Case Report

Pheniramine induced supraventricular tachycardia resistant to adenosine: A case report and review

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ABSTRACT

Cardiac toxicity is a very seldom documented side effect of Pheniramine. Although second-generation antihista-
mamines such as terfenadine and astemizole have been linked to cardiac injury, the incidence of SVT after Pheniramine treatment on adult clinical dose is currently unknown.

In this case, we present a 22-year-old girl who developed adenosine-resistant supraventricular tachycardia (SVT) after being given pheniramine due to a bean allergy. It is crucial to know that symptomatic SVT could occur with therapeutic doses of pheniramine.

This case highlights the importance of a comprehensive drug evaluation in emergency situations to identify the underlying etiologies and prompt treatment commencement. It also emphasizes the significance of assessing and choosing acute drugs for each patient admitted to the emergency unit to ensure the start of a newer medication if necessary.

1. Introduction

Supraventricular tachycardia (SVT) is defined as any tachycardia that originates from or extends above the atrioventricular (AV) node, excluding sinus tachycardia [1]. Alcohol, stress, coffee, cocaine, tobacco, and variety of drugs can cause supraventricular tachycardia [2]. Pheniramine maleate is a first-generation antihistamine synthesized from alkylamine, which is metabolized in the liver by hydroxylation, demethylation, and glucuronidation, with a 4-6-h duration of action [3, 4].

The incidence of SVT after Pheniramine treatment in adults is currently unknown. Risk factors for developing SVT after Pheniramine use are also currently unknown. Our aim was to improve the general understanding of Pheniramine induced by SVT in the management of allergic reactions. Here we reported a 22-year-old girl who presented with SVT that occurred within 3 h after the clinical dose of Pheniramine infusion in a patient with an allergic reaction to beans.

2. Case presentation

A 22-year-old girl comes to the emergency department with complained of epigastric pain, nausea, and generalized body itching for 3 hours after eating beans as dinner. She was stable; her pulse rate was 70 beats per minute on admission, blood pressure 120/80mmHg. There was no past medical history of diabetes mellitus, ischemic heart disease, hypertension or heart failure. She had never smoked cigarettes and there was no history of alcohol or illicit drug use. Her medical therapy on admission included 50 mg ranitidine, 10mg Hyoscine (buscopan), 125mg Methylprednisolone intravenous, and 45.5mg pheniramine maleate (avil) intravenous after 3 hours she developed palpitation, sweating, chest pain and she became agitated. Than vital signs were repeated, she was tachycardic with a heart rate of 188 beats per minute, blood pressure was 110/80, while respiratory rate was 18 per minute, and oxygen saturation was 97% on room air. Systemic examination was unremarkable. Electrocardiogram was performed and showed a supraventricular tachycardia (SVT) (Fig. 1), after vagal maneuvers failed, 6 mg (mg) of adenosine was administered as rapid IV push with 20 cc of normal salin push but did not terminate the arrhythmia (SVT), and the next dose of 12 mg of adenosine rapid IV push was administered which was also unsuccessful (Fig. 2). After failure of adenosine to terminate tachyarrhythmia, we decided to started 12.5mg of diltiazam direct IV push over 2 minutes and still didn’t resolve the SVT while hemodynamically the patient was stable (ECG similar to Fig. 2). After 15 minutes, we administered second dose of 17.5mg of diltiazam which was able to terminate SVT and slowly reverted to sinus rhythm (Fig. 3). Although we were not able to measure her serum pheniramine, but

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complete blood count, cardiac enzymes, troponin-I, serum electrolytes, renal functions, liver enzymes and coagulation profile all were normal as shown in Table 1. Chest X-ray revealed normal with no evidence of cardiomegaly, pleural or pericardial effusion or pulmonary edema (Fig. 4) and 2-D echocardiogram revealed normal cardiac wall motion and valves with 65% ejection fraction. At the discharge after 4 hours of observation, the patient prescribed 50 mg of Metoprolol per day for five days. The patient had no cardiac symptoms during the first month of follow-up, and her echocardiography and ECG were normal.

3. Discussion

Antihistamine medications carry a broad range of adverse effects depending on the specific class of drugs utilized. Antihistamines from the first generation are less selective and have more side effects than antihistamines from later generations, while their selectivity decreases at higher dosages and concentrations, affecting the cholinergic, serotonergic, and catecholaminergic systems [5].

Pheniramine maleate is a first generation antihistamine synthesized from alkylamine, which is metabolized in the liver by hydroxylation, demethylation, and glucuronidation, and has a 4-6-h duration of action [3,4].

