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Case report

Postpartum gangrene of three limbs complicating inotrope therapy: A case report

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Abstract *Background:* Symmetrical peripheral gangrene (SPG) is an uncommon but devastating complication in critically ill patients with a high mortality. It is seldom seen in pregnancy and postpartum period.

Case presentation: We hereby report a 27-year-old woman diagnosed of having postpartum hemorrhagic shock. The patient developed symmetrical peripheral gangrene triggered possibly by sepsis and inotropes. The patient presented with consciousness disturbance and hemodynamically unstable condition. Owing to the unstable hemodynamic status, inotropic agents with maximum dose of dopamine at 17 mcg/kg/min and norepinephrine of 8 mcg/kg/min were used. On the 4th day of admission, the patient developed gangrene and compartmental syndrome in the limbs. However, even with the dose of inotropic agents tapered, the gangrene did not resolve. So, multiple amputations and fasciotomy were done. Patient also developed acute kidney injury with anuria, thus necessitating hemodialysis treatment.

Conclusion: Although postpartum hemorrhagic shock is of high risk for sepsis and use of inotropes is common, occurrence of peripheral gangrene is rare. A high index of suspicion for the diagnosis and timely intervention will prevent irreparable damage and loss of limb.

1. Introduction

Despite the use of inotropes and settings of sepsis in postpartum hemorrhagic shock and DIC, we rarely encounter peripheral gangrene in pregnant women. Whether it is because of physiological changes in the peripheral vascular system during pregnancy (increased plasma volume, decreased plasma osmolality and decreased peripheral resistance) that actually offset a severe vasospasm is not fully understood? [1].

We report here a rare case of symmetrical peripheral gangrene which triggered possibly by sepsis and the action of two vasopressor drugs: noradrenaline and dopamine. Inotropes is frequently used in the management of hemorrhagic and septic shock because of its positive inotropic effects. Ischemic changes in the extremities, such as bluish discoloration and coolness of the fingers and toes, may be observed with prolonged administration of the drug at high infusion rates. However, progression of this ischemia, resulting in gangrene, is uncommon [1,2].

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2. Case presentation

A 27-year-old G1P1 woman presented to the emergency unit of our department with hemorrhagic shock after delivery at a district hospital by caesarian section since 12 h before admission. The patient developed postpartum hemorrhage and underwent re-laparotomy at the same hospital with B-lynch suture, uterine massage and direct echobolics injection intrauterine. The patient developed hypovolemic shock with poor blood and plasma transfusion. So, the patient was transferred to our hospital.

Vitals were unstable, all peripheral pulses were un-palpable. Extremities were cold. On per abdominal examination, a well contracted uterus corresponding to 20 weeks gestational age was felt. Internal examination was normal.

On investigation, Hb was 5 g/dl, total leukocyte count (TLC) 17,000/mm^3, platelet count 100.000/mm^3; liver function tests: (LFT), ALT/AST 28/25 and kidney function tests: (KFT) serum creatinine 0.8 mg/dl and blood urea 20 mg/dl. Prothrombin time was 8 s longer than control, and activated partial thromboplastin time was 13 s longer than control. Disseminated intravascular coagulation (DIC) was diagnosed. On transvaginal ultrasonography, uterine cavity was empty with no abdominal collection.

Intravenous fluids, multiple and repeated packed red blood cell, platelet, fresh frozen plasma, and cryoprecipitate transfusions were given. Patient developed anuria with urine output of 0–10 mL per day. With optimum central venous pressure, systolic blood pressure was 60 mmHg and the urine output remained low. Noradrenaline 8 mcg/kg/min was used together with dopamine 17 mcg/kg/min.

Her condition gradually stabilized and improved. However, her renal function remained impaired and the patient started to receive regular hemodialysis in the hospital till fully recovered after one month.

Within four days, left hand was cold, swollen with purple discoloration extending to below the elbow joint and the right hand was cold and swollen without discoloration. Similar changes of discoloration, coldness and swelling were seen in both feet extending to mid-calf. The patient began to present vesicle and bullous (Fig. 1).

The inotropes infusions were immediately stopped. The condition deteriorated without improvement. Color Doppler of limb vessels was done which indicated no flow. There was no prior history of intermittent claudication, cold or heat intolerance, tobacco smoking, collagen vascular disease or similar family history.

On sepsis work-up, her blood and urine cultures were sterile and culture taken from abdominal wound had no pathogenic growth. The patient's ELISA for HIV was negative and VDRL was non-reactive.

