

Blue toe syndrome

Síndrome do dedo azul

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Abstract

The authors report the case of a man with blue toe syndrome, who developed bilateral foot ischemia and underwent successful repair of an abdominal aortic aneurysm and associated renal artery stenosis. Blue toe syndrome is characterized by tissue ischemia secondary to embolization of cholesterol crystals or atherothrombotic debris. Microembolization most often occurs in elderly men who undergo an invasive vascular procedure or have an aneurysm.

Key words: blue toe syndrome, atherosclerosis, aortic aneurysm, renal artery stenosis.

Resumo

Os autores relatam o caso de síndrome do dedo azul em um homem que apresentou um quadro de isquemia bilateral dos pés e foi submetido ao reparo bem sucedido de um aneurisma da aorta abdominal e de estenose da artéria renal associada. A síndrome do dedo azul é caracterizada pela isquemia tecidual, secundária à embolização de cristais de colesterol ou aterotrombose. A microembolização ocorre mais freqüentemente em homens idosos que têm um aneurisma ou são submetidos a um procedimento vascular invasivo.

Palavras-chave: síndrome do dedo azul, aterosclerose, aneurisma de aorta, estenose de artéria renal.

Blue toe syndrome is one of the frequent manifestations of tissue ischemia. Cyanosis of the digits may have several etiologies ranging from trauma to connective tissue disease. However, the most common cause of blue toe syndrome is the atheroembolic disease or aneurysm.

Case report

A 55-year-old man was admitted to the hospital with a four-month history of bilateral lower extremity pain and blue discoloration of toes. The bilateral foot pain had worsened for the past 1-2 months. The pain was relieved by rest, severely limited physical activity and walking. He had smoked since the age of 20. He

had a history of arterial hypertension, angina, renal insufficiency, a 4-cm abdominal aortic aneurysm (AAA) and bladder neoplasm treated 10 years before. Medications at the time of admission were: atorvastatin, lisinopril, hydrochlorothiazide and acetyl-salicylic acid. Upon examination, the abdomen was soft, with a pulsatile mass in the epigastric region. He had cold feet, with a decrease of tactile sensation. Femoral, popliteal, DP and PT pulses were palpable bilaterally. All toes were cyanotic and cool and the right big toe was ulcerated. A CT scan of the abdomen and pelvis showed an infrarenal AAA measuring 4 cm in diameter. A renal artery duplex showed right and left renal arteries stenosis at their origins, with peak systolic velocities of 262 cm/sec and 449 cm/sec, respectively. The patient was admitted to the hospital for surgical treatment. Under general anesthesia, a retroperitoneal approach was performed to expose the abdominal aorta and the left renal artery. The aorta and renal arteries were dissected and proximal and distal control obtained. A longitudinal aortic arteriotomy was made and an organized thrombus was removed from the aorta. The procedure performed

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Article submitted on September 19, 2005, accepted on November 11, 2005.

was an aorto-aortic bypass graft with a side-arm left renal artery Dacron-PTFE bypass graft (Figure 1). The patient was maintained in an intensive care environment for the first 2 days after the surgery. The creatinine level was 2.9 mg/dl before the operation and came down to 2 mg/dl in the postoperative period (Figure 2). The urea nitrogen dropped from 49 g/dl before the operation to 28 g/dl afterwards (Figure 3). The urine output immediately after the operation was greater than 200 ml/h and the renal function gradually improved over the course of a few weeks. The histological examination of the aneurysm contents showed only thrombus and calcified debris.