H-1 receptor antihistamines have anticholinergic properties, including dry mouth, blurred vision, constipation, and tachycardia which is a relatively common adverse effect, while some users experience dizziness, tinnitus, insomnia, euphoria, decreased coordination, and delirium [6].

Cardiac toxicity is a very seldom documented side effect of Pheniramine. Although certain second-generation antihistamines (terfenadine and astemizole) have been linked to cardiac harm (mostly ventricular tachyarrhythmias).

The incidence of SVT after Pheniramine treatment on clinical dose in adults is currently unknown. Risk factors for developing SVT after Pheniramine use are also currently unknown.

In the present case, the presence of pheniramine and the absence of other compounds was established the relationship between pheniramine and SVT. Overdosing on pheniramine has resulted in some sudden and unexpected fatalities in both adults and children [7].

Occurrence of SVT and ventricular arrhythmias with first-generation antihistamine has been reported in a 27-year-old man presenting with pheniramine overdose, while a nine-year-old girl had presented with supraventricular tachycardia while on clinical doses of hydroxyzine for pruritus [7,8].

Both pheniramine and tricyclic antidepressants have cocaine like effects on the sympathetic nervous system, and toxic doses amplify catecholamine effects on cardiovascular tissue. And as a result, they may contribute to SVT (atrial tachycardia) [9].

However, we could not find reports of pheniramine and ranitidine, Hyoscine or methylprednisolone interactions causing SVT, despite many patients with allergic reaction being given pheniramine.

In conclusion, this girl presented with SVT after administering pheniramine at night for an allergic reaction to beans. Significantly, symptomatic SVT could occur with therapeutic doses of pheniramine in a patient who did not have cardiac abnormalities or risk factors for SVT.

Recommendation: Further studies are needed to explore the exact mechanism and sites of pheniramine, and the role first generation antihistamine on human cardiovascular function.
Fig. 2. The rhythm strip of the patient shows no improvement in response to adenosine.

Fig. 3. ECG showing normal sinus rhythm after next dose of Diltiazem.
Table 1
Summarized of Laboratory results after the patient developed SVT.

| Blood investigations | Results | Normal range |
|----------------------|---------|--------------|
| WBC                  | 8.49\times1000/m | X1000/m |
| HGB                  | 10.4 mg/dl | 12-16 mg/dl |
| PLT                  | 257\times1000/m | X1000/m |
| AST                  | 19 U/l | 0-31 U/l |
| ALT                  | 16 U/l | 0-45 U/l |
| Urea                 | 21 mg/dl | 10-45 mg/dl |
| Kreatinin            | 0.69 mg/dl | 0.5-1.35 mg/dl |
| Albumin              | 2.8 g/dl | 3.5-5.5 g/dl |
| Glucose              | 157 mg/dl | 60-110 mg/dl |
| Sodium               | 137 mEq/L | 135-150 mEq/L |
| Potassium            | 4.33 mEq/L | 3.5-5.5 mEq/L |
| Calcium              | 9.2 mg/dl | 8.3-10.4 mg/dl |
| Magnesium            | 1.6 mEq/L | 1.3 to 2.1 mEq/L |
| Chloride             | 104 mmol/L | 96-110 mmol/L |
| Troponin             | 0.001 | 0.02-0.06ng/mL |
| INR                  | 1.1 | 0.8-1.2 |
| aPTT                 | 28.6 seconds | 23.2-35.2 seconds |

WBC; White blood cells, HGB; Hemoglobin, PLT; Platelets, AST; Aspartate transaminase, ALT; alanine aminotransferase, INT; international normalized ratio, aPTT; Activated partial thromboplastin time.

Ethical approval

Based on the regulations of the review board of the Mogadishu Somali Turkish Training and Research Hospital, institutional review board approval is not required for case reports.

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We declare that we have no funding source.

Author contribution

Both authors performed substantial contributions to accession of data, or analysis, conception and design, and interpretation of data. Took part in drafting the article or revising it critically for important intellectual content and gave final approval of the version to be published.

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1. Name of the registry: Not Applicable.
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Guarantor

As Corresponding Author, I confirm that the manuscript has been read and approved by all named authors.

Consent

Written informed consent had obtained by the patient and her father to have the case details and any accompanying images published. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Data sharing statement

We declared that we had full access to all of the data in this study, and we take complete responsibility for the integrity of the data. All

Fig. 4. Posterior-anterior chest x-ray revealed normal without effusion and cardiomegaly.
original data are available in the Mogadishu Somali Turkish Training and Research Hospital, Mogadishu, Somalia. Data used to support the findings of this study are available from the corresponding author upon request.

Declaration of competing interest

We declare that we have no conflict/competing interests.

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N/A.

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