



Amoxicillin에 의한 비정상적 증상인 고혈압

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Unusual Symptom of Hypertension associated with Amoxicillin

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ABSTRACT

An 80-year-old Korean woman who previously experienced penicillin allergy presented to a dental hospital for treatment of a fractured tooth. A dentist extracted the tooth and prescribed her A-cillin (amoxicillin hydrate) 250 mg orally 3 times a day for 3 days and Carol-F[®] (ibuprofen arginine) orally 3 times a day for 3 days. She received the prescriptions, returned home, and took one dose of each drug. One hour later, she experienced hypertension, itching, shortness of breath, and was unable to move her tongue to pronounce words. Approximately 6 hours after drug administration, the symptoms persisted, and the patient was admitted to an emergency medical center (EMC). The patient was discharged from the EMC after a one-night stay in the hospital for symptomatic treatment.

KEYWORDS: Amoxicillin, electronic medical records, hypertension, penicillin allergy

Penicillin-induced allergy is the most commonly reported antibiotic allergy. An allergic reaction from drugs is defined as a specific immunologic- immunoglobulin (Ig) E mediated-reaction which defined its two categories as immediate reactions and delayed reactions.¹⁾ Penicillin allergy commonly has various symptoms such as pruritus, flushing, urticarial, bronchospasm, laryngeal edema, abdominal distress, hypotension, etc.¹⁾ Amoxicillin may occur common adverse reactions such as rash, diarrhea, nausea, headache and vulvovaginitis. The serious adverse reaction cases of it may have Stevens-Johnson syndrome, clostridium difficile diarrhea, anaphylaxis, and hypersensitivity reaction like penicillin allergy.²⁾

We reported the case of a patient with penicillin allergy who suffered allergic reactions including urticaria, laryngeal edema and hypertension following the administration of an amoxicillin

capsule in the dental hospital. We also reported that the electronic medical record system of the dental hospital was changed to provide the allergy information of patient to health providers via a pop-up alert system after discovering the consequence of the prescription error.

Case Presentation

An 80-year-old Korean woman who had an experience of anaphylaxis through penicillin parenteral administration 40 years ago was presented to a dental hospital to receive care for a fractured tooth. She had reported an allergy from penicillin in the dental hospital that she had visited it since 2005. She and her family did not have hypertension. She had hyperlipidemia in 2011, previous experience of an appendectomy

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in 1993, and suffered pulmonary tuberculosis in 1973. She did not take any medication recently when she visited the hospital.

Simple extraction was performed by a dentist for the troubling tooth and two medicines were prescribed for her: Amoxicillin (amoxicillin hydrate) 250 mg PO TID for 3 days and Carol-F (ibuprofen arginine) PO TID for 3 days.

At home around noon, she took one dose of each medicine and started to feel something wrong with her condition. For example, she began experiencing urticarial rash, pruritus, dyspnea, vomiting, numbness of the tongue, edema on the face, legs, and arms within 30 minutes from administration. At first she was unable to realize these were symptoms from penicillin allergy. After 5 hours of the persistent symptoms, she decided to go to an emergency medical center (EMC) right away. She complained of urticaria, rash, pruritus, dyspnea, swelling of the throat and a little chest tightness. The medical doctor diagnosed her as having an allergy related to amoxicillin.

The patient's laboratory data were normal ranges as follows: temperature 36°C, pulse 72/minute, respiratory rate 20 beats/minute, SPO₂: 99%, White blood cell count: $9.7 \times 10^3/\text{mm}^3$, red blood cell count $4.34 \times 10^6/\text{mm}^3$, platelet blood cell count $286 \times 10^3/\text{mm}^3$, lymphocyte 25.4%, monocyte 8.2%, neutrophil 65.3%, eosinophil 1.0%, basophil 0.1%, alkaline phosphatase 84 μL (35~129 U/L), aspartate aminotransferase 27 U/L, alanine aminotransferase 25 U/L, blood urea nitrogen 17.2 mg/dL, serum creatinine 0.83 mg/dL, glucose 103 mg/dL. Her laboratory data were abnormal ranges as follows: blood pressure 150/90 mmHg, C-reactive protein: 0.7 mg/dL (0~0.3 mg/dL), Platelet distribution width 9.9% (12~16.5%).

She was treated with 0.9% NaCl 500 mL intravenously at 22 mg/hour, Toraren (diclofenac) 75 mg/2 mL by intramuscular injection, Peniramin (chlorpheniramine) 4 mg/2 mL intravenously, Xyzal (levocetirizine) 5 mg tablet at bedtime, Allegra (fexofenadine) 180 mg at bedtime.

She had a normal blood pressure (121/61 mmHg) that morning (10:00 am), but her blood pressure was higher (150/90 mmHg) when she visited hospital and complained skin rash with a little chest tightness at the same day.

Her urticaria, dyspnea, and chest discomfort went away the next day and she was discharged with oral antihistamine medication after confirming that her total body condition was well with a blood pressure of 110/70 mmHg (Fig. 1).