Figure 1 - Aorto-aortic and aortorenal bypass

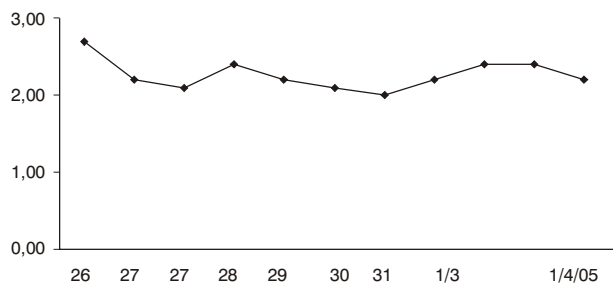


Table 1 - Creatinine decrease after the aorto-renal bypass in 12/27/04

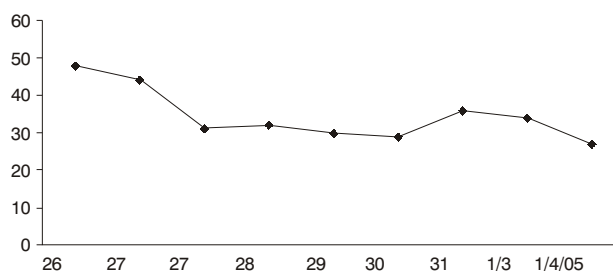


Table 2 - Urea decrease after the surgery

Discussion

The therapeutic goal for blue toe syndrome consists of surgical or percutaneous elimination of the source of embolism. Microembolization most often appears in elderly men who have undergone an angiographic procedure or vascular surgery or even anticoagulant or thrombolytic treatment.^{1,2} The differential diagnosis includes Raynaud's (especially secondary) phenomenon. In blue toe syndrome skin lesions are usually restricted to the occluded artery. Clinical presentation can range from a cyanotic toe or livedo reticularis to a diffuse multiorgan systemic disease that can mimic other systemic illnesses. The kidney is the organ that is most frequently affected (in approximately 50% of cases). In the systemic form prognosis is poor, with a mortality rate of about 70%.

The association with renal vascular hypertension and heart disease increases the chances of complications after the surgery.

The syndrome of cholesterol embolism in this case needs an urgent approach due to the distal ischemic

pain. The occlusion of small distal vessels was caused secondary to embolization of the cholesterol crystal from the aneurismal wall. In addition, our patient is young and had a small AAA associated to renal stenosis.

The decision regarding the type of intervention was not easy. The overall benefit of the endovascular treatment of AAA is well established.³⁻⁵ There was also the option to perform the renal angioplasty before the aneurysm treatment. Alternatively, we could have first done the endovascular approach to the renal artery. However, we decided to do the conventional approach for both illnesses at the same time. The reasons were: age (55 years old), the short neck of the proximal aorta in the CT scan, and to avoid contrast and the renal stenosis. The authors believe that up to this moment there are no benefits to do the renal artery stenting to improve renal function in a young patient who is going to suffer an open procedure anyway. Renal artery stenting is associated with restenosis rates (approximately 20%) and clinical failure rates of at least the same degree. Also, the intermediate term results are similar to open repair.⁶

In this case we decided to treat the abdominal aneurysm by open technique. Then our decision was to do the retroperitoneal access and fix both the aneurysm and the left renal stenoses. The incision was placed in line with the ribs to avoid injury to the intercostal nerves. The purpose of the operation is to place a prosthetic graft inside the aneurysm and anastomose the graft at its ends to relatively normal arteries. An aorto-aortic bypass was performed, as well as an aortorenal bypass. At this time, during the performance of the operation and surgical technique, technical notes should be made to identify the left renal artery. In addition, the left kidney is retracted anteromedially. It is our routine to feel the pulse of the renal artery. To improve the flow, the prosthesis should be parallel to the aorta as shown in Figure 1. For us it is a better way to perform the renal anastomosis. Relief of the pain in the distal bilateral lower limb was immediately observed. The clinical manifestations of the blue toe syndrome and laboratorial examinations stabilized. The distal lesions need amputation or debridement after

delimitation of the necrosis. Medical treatment is mostly symptomatic: rest, warm condition, appropriate dressing, hydration, and organ support when necessary, particularly to ensure renal function. Treatment of pain that is usually disproportionate to the extension of tissue lesion is of utmost importance. Because these patients usually have advanced atherosclerotic disease, secondary prevention with elimination of risk factors of atherosclerosis is mandatory. Antiplatelet drugs represent one of the basic treatment options of blue toe syndrome. In the future large randomized studies will be needed to help predict embolization and thus decide on the proper medical therapy.

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