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Case Report

Rescue of anaphylaxis after oral aspirin ingestion

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ABSTRACT

Aspirin is increasingly used to prevent platelet aggregation; however, hypersensitivity to aspirin is a high-risk of life-threatening complication. Our patient was a 52 year old male who underwent emergent splenectomy because of accidental splenic rupture and developed a severe anaphylactic reaction approximately one minute after oral aspirin ingestion to perform anti-platelet sharply rise, in accordance with the medical care during postoperative period. Acute rescue measures included intubation and large dose of dexamethasone administration. His blood pressure and SaO_2 were maintained and supported by intravenous fluids and vasoactive drugs, and he was transferred to our intensive care unit. His condition normalized and stabilized one hour after rescue and extubated then discharged uneventfully a week later. Management of aspirin and awareness of adverse effects are both very important. We propose that the timely rescue underlying aspirin allergy may be requirement of proper medical care based on the unique presentation of the patient. Emergency physicians and nurses should be prepared to rescue patients at potential risk of anaphylactic shock.

Keywords: Aspirin, Anaphylaxis, Medical care

INTRODUCTION

Although allergic reactions to aspirin, including anaphylaxis, are well described in the literature, aspirin has become the most commonly used drug to prevent platelet aggregation.[1] Most patients with cardiovascular or cerebrovascular disease, or at a high risk of vascular thrombosis, benefit from the efficacy and safety of aspirin. Nonetheless, allergic reactions to aspirin occur unexpectedly and with unpredictable severity. Although such allergic reactions are rare, nurses facing high platelet levels after splenectomy should be aware of these adverse episodes, especially anaphylaxis, and have prepared management protocols and have trained team-work.

CASE REPORT

A 52 year old male with no relevant prior medical record history presented with a traumatic spleen rupture and was admitted for emergency splenectomy. He reported no known drug allergies. His preoperative electrocardiogram (ECG) was unchanged from prior ECGs, as well as his basic laboratory results, except for a drop in hemoglobin. This case was complicated with multiple rib fractures and mild head trauma.

On postoperative day 11, he ingested one-half of a 25-mg enteric coated tablet of aspirin (Bayer HealthCare Pharmaceuticals; Split charging by Beijing, China; batch

number: J20130078) 30 min after dinner, in accordance with his doctor's advice, and his platelet count increased to a maximum concentration of 704×109/L. Our successful practical experience is to always use aspirin and low molecular dextran as an anti-platelet regimen when the platelet count is ≥ 500×109/L to reduce the risk of venous thrombosis formation.

Severe anaphylaxis to oral aspirin occurs unexpectedly and prophylactically, evoking the following series of symptoms, as emerged in the present case: uncontrollable motions and a sense of dying, accompanied by dizziness, precordia distress, upper abdominal pain combined with vomiting, nausea, and defecation, along with dyspnea without wheezing. Incredibly, two transient, but extremely intense, hyperspasmia events occurred and lasted about 3–5 minutes each. Simultaneously, his blood pressure and oxygen saturation (SaO_2) decreased to 70–80/40 mmHg and 70–80%, respectively. However, his face became flush and he complained of body-wide pruritus, even though no obvious urticaria was observed at that time. Electrocardiography indicated atrial tachycardia. However, urgent laboratory test results of blood routing, blood glucose, serum electrolytes, and myocardial enzyme were all normal. His condition became so severe that he was intubated immediately. Certainly, other rescue measures were carried out according to usual clinical guidelines, which included oxygen aspiration by mask and volume expansion therapy with methylprednisolone and Ringer's fluids. With regard to the possibility of anaphylaxis to aspirin, 10 mg of dexamethasone was also intravenously administered. Then, the patient was transferred to our intensive care unit. The patient significantly improved during the next 24 hours and was weaned off all vaso-active drugs (aramine, dobutamine, and dopamine) and high-dose glucocorticoid (methylprednisolone). He was extubated in the next morning and discharged home a week later. At a one-year follow-up, there was no evidence of residual complications related to anaphylaxis.

DISCUSSION

Aspirin was first synthesized in 1897 by Felix Hoffman, a chemist employed the German pharmaceutical company Bayer.[2] As the first nonsteroidal anti-inflammatory drug (NSAID), aspirin has since been used by billions of individuals because of its multiple useful effects (anti-inflammatory, anti-platelet aggregation, anti-pyretic, and analgesic). Undoubtedly, aspirin is the most commonly used drug in the world. Considering its wide spread use, the incidence of severe side effects or adverse reactions to aspirin is remarkably low. Despite its therapeutic versatility and relative safety, allergic reactions to aspirin occur at a frequency of only 0.5%-2.4%.[3] Although rare, an anaphylactic reaction to aspirin can become life-threating and require emergent treatment.

