Crutch-induced bilateral brachial artery aneurysms

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Received 22 August 2009; received in revised form 8 September 2009; accepted 10 September 2009

Abstract

A 57-year-old man, who was a chronic axillary crutch user as a result of childhood poliomyelitis, was referred to our hospital because of a sudden onset of right forearm ischemia. The right forearm had no pulse, and three-dimensional computed tomography (3DCT) showed an aneurysm of the right brachial artery associated with arterial occlusion. The thrombosed aneurysm of the brachial artery was resected and the brachial artery was successfully revascularized by interposing a saphenous vein graft. Postoperative 3DCT revealed an asymptomatic left brachial artery aneurysm. His postoperative course was uneventful under warfarin anticoagulation therapy.

Keywords: Axillary crutch; Brachial artery aneurysm; Saphenous vein graft; Brachial artery thrombosis; Forearm ischemia

1. Introduction

Cardiogenic embolism is the most common cause of peripheral artery occlusion. However, some embolisms arise from an arterial source. Chronic axillary crutch use may be associated with artery stenosis, aneurysm formation of the upper limb, and secondary axillobrachial thromboembolic disease. Here, we report a 57-year-old man with a diagnosis of acute upper limb ischemia.

2. Case report

A 57-year-old man was admitted because of an acute occlusion of the right brachial artery. Three days before admission, the right forearm had suddenly become numb and painful. The symptoms worsened, and he saw a family physician. The right forearm was found to have no pulse, and he was referred to our hospital.

The present episode was his first upper limb ischemia. He used crutches and a wheelchair owing to childhood poliomyelitis. He had been treated for non-insulin dependent diabetes for three years. No necrotic changes were observed on the right forearm. Heart sounds were normal without heart murmurs. Echocardiogram (ECG) revealed a normal sinus rhythm. His white blood cell count was 7300/μl, and serum creatinine kinase and lactate dehydrogenase levels were 20 mU/ml and 170 mU/ml, respectively. Three-dimensional computed tomography (3DCT) showed an aneurysm of the right brachial artery associated with arterial occlusion (Fig. 1). The location of the aneurysm corresponded to the site of an axillary pad of a crutch when used by the patient.

Because emergent catheter thrombo-embolectomy was unsuccessful, brachial artery grafting was scheduled. Anticoagulation therapy by heparin in combination with prostaglandin and cilostazol improved the ischemia. He underwent the operation 12 days after the initial symptoms. The thrombosed aneurysm of the brachial artery, 20 mm in diameter, was resected and the brachial artery was revascularized by interposing a saphenous vein graft after embolectomy of the forearm.

Pathological study of the resected specimen revealed thinning of the media and atherosclerotic changes without calcification. The thrombus in the aneurysm was not organized. His postoperative course was uneventful under warfarin anticoagulation therapy as postoperative anticoagulation for brachial artery bypass grafting. A postoperative 3DCT revealed a patent saphenous vein graft and an aneurysm, without a thrombus, of the left brachial artery associated with arterial occlusion. The thrombus in the aneurysm was not organizable, but calcification. The thrombus in the aneurysm was not organized.

3. Discussion

Aneurysms of the axillary and/or brachial arteries are not common but are potentially lethal for the upper extremity. These aneurysms can arise as aneurysms or pseudoaneurysms secondary to atherosclerosis, trauma or degenerative lesions such as Marfan’s syndrome [1–3]. They can also arise as poststenotic lesions in patients with thoracic outlet syndrome [4]. Use of an axillary crutch produces subtle but accumulating long-term pressure loading to the axillary and/or brachial arteries. Thus, a chronic axillary crutch user is at increased risk of developing axillary and/or brachial artery stenosis, aneurysms, and secondary thromboembolic episodes in the upper extremities.
Fig. 1. Preoperative and postoperative 3DCT. The right brachial artery is completely obstructed at the mid-portion of the upper arm, and the left brachial artery also has an aneurysm of 15 mm in diameter.

Fig. 2. Pathological findings. Pathological study of the resected specimen revealed thinning of the media and atherosclerotic changes without calcification (Elastica von Gieson stain ×10). The thrombus in the aneurysm was not organized.

The signs and symptoms vary according to the size and location of the aneurysm and include mass effects of brachial plexus compression and ischemic events of the upper extremities [2]. 3DCT and duplex scanning are the most useful imaging modalities, and treatment should be considered to prevent limb loss or dysfunction.

The treatment of crutch-induced axillary and/or brachial aneurysm or stenosis must be performed before definitive sequelae develop. Most cases can be treated successfully with surgical excision and vascular grafting, and some respond to percutaneous transluminal angioplasty (PTA) of a focal artery stenosis [5–7]. For example, Feldman and colleagues reported a case with an axillary artery aneurysm and distal thromboembolic disease, which was treated by both thrombolysis and surgical thromboembolectomy, and later by PTA to treat an axillary artery intimal disruption [7]. Initially, we tried catheter thromboembolectomy. The procedure was carefully performed in order to avoid mechanical endothelial damage. As a result, however, thrombus was not removed. Thrombolytic therapy might be chosen without catheter thromboembolectomy in this case.

For an asymptomatic patient, treatment is controversial. When the aneurysm contains a thrombus, surgical treatment should be offered at the time of discovery of the aneurysm to prevent potential embolisms to the extremity. Our patient has another aneurysm on the left upper arm, but which has no thrombus. Thus, the patient is being closely followed-up. Our patient with bilateral brachial artery aneurysm strongly implies that a chronic axillary crutch use can be a cause of aneurysmal formation in the upper arm. Chronic crutch users should be aware of this entity, crutch-induced vascular injury, which is a common cause of upper extremity ischemia.

References