

Crutch-related acute arterial thrombosis in upper limb: case report

Oclusão arterial aguda de membro superior associada à utilização de muleta: relato de caso

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Abstract

Case report of an acute arterial obstruction in the upper limb secondary to thrombosis of the axillary artery caused by chronic use of crutches. The authors make a brief review of the literature and discuss it in relation to the present case.

Keywords: axillary artery; thrombosis; crutches.

Resumo

Relato de caso de obstrução arterial aguda do membro superior por trombose da artéria axilar secundária ao uso crônico de muleta. Os autores fazem uma breve revisão da literatura, discutindo o presente caso.

Palavras-chave: artéria axilar; trombose; muletas.

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INTRODUCTION

Acute thrombosis of the axillary artery resulting from injury caused by chronic use of crutches is a rare event. Difficulty in walking is the most common reason for using crutches, usually secondary to orthopedic problems and neurological sequelae. Incorrect use of underarm crutches results in axillary compression for long periods and can cause localized trauma leading to structural changes, formation of thrombus, and/or aneurysmal degeneration at the site, which in turn can lead to acute arterial obstruction.¹⁻⁴ This case report is intended to call attention to the type of clinical presentation found in this rare form of upper limb arterial obstruction and the importance of its prevention.

CLINICAL CASE

The patient was a 67-year-old white woman who had undergone multiple surgical interventions during childhood because of osteomyelitis of the right femur, resulting in limb hypoplasia as a sequela (Figure 1). She adapted herself to using a home-made crutch as an aid in walking, which she used under the right axilla (Figures 2 and 3). She presented systemic arterial hypertension, for which she was on Enalapril, depressive syndrome, being treated with Fluoxetine and Alprazolam, and had a past history of an adenocarcinoma of the left breast, that had been treated with quadrantectomy and left-side axillary clearance 5 years previously and was still taking Tamoxifen. Four days prior to the admission to our service she began to suffer continuous pain, low temperature and pallor in the right upper limb. On the day of admission she sought medical attention in her home town, where she was given a bolus infusion of 10,000 i.u. of unfractionated heparin and was then maintained on continuous infusion of unfractionated heparin at a dosage of 625 i.u. per hour. She also received analgesia. Some hours later her clinical status worsened with sudden cyanosis of the right upper limb associated with pain and pallor and she was referred to our service on the basis of suspected acute arterial obstruction. She stated that she had not suffered pain in the limb during physical exercise previously. On admission to our service she exhibited a good general appearance, although in continuous pain with reduced temperature and loss of sensitivity in the upper right limb, but with motricity preserved and no arrhythmia on clinical examination or on the electrocardiogram. Continuous wave Doppler showed an absence of arterial blood flow and presence of venous flow in

the affected limb, and she was diagnosed with a Rutherford type II-B acute arterial occlusion. She was transported to the operating room, where an embolectomy was attempted via the brachial artery. It was possible to clear the distal arterial bed, but restoration of antegrade flow was unsuccessful because it proved impossible to advance the Fogarty catheter proximally. The decision was taken to construct an axillobrachial graft with a reversed great saphenous vein. During the operation the patient suffered a coagulation disorder, probably because of the accumulation of the doses of heparin she had already been given plus the dose given intraoperatively (5,000 i.u. of unfractionated heparin in bolus), which was reversed by administration of protamine sulphate. On the first day after surgery



Figure 1. Hypoplastic right lower limb.



Figure 2. Patient using crutch. Observe that the crutch is higher than the axillary pit and is used at an open angle with the body leaning in the contralateral direction. There is no hand grip.

she suffered an occlusion of the graft. In view of the previous 4 days' clinical history, the hypothesis was that the distal bed could be obstructed. The patient underwent embolectomy of the graft and intra-arterial thrombolysis of the distal bed of the forearm and hand, using recombinant tissue plasminogen activator, achieving restoration of flow through the graft, radial pulse and good perfusion to the fingers. Subsequent recovery was uneventful and at 30 days the radial pulse was still present and the limb was viable.

DISCUSSION

The most common cause of acute arterial obstruction of upper limbs is attributed to emboli from cardiac sources.⁵⁻⁷ Symptomatic arterial



Figure 3. Improvised home-made crutch.

thrombosis of an upper limb is a rare event. The primary hypothesis for the cause of such cases is distal embolization or thrombosis of aneurysms of the subclavian-axillary transition secondary to thoracic outlet syndrome.⁷ Other causes that can provoke aneurysmal degeneration of this segment include the inflammatory diseases, particularly giant-cell arteritis, and repetitive trauma. Previously published reports of similar cases illustrate that the clinical presentation of arterial thrombosis is different from the presentation of embolism, since it is more gradual and patients generally seek medical care several days after onset of the symptoms. It may also be observed that some patients who use crutches present with pain in the upper limb during physical activity. Table 1 lists the times from onset of symptoms to admission of patients with arterial obstruction in some of the case reports that have been published to date. In the majority of cases, initial clinical presentation is of

Table 1. Time from onset of symptoms to admission and prior presence/absence of pain during physical effort in cases described in the literature.

Reference	Case	Time from onset of ischemic symptoms to admission and prior presence/absence of the symptom pain during effort
Brooks AL et al. ¹	Case 1	5 days
	Case 2	3 months + pain during effort
	Case 3	3 weeks
About WM et al. ²	Case 1	18 hours
	Case 2	6 months + pain during effort
	Case 3	18 hours + pain during effort
	Case 4	Not described
	Case 5	2 days
	Case 6	1 day
	Case 7	Not described
De Luccia N et al. ³	Case 1	8 hours
Achramek A et al. ⁴	Case 1	6 hours
	Case 2	2 weeks
Ettien J T ⁵	Case 1	3 days
McFall B et al. ⁶	Case 1	Not described
Konishi T et al. ⁷	Case 1	3 days
Moon I S et al. ⁸	Case 1	7 years - 8 hours
	Case 2	7 months + pain during effort
Furukawa K et al. ⁹	Case 1	5 years + pain during effort
The present report	Case	4 days

low perfusion for a period varying from hours to days preceding the definitive occlusion defined as severe ischemia, as was seen in this case, since the patient initially had symptoms of low perfusion and pain, reduced temperature and pallor in the limb 4 days before her admission. Later the condition deteriorated over a short period of time with worsening of the existing symptoms and emergence of cyanosis and paresthesia of the limb.

It should be remembered that the use of crutches is one possible cause of vascular injury leading to acute arterial obstruction in patients who need the help of orthoses.⁴ The trauma caused by the crutch against the axilla generates chronic repetitive traumatic compression of the axillary artery, which is capable of provoking the formation of an aneurysm or localized thickening of the artery wall.^{5,6,8} An arterial dilation can often be the site of local formation of mural thrombi, which, if displaced, can cause acute arterial

obstruction. When present, aneurysms should be treated as soon as they are diagnosed.⁹ All patients chronically reliant on crutches should be taught how to use them correctly, in terms of configuration and fitting adjustments. When indicated, Canadian crutches should be preferred to axillary support crutches.^{3,8,9}

CONCLUSIONS

The use of crutches may be associated with thrombosis and formation of aneurysm of the axillary artery through a mechanism of chronic injury, although the condition is rare. Aneurysms of the axillary artery should be repaired to prevent episodes of acute arterial obstruction. Canadian crutches should be preferred for patients with walking difficulties, whenever indicated, in order to reduce the occurrence of aneurysms/thromboses of the axillary artery.

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