The dental hospital reviewed and found that error having occurred from the electronic medical record (EMR) system in which the medical provider must click patient information

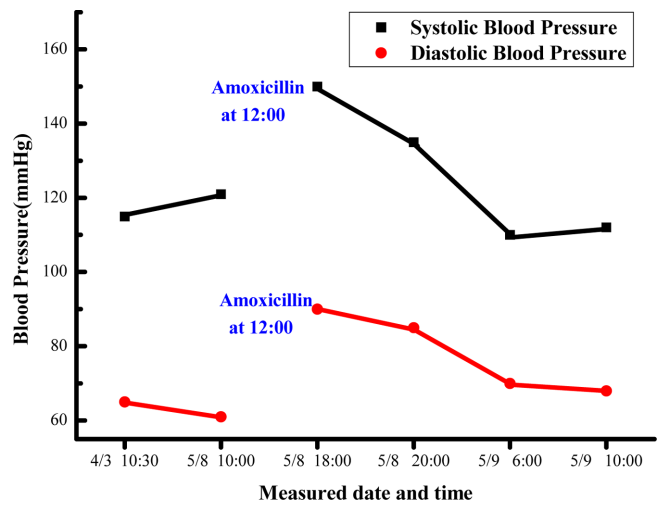


Fig. 1. Representation of the changed blood pressure.

icon when the provider wants to check her/his allergy or specific condition. The dental hospital made an improvement by changing the EMR system that automatically sent an alert when the medical provider accesses patient's record whether the patient has any allergy, anaphylaxis, or a specific warning sign.

Discussion and Review

This case has two issues, including the allergic reactions to amoxicillin and the prescription error by both the dentist and the pharmacist.

Allergy or anaphylaxis is mainly associated with an individual's unique immunity.²⁾ The patient's allergy reaction might be defined as an immediate reaction because her symptoms began within 60 minutes of oral drug administration. This is a plausible assumption even though she did not have laboratory data at the initial occurrence of allergy symptoms as she was not admitted to a hospital at the time.

Amoxicillin is the most commonly prescribed antibiotic by dental specialists for preventing infection in Korea and the USA.³⁾ The patient suffered common allergy symptoms from amoxicillin such as urticaria, dyspnea, and chest discomfort. She also experienced hypertension which does not often occur from amoxicillin, which is more often associated with hypotension.⁴⁾ After receiving treatment for allergy reaction, the patient's blood pressure returned to normal condition. Her platelet distribution width was under that of the normal range and c-reactive protein was over the normal range during allergy

reaction. The patient's panels also came back to normal ranges after receiving treatment for the reaction in the hospital emergency room.

Penicillin reaction was reported many cases that the 9 year-old girl had purpura, myalgia, arthralgia, anemia when a benzathine-procaine penicillin G injection administered.⁵⁾ The common allergy reactions of it were reported with rash, hive, swelling/angioedema.⁶⁾ Hypertension associated with penicillin allergy was not reported yet. This elderly patient did not manifested any symptom except a little heart tightness associated with high blood pressure. 6 hours after amoxicillin administration, her blood pressure reached 150/90 mmHg. It was decreased gradually with treatment and stabilized next day. This presumed cause of association was an adverse reaction of penicillin due to no another reasons.

Prescription error might occur in various medical fields. There were several reasons why amoxicillin was prescribed to the patient with penicillin allergy history. The reasons might include negligence by both prescriber and pharmacist, the excess number of brand names for a generic drug in outpatient care systems, and EMR systems of some facilities. The prescriber did not carefully check the allergy record of EMR for the patient. The dispensing pharmacist also did not ask the patient whether she had any drug allergies and did not check her records for allergies. Both errors were made due to their ignorance.

One of reasons for prescription error was the uncomfortable EMR system of the dental hospital in which the dentist must make several clicks on the EMR system to check the patient's allergies on the patient's basic information section. After the accident occurred that amoxicillin was prescribed to the patient with penicillin allergy, the dental hospital made the improvement of changing the EMR system. Per the new system, the dentist can be alerted immediately with the patient name input simply with an automatic pop-up window if patient has any anaphylaxis or allergy from particular drugs or foods. The improved EMR system is one example of an effort made to reduce malpractice. The efforts of reducing prescription malpractice are very critical to care for patients across medical fields.

Conclusion

We reported the first instance of hypertension that can occur

from an adverse allergy to amoxicillin capsule in a patient with the previous history of allergy from penicillin. We also presented that the EMR of the dental hospital was changed to provide the allergy information of patient to health providers via a pop-up alert system after discovering the consequence of the prescription error.

This study would be helpful to prevent medication errors and raise awareness on checking patient allergy or anaphylaxis history by both prescribers and pharmacists.

Conflict of Interest

All authors: not reported conflict.

Authors Contributions

YAC, EJC and HY contributed to the preparation for the literature research and writing. YAC collected the clinical information on the patient record. HY supervised the entire.

Ethics Approval

IRB was approved by Gyeongsang National University (GIRB-A19-X-0066) with obtained patient consent.

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