

Intraarterial Nitroprusside Treatment for Ergotism

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Peripheral ischemia and gangrene are well known complications of ergotamine tartrate. This may be due to either overdosage or individual hypersensitivity to normally tolerated doses [1]. Because of characteristic angiographic features, angiography may be the first clue to the proper diagnosis in these patients. Withdrawal of the ergotamine will eventually reverse the spasm [2]. However, if a limb is in a pregangrenous state, more aggressive measures are necessary. Therapy has been quite varied and unpredictable.

Recently, O'Dell et al. [3] reported a case of ergotamine spasm successfully treated by infusion of nitroprusside. We have had similar success with intraarterial nitroprusside in a patient with a pregangrenous foot.

Case Report

A 37-year-old female had sudden onset of a severe left frontal headache 2 months before admission. Angiography revealed two left intracavernous aneurysms. In the month preceding admission, the patient used 18 tablets and three suppositories of Cafergot for headache, a total of 24 mg of ergotamine tartrate. On admission, the remainder of her medical history was not relevant to the clinical problem. The general physical and neurologic examinations were negative, with good femoral and distal pulses bilaterally.

The day after admission, a left carotid Selverstone clamp was placed to treat the intracavernous carotid aneurysms. Partial closure of the clamp was performed 3 days later. That day, the patient complained of pain in both legs. The femoral pulses were markedly diminished bilaterally with absent peripheral pulses and a cool, cyanotic right foot.

During the first 4 days after admission, the patient received 11 Cafergot suppositories, a total of 22 mg of ergotamine tartrate, for left frontal headache. No more than three suppositories were used in any one day. During this time, she also received intermittent diazepam, propoxyphene hydrochloride, aspirin, and oxycodone hydrochloride. Because of apparent lower limb ischemia, arteriography was performed. Procedure via the axillary route demonstrated severe spasm of both external iliac, femoral, and peripheral arteries (fig. 1A).

Despite a continuous epidural block with local anesthetic, intravenous low molecular weight dextran, and intravenous hydrocortisone, the right foot continued to be cold and painful. A line of ischemic demarcation appeared in the right mid-calf. A catheter was placed in the distal abdominal aorta; repeat pelvic angiography revealed no significant change. Twenty-four hours after the first signs of ischemia, a continuous infusion of sodium nitroprusside was begun through this catheter. Treatment was begun at 18 $\mu\text{g}/\text{min}$ and increased to 84 $\mu\text{g}/\text{min}$. At this level of infusion, there was little change in the patient's normal systolic blood pressure of 80 mm Hg, as monitored by a radial arterial catheter.

One hour after the beginning of intraarterial nitroprusside, the right foot felt slightly warmer but was still painful. The infusion was continued for about 14 hr before it was tapered and changed to intravenous nitroprusside which was maintained at 36 $\mu\text{g}/\text{min}$ for 24 hr longer. Repeat angiography prior to intravenous therapy (fig. 1B) revealed disappearance of the arterial spasm on the right. At this time, the right posterior tibial pulse was palpable and the right foot was warm and pink. Although the left leg was asymptomatic, there was little angiographic improvement of the peripheral vessels. Pulses returned to the left foot before completion of the intravenous infusion.

The patient then developed deep venous thrombophlebitis of the right calf, confirmed by phlebography and treated by heparinization. Completion of closure of the Selverstone clamp was carried out. The patient was discharged on sodium warfarin after healing of her surgical wound and resolution of the acute thrombophlebitis. At follow-up 3 months later she had developed right foot drop due to an ischemic peroneal nerve palsy, as well as causalgialike pain in the right foot. Fortunately, her headache had disappeared.

Discussion

Ergotamine produces both direct peripheral vasoconstriction and alpha-adrenergic blockade [4]. The recommended safe maximal dosage is six tablets (6 mg) or two suppositories (4 mg) per attack. Total weekly dosage should not exceed 10 mg [5]. The excellent absorption of the drug through the rectal mucosa and the ease of administration increase the danger of intoxication from the use of rectal suppositories. Increased sensitivity to ergot alkaloids may be present in septic states and impaired liver function [6, 7]. Ergotism may occur as a result of chronic ingestion of therapeutic dosages of ergotamine, as a result of acute ingestion of small amounts of ergot drugs in individuals hypersensitive to them, or, as in our patient, due to overdosage [1].

The treatment of ergotamine-induced vasospasm has been controversial. Sympathetic and epidural blockades have been advocated. However, it is not surprising that these therapies have failed, since ergotamine acts directly on smooth muscle and not through neural pathways. Direct vasodilators provide a more logical treatment approach. However, systemic niacin, tolazoline, papaverine hydrochloride, and hydralazine have all had limited success.

Several recent articles [3, 4, 8] indicate the benefits of systemic nitroprusside infusion in conjunction with other therapies in the treatment of ergotamine poisoning. Sodium nitroprusside, a potent, direct-acting vasodilator, seems well suited for treatment of this condition. It can be precisely titrated to avoid hypotension because

