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Case Report

Skin necrosis following dobutamine extravasation

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Abstract

Background: Dobutamine, a synthetic catecholamine with alpha-1 and beta-2 adrenergic activity, is commonly used as an inotropic agent for short-term management of heart failure. While its adverse effects are predominantly cardiovascular, cutaneous reactions, including local inflammation and rare cases of skin necrosis, can occur following extravasation.

Case report: We present a case of 80-year-old woman with a history of diabetes and hypertension who developed local skin necrosis at the site of a dobutamine infusion. Admitted for cardiogenic shock, she received intravenous dobutamine via a peripheral catheter on the dorsal side of her left hand. On the third day, she developed a painful necrotic lesion with fever. The dobutamine infusion was discontinued, and treatment with systemic antibiotics and topical therapy led to complete regression within 15 days.

Discussion: The Naranjo Adverse Reaction Probability Scale confirmed dobutamine as the likely trigger of necrosis (score=6). Necrosis is attributed to local α1-adrenergic stimulation leading to vasospasm, venous constriction and tissue ischemia. Risk factors for vasopressor-induced necrosis including diabetes, hypertension, and advanced age were present in our patient. Peripheral administration of vasopressors increases the risk of extravasation injuries, highlighting the importance of central venous access for such medications.

Conclusion: This case underscores the importance of early recognition and management of cutaneous necrosis associated with dobutamine extravasation, particularly in patients with predisposing factors.

Keywords: Cutaneous Adverse reaction, Dobutamine, Drug extravasation, Necrosis, Pharmacovigilance

Introduction

Dobutamine is a synthetic catecholamine with activity on both alpha-1 and beta-2 adrenoceptors. It is used intravenously as an inotropic agent for short term treatment of heart failure [1]. Dobutamine side effects involve usually cardiovascular system [2]. Cutaneous side effects such as inflammation in the administration site following accidental extravasation could occur [3]. Skin necrosis from intravenous soft tissue infiltration is a rare but serious complication of intravenous therapy. Herein we report a rare case of a local skin necrosis in dobutamine infusion site.

Case Report

An 80-year-old woman with history of diabetes and hypertension was admitted to the cardiovascular intensive care department for cardiogenic shock following myocardial ischemia. An infusion of noradrenalin 180 mg/hour was immediately administrated through a peripheral venous catheter in the right radial vein. Dobutamine infusion (600 µg per minute) was started on the dorsal face of the left hand. An endocavitary probe for electro-systolic stimulation had been fitted.

The patient had stabilized hemodynamic function and blood pressure remained about 120/80 mmHg. Two days later, the doses of dobutamine and noradrenalin were reduced to 120 mg/hour and 450 µg per minute respectively. On the third day, the patient complained about painful lesion around the site of dobutamine infusion and fever. On clinical examination, the patient had a temperature of 38.6°C and cutaneous examination revealed a well demarcated necrotic plaque with an inflammatory border involving an area of 4×5 cm on the dorsal face of the left hand (**Figure 1**). The intravenous line was immediately removed, and the patient was prescribed an intravenous association of amoxicillin /clavulanic acid and local topics in the necrosis site. The cutaneous necrosis healed fifteen days later.

Discussion

Dobutamine was suspected to be the responsible drug for skin necrosis in this case based on the Naranjo Adverse Drug Reaction Probability Scale with a score of 6 (definite) [3].

The α1-agonism of dobutamine, at high local tissue concentrations, may be responsible for local necrosis. Indeed, direct α-adrenergic stimulation induces vasospasm of the smaller veins and the vasa vasorum, leading to inadequate distal blood flow. Subsequent increases in the hydrostatic pressure of the venous circulation cause further effusion of the drug into the tissues. Ischemia then follows to the infusion site as the vasopressor agent diffuses into tissue space and the tributary veins constrict [4].

Risk factors for vasopressor necrosis were identified by some authors such as vasculopathy, preexisting hypotension, diabetes, Raynaud disease, coagulopathy, advanced age and hypertension [4,5].

Reynolds *et al.* identified risk factors for extravasation. First dealing with the duration of infusion, the infiltrative volume, the catheter type and the infusion rate. Second risk factors dealing with the patient himself such as hypotension, peripheral vascular disease, extreme in age and peripheral neuropathy that were present in our patient. The third risk is related to the health care staff with a lack of knowledge of intravenous access skills [4].

In our case, the patient had diabetes, hypertension, and an advanced age that could induce an alteration of the microcirculation.

In practice, to decrease this risk, central venous access is recommended for vasopressor perfusion. However, despite being less common, extravasation in central catheters is potentially more dangerous because of the delay in diagnosis and proximity to dangerous anatomical structures [6].

Most dopamine side effects are caused by peripheral vasoconstriction caused by high-dose dopamine infusion [7]. Even in low doses, vasopressor extravasation leads to high local concentrations and can cause severe vasoconstriction and tissue ischemia [8].

To avoid extravasation complications, Bhosale *et al.* recommend using sterile gauze or sterile transparent dressing at the catheter insertion site, daily palpation over intact dressing for signs of phlebitis and direct inspection of the site. Catheters should be replaced if signs of complication are present. Multiple punctures of the same vein, excessive infusion pressures, and intravenous access sites adjacent to tendons, nerves, or arteries should all be avoided [9].

Conclusion

This case highlights a rare but serious complication of dobutamine infusion, resulting in local skin necrosis likely linked to its α1-adrenergic activity. Patient-specific factors, such as advanced age, diabetes, and hypertension, emphasize the need for careful risk assessment and adherence to proper catheter management protocols is strongly recommended.

Conflicts of Interest

The authors have no conflicts of interest.

Figure 1. Cutaneous necrosis on the dorsal face of left hand.

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