mother who is a housewife without any healthcare professional degree or license. As her family reported later on, the patient took five injections of Cefotaxime without any complications; however, after taking the sixth injection she deteriorated and was transferred to the emergency department of a nearby hospital. In the hospital she was examined by a junior doctor (who wrote in the patient's record "the patient's family gave history of Ceftriaxone injection by intravenous route"). The patient's family brought the Ceftriaxone vial with them to the hospital. After that, the patient was admitted to the Respiratory Care Unit (RCU) because of breathing difficulties and stayed there for five days. Two days after admission, she lost consciousness and had abortion. On the fifth day of hospitalization, the patient died and was sent to the Forensic Medicine Section (FMS) to investigate the cause(s) of death. The FMS doctor reported that the patient had septicaemia (confirmed by blood culture of *E.coli* bacteria) in addition to cerebral oedema due to the cessation of respiration and toxicity of Ceftriaxone. The latter information was reported based on gross observation without histopathological examination of the tissues in question. A blood sample was sent for toxicology inquiry which later on proved negative. Depending on the autopsy report, the patient's family raised a legal complaint against the doctor who treated the patient in the private clinic.



Flow chart summary of the case.

Discussion:

Whatever the cause(s), death should be confirmed by clinical as well as laboratory evidence. In the autopsy report there were two causes for the death of the patient which seem to be independent; septicaemia and drug toxicity. It is common for UTI in pregnancy to develop into septicaemia due to the adaptive changes in the urinary tract caused by hormonal changes [3,4]. In addition, sepsis during pregnancy may result in pre-term labour, abortion and/ or 20-80% chance of maternal mortality [3,4,13]. Therefore, the abortion experienced by our patient could be due to septicaemia secondary to her UTI [14]. The latter is supported by the finding that *E.coli*

bacteria were cultured from the patient's urine and blood samples before hospitalization and after autopsy, respectively. Unfortunately, neither a blood culture nor an early diagnosis of sepsis was performed during the 5-day hospitalization of the patient. Early diagnosis and initiation of treatment would decrease death rates associated with sepsis [14,15]. Therefore, the deterioration of the patient's condition at home, hospitalization, abortion and her death were due to progression of a UTI into septicaemia that was overlooked and inadequately treated in the hospital [16, 17, and 18]. As for the hypothesis that the patient suffered from drug toxicity in the form of hypersensitivity reaction to the prescribed cephalosporins (Cefotaxime and Cefixime), the forensic pathologist did not provide adequate evidence to confirm it. From the case history, it was obvious that the prescribing doctor did his best to get scientific and clinical justifications for his prescription by sending urine for GUE as well as culture and sensitivity tests. Even empirically, cephalosporins are indicated for the treatment of bacterial UTI in pregnancy since other antibiotics are contraindicated [19]. In addition, the dose of cephalosporins and duration of treatment were reasonable [20]. Moreover, the following reasons can exclude the possibility of having hypersensitivity reaction to cephalosporins (acute or delayed) in this patient. First, the patient did not give a history of a drug allergy at all and she did take oral amoxicillin for three days prior to urine culture results. Second, the patient received cephalosporins (oral and injectable) for three days without any complications. However, the sixth injection was not the exact drug prescribed by the doctor and was given by the wrong route, despite the fact that both Cefotaxime and Ceftriaxone are 3rd-generation cephalosporins. Moreover, as the injections were given by a housewife, it is possible that ceftriaxone was administered by quick intravenous injection rather than by infusion, as the local health directorate recommends. Furthermore, cephalosporins have only some side effects with hypersensitivity reactions are the most frequently reported events [17]. They present as maculopapular skin rashes after several days of administration and they may be associated with elevated body temperature. In addition, cross-allergy with penicillins may happen in 2% of people or less. So that cephalosporins are regarded safe antibiotics even in patients allergic to penicillin [17]. In summary, the 14-year old pregnant lady had UTI that developed into septicaemia. The diagnosis of the latter was overlooked in the hospital and complicated to end up with abortion and maternal death.

Conclusion:

Urinary tract infection during pregnancy may progress to septicaemia. The early diagnosis of septicaemia and the initiation of effective treatment may reduce its incidence and its associated potentially fatal outcomes.

Ethical clearance was obtained from the Research Ethics Committee at University of Baghdad/ College of Medicine.

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Conflict of Interest: Nil.

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المضادات الحيوية (السيفالوسبورينز) ليست سبب الوفاة لامرأة حامل ومصابة بالتهاب المجاري البولية

ا.م.د. محمد عبد الحسن جبارة

الخلاصة:
المقدمة: يعتبر التهاب المجاري البولية من الامراض العالية الانتشار على مستوى العالم وهو يصيب النساء اكثر من الرجال وخاصة اثناء الحمل مما قد يؤدي الى الاصابة بتسمم الدم المميت.. وعليه فان
الهدف من الدراسة الحالية كان تقديم تقرير عن حالة سريرية يبين كيف ان التفسير الخاطيء لاعراض تسمم الدم ممكن ان يؤدي الى التشخيص المتاخر والعلاج الغير الكافي بل ربما غير الصحيح لهذه الحالة المميتة اثناء الحمل ومن ثم يؤدي الى المشاكل الطبية العدلية والقضائية.
طريقة البحث: الدراسة تتضمن تقرير عن حالة امراة حامل اصيبت بالتهاب المجاري البولية اثناء الحمل وتمت معالجتها باستعمال ادوية السيفالوسبورينز.. رغم العلاج فان الالتهاب تطور الى تسمم في الدم ادى الى اسقاط
الجنين ومن ثم وفاة الام.
الاستنتاج: التهاب المجاري البولية خلال الحمل ممكن ان يتطور الى تسمم الدم وعليه فان التشخيص المبكر والعلاج الدوائي الفعال لالتهاب المجاري البولية ممكن ان يقلل من حالات الوفاة الناتجة من مضاعافات هذا المرض.
الكلمات المفتاحية: سيفالوسبورينز. الموت. الحمل. الاسقاط. التهاب المجاري البولية.