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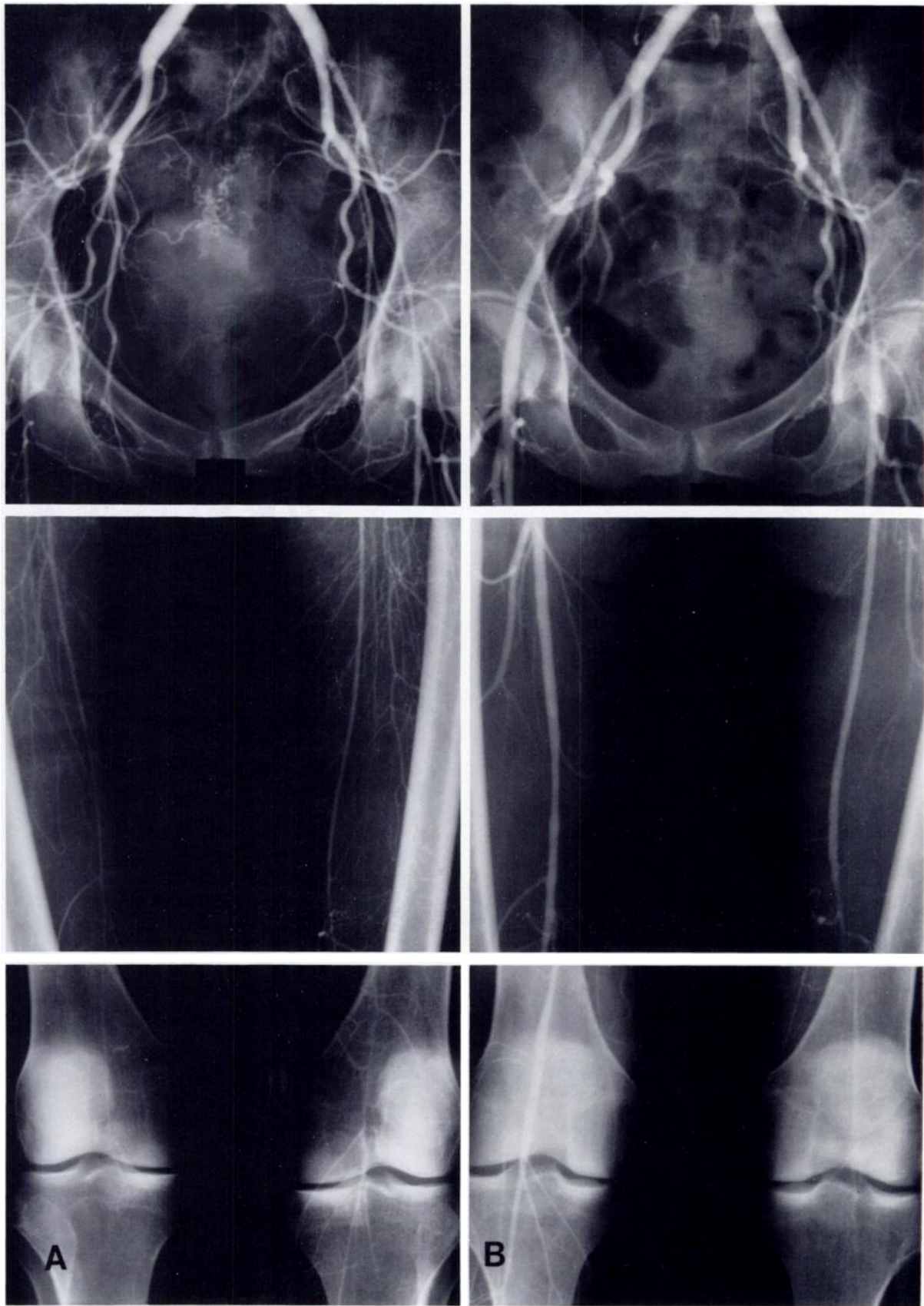


Fig. 1.—A, Original angiogram demonstrating bilateral spasm of external iliac, common and superficial femoral, and popliteal arteries. Collateral circulation also visible. B, Film after 14 hr of nitroprusside infusion above aortic bifurcation showing marked improvement of vessels on right. Spasm in left external iliac, superficial femoral, and peripheral arteries with collateral circulation persists. Right posterior tibial pulse was normal at this time.

of its rapid onset and cessation of action. In addition, tachyphylaxis has not been reported [4, 8, 9].

During treatment with nitroprusside, precise blood pressure monitoring and control, preferably with an arterial catheter, are strongly recommended. These techniques were essential in this case, because undesired hypotension could have easily produced cerebral ischemia distal to the partially closed carotid artery. In addition, in this patient intraarterial delivery was chosen for more selective action on the affected leg. The subsequent intravenous infusion was to prevent reactive vasospasm after withdrawal of the vasodilator, which although rare has been reported [8]. Despite infusion above the aortic bifurcation and into angiographically similar iliac vessels, the initial effects were much more dramatic in the ischemic leg, an unexplained but quite beneficial effect.

The injection factors for both pre- and posttherapy angiography were identical, using a total of less than 200 ml of contrast material for multiple injections during each study. There were no obvious effects of the contrast agent on the circulation in the limbs during or after the procedures.

The angiographic findings of arterial spasm and collateral circulation are usually bilaterally symmetric with areas of severe narrowing. These may be quite extensive, becoming more severe distally, or may be quite localized. In the lower extremities, which are most commonly affected, the spasm is usually in the superficial femoral arteries, although it may be in the iliac arteries. Thrombosis is a rare complication. Carotid [10], axillary [6], renal [11], and coronary [12] arteries may rarely be involved.

In 1936, Yater and Cahill [13] reported the first angiogram of bilateral gangrene of the feet due to administration of ergotamine tartrate. They described peripheral arterial occlusion with collaterals. No arterial spasm was demonstrated; however, angiography was done almost 6 weeks after the ergot was discontinued.

Although experience is very limited, our observations support those of O'Dell et al. [3] and Carliner et al. [4] that closely monitored intraarterial or intravenous infusion of nitroprusside may be an effective treatment of ergotamine-induced peripheral ischemia.

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