Patient was further investigated for all possible causes of peripheral gangrene which included antiphospholipid antibody testing (ACL IgG and IgM and LAC which all were negative), lipid profile (Serum cholesterol 140 mgs/dl, Serum TG 110 mg/dl, HDL-chol 40 mg/dl), antinuclear antibody and rheumatoid factors were negative too.

A biopsy of the blistered area showed epidermal necrosis, epidermal and subepidermal blister and the absence of an inflammatory process in the dermis.

Considering the clinical and anatomic pathological aspects, the diagnosis was skin necrosis due to the intensive use of vasopressors.

Surgical consultation was sought. Therapy in the form of broad spectrum antibiotics, low molecular weight dextran and a hemorheologic agent, pentoxyphylline, was started. In spite of all kinds of medical & gynecological support the patient did not improve. So, multiple amputations were done in the form of bilateral below knee and left below elbow ampu-

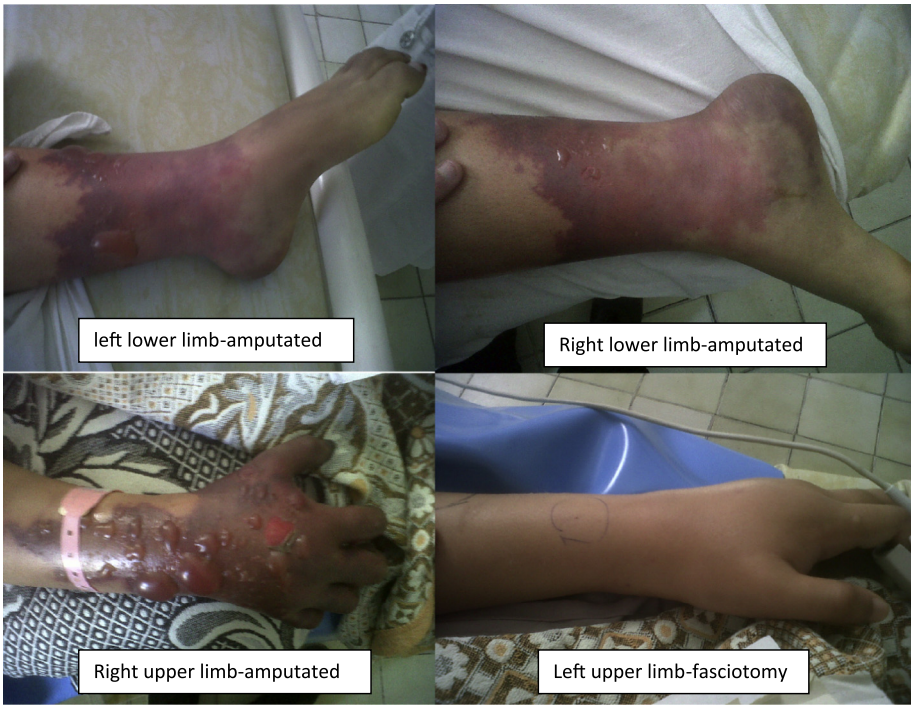

Figure 1 Shows gangrene of three limbs with involvement of the fourth with compartmental syndrome.

tations. Also, fasciotomy for the right forearm for compartmental syndrome was done.

Her condition gradually stabilized and improved. Patient was discharged on pentoxyphylline, with advice on the care of hand after one month of admission.

3. Discussion

Our patient was young with no prior evidence of major occlusive disease, connective tissue disorder or any other identifiable cause for gangrene. She developed peripheral symmetrical gangrene after being delivered at a private hospital. Although sepsis could not be documented despite a thorough workup, we feel that this phenomenon along with inotropes injection could have affected the process of gangrene.

A high index of suspicion, early diagnosis and intervention with appropriate measures.

Although sporadic reports of postpartum gangrene in pregnancy have been reported, these have been mainly due to underlying vascular occlusive disorders or following abortions induced by ergots [2–6]. A recent report evaluated 14 patients with symmetrical peripheral gangrene and found sepsis to be a major cause with a high amputation rate and mortality [6].

In our case no clear cause could be defined. We present this case to highlight the importance of identifying and treating pre-gangrenous changes in limbs early enough to avoid amputation.

