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Case Report

Minoxidil poisoning presenting as acute coronary syndrome: a rare case scenario

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ABSTRACT

We present a case of severe minoxidil poisoning (3000 mg) with resultant severe hypotension, tachycardia and subendocardial ischemia initially treated crystalloid, dopamine, aspirin, clopidogrel on the lines of acute coronary syndrome with partial haemodynamic improvement. After getting the history of minoxidil poisoning, the patient was treated with bolus doses of norepinephrine, and norepinephrine infusion, resulting in resolution of hypertension, tachycardia and reversal of ischemia. Topical minoxidil is commonly used agent for male pattern baldness. It also has got antihypertensive action when ingested, acute coronary syndrome and compensatory tachycardia with successful management with norepinephrine bolus and infusion.

Keywords: Minoxidil, Norepinephrine, Subendocardial ischemia

INTRODUCTION

Minoxidil is being used commonly for male pattern baldness, and an antihypertensive agent. A single bottle of 60 ml 5% is 3000 mg of minoxidil, which is equivalent to 30 times the maximum recommended daily dose of the oral antihypertensive formulation. The acute coronary syndrome as subendocardial ischemia with severe haemodynamic compromise associated with ingestion of such a solution will be described.

CASE REPORT

A 30 year, 60 kg man with no prior cardiac history was brought into the emergency department. He was anxious with retrosternal chest pain, headache, and giddiness. Vital signs were pulse 160/minute, feeble. Blood pressure was 60/40 mm Hg by noninvasive blood pressure monitor. The patient was afebrile. Physical examination revealed no further abnormalities. The ECG showed tachycardia, evidence of subendocardial ischemia. He was resuscitated with 1 liters of normal saline and shifted to the coronary intensive care unit. Upon arrival, patients received 325 mg of aspirin and 300 mg of clopidogrel, 2 mg of morphine. Oxygen supplementation was started with 6 liters of oxygen/minute. Then patient given a history of ingestion of 60 ml of minoxidil before 3 hours. Fluid resuscitation was started with 1 liter of normal saline. Simultaneously 7 french 16 cm triple lumen central line was inserted through internal jugular vein. Injection dopamine 8 µg/kg/minute was started through syringe pump. Central venous pressure was low 6 cm of H20. After starting of dopamine, blood pressure was marginally raised to 80/50 mmHg with a pulse rate of 140/minute and urine output of 20 ml. Another 1 liter of Normal saline 0.9% infused over 30 minutes, still Blood pressure was 80/50 mmHg and pulse rate of 140 /minute with urine output of 20 ml. Thereafter injection noradrenaline 20 microgram bolus given and infusion was started at 0.05 µg/kg/minute. Immediately blood pressure was 110/70 mmHg and pulse rate of 100/minute. Urine output was increased to 60 ml after 30 minutes. As

the blood pressure stabilized, the patient was slowly weaned of noradrenaline infusion and stopped 12 hours post ingestion. Dopamine was also titrated down to a dose of 2 g/kg/minute, and stopped 24 hours post ingestion. All investigations were normal after 8 hours. CK-MB, and troponin I was negative. Initial ECG changes reverted to normal after 12 hours. Patient discharged home uneventfully on the 3rd day.

DISCUSSION

Minoxidil originally used as an oral antihypertensive agent recently has been approved for treatment of male pattern baldness.[1] The topical solution is to be applied to the affected area of the scalp twice daily 2ml. Each 60 ml bottle contains 5% minoxidil 3000mg absolute alcohol 30% w/v and water.[2] Minoxidil produces systemic hypotension by a direct arteriolar vasodilatation and is associated with a reflex increase in cardiac output and myocardial contractility mediated by the sympathetic nervous system. Peak concentration in the blood is achieved 1 hour after oral dosing but due to delay of active metabolite formation, the maximum therapeutic effect occurs much later. The serum half-life is 3 to 4 hours, but the duration of effect can be 24 hours or longer.[3] Minoxidil is mainly eliminated by hepatic metabolism. There are reports[4,5] that minoxidil does not lower blood pressure in normotensive individuals and treatment of overdose should reflect this idea.

There are reports of various cardiovascular manifestations with differing doses of minoxidil with lower doses only producing hypotension and successive increase in doses leading to an association with tachycardia and myocardial ischemia. This tachycardia and resultant myocardial ischemia are probably as a compensatory mechanism for severe hypotension. These cases were treated with combination of crystalloid, dopamine[6] and phenylephrine infusion,[7] guided by the cardiovascular parameters.

In the present case, the patient did not give a history of minoxidil poisoning, which naturally led the diagnosis to be an acute coronary syndrome and treated on the same guidelines. After receiving history from the patient relatives, and after optimizing preload, norepinephrine was added as patient had severe tachycardia. The patient immediately responded to norepinephrine infusion as suggested by cardiac parameters and serial ECGs. Our patient had ingested maximum dose of minoxidil amongst the reports reviewed by the authors (3000 mg).

The patient was 30 years old, and no prior cardiac history, therefore the subendocardial ischemia was believed to be caused by a combination of increase myocardial oxygen demand, decrease coronary perfusion pressure secondary to extreme tachycardia and hypotension. Although dopamine and phenylephrine has been used in earlier reports the norepinephrine was used in the present case, and prompt response to norepinephrine would suggest that in severe minoxidil poisoning with profound hypotension, tachycardia and subendocardial ischemia, a prompt initiation of norepinephrine infusion would be appropriate. It is possible in this case that a more immediate initiation of norepinephrine on admission instead of dopamine may have even minimized myocardial ischemia.

In summary, a case of severe hypotension, tachycardia and acute coronary syndrome as subendocardial ischemia from ingestion of 5% topical minoxidil solution has been described along with a treatment regimen. As the use and availability of topical minoxidil increases a greater awareness of its toxicity and the treatment thereof will be necessary.

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