Although data regarding the frequency of anaphylactic or anaphylactoid reactions are sparse, anaphylaxis to aspirin has been established. The well recognized anti-platelet aggregative effects of aspirin is a result of its ability to inhibit cyclooxygenase (COX-1) enzymes and thromboxane A_2 (TXA_2) formation.[1,4]

Most relevant studies agree that anaphylaxis to aspirin is mediated by serum immunoglobulin E (sIgE) production, although the precise mechanism of allergy reactions to aspirin remain unclear.[1,5-7] Allergy reactions can be classified into five types, according to the classification proposed by Gollapudi et al.[8] Based on selective patterns, clinical pretentions, and high risk factors, of which respiratory reactions I, II, III and IV are convertible reactions; type V, a systematic anaphylactic reaction; type II, characterized by a past history of chronic idiopathic urticaria and presents with urticaria and angioedema; type III, no history of chronic idiopathic urticaria and presents with convertible reactions; and type IV, which occurs after the use of aspirin, but differs from initial use of aspirin as occurs in types II and III. However, to the best of our knowledge, our patient had somewhat unique clinical presentations, including transient limbs spasms and severe cardiac arrhythmia (atrial tachycardia, 150–200 beats/min), which aroused our interest and attention. But, it is not so easy to explain our patient's dyspnea and normal breath sounds by prior hypothesis. Furthermore, this report might be the first of limb spasm and atrial tachycardia associated with an anaphylactic reaction to aspirin. Therefore, we suspect that the development of aspirin anaphylaxis in this case may have been due to a previously undescribed type of allergic reaction because all of the presentations seemed to have been easily culminated and were associated with vasospasm via unknown mechanisms.

In practice, it is not easy to identify the specific drug triggering an anaphylactic reaction. Therefore, it is crucial to consider five key points:

A. Be familiar with the patient's medical history, especially preexisting conditions and allergies.
B. Acquire a thorough history of food consumption, exercise, and onset/development of symptoms.[9]
C. Perform an emergent physical examination and symptom-related laboratory and/or imaging examination to exclude other suspected etiologies.
D. Especially consider the response to rescue drugs.
E. Consider the possibility of cross-reactions with other NSAIDs.

In general, most allergic reactions are short-lived as long as allergy to aspirin has been adequately considered and appropriate therapy administered. Sometimes, empiric therapy is more crucial to save life in some urgent situations. In the case of severe anaphylaxis to aspirin, it is critical to first cease the use of the suspected drug(s) containing potential allergen(s), such as aspirin, as quickly as possible. The following list is a short overview

of necessary urgent rescue measures according to our empiric therapy and confirmed practical guidelines.

Acute measures

Be familiar with the basal clinical data and stop and/or avoid repeated contact with the suspected or confirmed allergen, such as aspirin.

Recruit personnel (i.e., physicians of multiple departments, surgeons. and nurses on duty) to assess the potential etiology of symptoms and design a relatively safe, feasible, and effective rescue strategy as soon as possible. Additional acute measures for stabilizing a patient should be initiated according to the ABCDE scheme.

Priorities are securing the airway by tracheal intubation under general anesthesia, maintaining sufficient oxygen levels, and stabilizing hemodynamics with the help of volume expansion (such as methylprednisolone solution) and other drugs (aramine, dobutamine, dopamine, dexamethasone, and anti-histamines) that should be administered simultaneously.

Rescue measures based on the ABCDE scheme.[10]

A (Airway): In case of tracheal swelling and spasm or decrease in SaO_2, supply sufficient oxygen via a mask, adequate intravenous dexamethasone, and intubation, if necessary.

B (Breathing): Respiration with proper FiO_2; decreasing SaO_2 must be treated with bronchodilators to improve ventilation and vasodilators to improve aerobic function.

C (Circulation): Addition of venous catheters, volume expansion therapy, vasoactive drugs, and cardiopulmonary resuscitation, when necessary.

D (Disability): Second-line-therapy with H_1/H_2 anti-histamine.

E (Evaluation): Further examination and various serum tests or imaging examinations for differentiation from similar disease if the patient's condition permits. Revaluation of the patient's condition.

Based on our experience and lessons in this case, routine allergy assessment by means of a standardized questionnaire completed by the patient before oral aspirin therapy is extremely useful.

Questionnaire

- Do you have any known allergies?
- Do you have a history of allergic reactions to certain foods, such as wheat protein or chickpea?
- Do you or any of your family members have a history of asthma?
- Have you ever taken aspirin or other NSAIDs?
- Have you ever experienced adverse reactions to aspirin?
- Have any doctors or nurses given you key information about drugs prescribed to you?
- It is recommended to exchange aspirin with low molecular dextran and persantin as an anti-platelet therapy if the patient is found to be at high-risk for aspirin allergy.

CONCLUSION

Anaphylaxis to aspirin is a rare, but life-threatening, reaction. Based on our experience, we propose that the mechanism of aspirin allergy may be related to vascular spasm based on unique presentations. It is most important to assess allergy risk to ultimately determine the risk or aspirin therapy. Also, it is necessary to adopt standardized emergency measures to avoid anaphylaxis to aspirin. Focusing attention on these adverse effects of aspirin should be helpful to address anaphylactic progression to improve success of emergent intervention.

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