When dopamine is administered in low doses (2–5 mcg/kg/min) it brings about vasodilatation in the renal and mesenteric vascular beds. In moderate doses (10–20 mcg/kg/min), dopamine enhances cardiac contractility; higher doses (20–50 mcg/kg/min) may also cause vasoconstriction [3]. Consequently, peripheral ischemia and gangrene are not unexpected following the use of large doses of dopamine. Gangrene has only rarely been reported with dopamine infusion rates in the range of 1.5–10 mcg/kg/min. Gangrene complicating low-dose dopamine therapy suggests either an idiosyncratic response to the drug or a multifactorial cause of the ischemia and necrosis. Coexisting disseminated intravascular coagulation may be one risk factor [5], and the occurrence of gangrene in our patient, whose DIC was consequent to the intravascular hemolysis associated with PPH, adds to the evidence. Perhaps low dose dopamine therapy, when superimposed on the hypercoagulable state of DIC, causes peripheral vessels to narrow below a critical diameter [6].

When dopamine is infused in a patient with DIC, we recommend close monitoring of the extremities for ischemic changes. Once peripheral ischemia is detected, the dopamine infusion should be stopped immediately [7].

The noradrenaline doses were much higher than those habitually used (5 mcg/kg/min) and the doses of dopamine were in the highest range of use, as above 8 mcg/kg is considered as having a high alpha-adrenergic power [7].

The effects of noradrenaline on skin necrosis have been reported for over 40 years, and this event is possible even in the absence of extravascular spillover of the drugs. However, few new cases have been described and there is a whole generation of dermatologists who have not seen or studied this catastrophic effect of noradrenaline on skin [4,5].

Treatment of established SPG is generally unsatisfactory. Numerous therapeutic maneuvers have been advocated including intravenous administration of phentolamine, trimetaphan, nitroprusside and heparin [5–7], as well as sympathetic blockade. Although this treatment is rarely successful, some cases have reported benefits with intravenous infusion of chlorpromazine hydrochloride, infiltration of the ischemic area with phentolamine hydrochloride and local application of nitroglycerine ointment [8–10].

4. Conclusion

Although postpartum hemorrhagic shock and DIC run a high risk for sepsis and use of inotropes, occurrence of peripheral symmetrical gangrene is rarely seen in this period. Peripheral symmetrical gangrene is a life-threatening condition which warrants early diagnosis and prompt treatment, any delay to do so may leave sequelae which vary from amputation to death.

SPG is a cutaneous marker of serious underlying medical disease. The rarity of this complication suggests that it is produced only by specific combination of predisposing events. However, once ischemia developed, it is difficult to prevent its relentless course to gangrene. Hence, we need to have a high index of suspicion, provide early treatment of underlying consumptive coagulopathy, correct hypervolemia, and control septicemia in patients using inotropes.

Our report hopefully could call attention to a more judicious use of inotropes in critically ill patients.

5. Conflict of interest

There was no conflict of interest in this study.

References

[1] Hoffman BB, Lefkowitz RJ. Catecholamines and sympathomimetic drugs. In: Gilman AG, Rall TW, Niles AS, editors. Goodman and Gilman's the pharmacological basis of therapeutics. New York: Pergamon Press; 1991. p. 200–1.
[2] Goldbranson F, Lurie L, Vance RM. Multiple extremity amputations in hypotensive patients treated with dopamine. JAMA 1980;243(1):145–6.
[3] Winkler MJ, Trunkey DD. Dopamine gangrene. Association with disseminated intravascular coagulation. Am J Surg 1981;142:588–91.
[4] Valdes ME. Post-dopamine ischemia treated with chlorpromazine. N Eng J Med 1976;295:1081–2.
[5] Goldberg LI. Dopamine-clinical uses of an endogenous catecholamine. N Eng J Med 1974;291:707–10.
[6] Gibbs NM, Oh THE. Nitroglycerine ointment for dopamine induced peripheral digital ischaemia. Lancet 1983;i:290.
[7] Dutkowski R. Necrosis of the skin and fingers in the course of noradrenaline administration. Wiad Lek 1966;19:887–9.
[8] Golan MA, Pansky M. Raynaud's phenomenon and peripheral gangrene complicating scleroderma in pregnancy—diagnosis and management. Br J Obstet Gynaecol 1992;99(10):850–1.
[9] Dam AK, Mishra JC. Managing ergot-induced gangrene: the anesthesiologist as a key player. Anesth Analg 2002;95(2):409–10.
[10] Ghosh SK, Bandyopadhyay D, Ghosh A. Symmetricalperipheral gangrene: a prospective study of 14 consecutive cases in a tertiary-care hospital in eastern India. J Eur Acad Dermatol Venereol 2010;24(2):214–8.