

DIRECT THROMBEMBOLECTOMY OF AXILO-BRAHIO-RADIO-ULNAR VESSELS FOLLOWING CRITICAL UPPER LIMB ISCHEMIA AS COMPLICATION OF A CLAVICULAR FRACTURE – CASE REPORT

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Abstract: Critical limb ischemia is a vascular emergency defined as a sudden decrease in limb perfusion associated with a risk of loss of viability of the affected extremity. It has two treatment possibilities: surgical treatment or catheter-based treatment. In our opinion, mechanical thrombectomy (MT) is superior to thrombolysis in the treatment of limb ischemia in some cases. In rare cases, a clavicle fracture can cause arterial compression, releasing a limb ischemia. We describe the case of a 50-year-old male patient with critical ischemia of the right upper limb. He had a history of untreated right clavicle fracture in the childhood which had caused an extrinsic compression of the subclavian artery releasing occlusion. A thromboembolctomy combined with endovascular therapy of the subclavian, brachial and distal arteries was performed, mechanical thrombectomy proved to be more effective in this case.

INTRODUCTION

Superior arm ischemia is a seldom met case in vascular surgery. Endovascular treatment has developed at an astonishing rate in the last years, but has its indications and limits.(1) In rare cases, a clavicle fracture can cause arterial compression, releasing a limb ischemia.(2,3)

In cases of superior arm ischemia there are two treatment possibilities: surgical treatment or catheter-based treatment. Sometimes, mechanical thrombectomy (MT) is superior to thrombolysis in the treatment of limb ischemia in some cases.(4,5)

We report the case of a male patient presented in the emergency department (ED) with right superior limb pain, paresthesia and disfunctionality. A diagnosis of superior limb artery occlusion was set, following a fractured right clavicle, over a period of 20 years (progressive stenosis). Surgical treatment consisted of MT, endovascular-therapy and anticoagulation therapy.

CASE REPORT

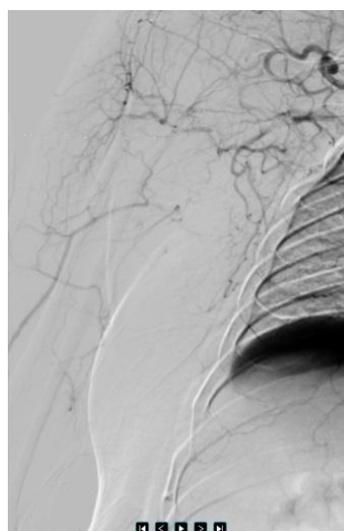
A 50-year-old no smoker male, right-handed patient presented in the ED with right superior limb pain, paresthesia, coldness and disfunctionality, with onset of simptomatology in the past 30 days. Before admission, the patient reported an acute increase in pain following physical exercise.

The clinical examination shows a normostenic, conscious, cooperative patient with correct orientation in space and time, he has cold and pale skin, oedema of the entire superior limb, absence of axillary, brahial, ulnar and radial pulses, motor and sensorial deficit, motion restricted only to the fingers. The blood pressure could not be measured in the right arm with 125/65 mmHg in the left arm. The patient has a history of arterial hypertension, mitral valve insufficiency, tricuspid valve insufficiency, hypercholesterolemia. Doppler ultrasonography showed no distal blood flow and monophasic

flow in the axillary artery.

Peripheral arteriography reveals an atherosclerotic plaque in the right subclavian artery extended over 23 mm causing a stenosis of 30-40%, without haemodynamical significance. Distal to the stenotic region a mobile thrombus is found causing a subocclusive stenosis. Following the stenotic region, no distal filling is noted and poor distal refilling via collateral vessels (figure no. 1). The image studies suggested an acute thrombosis. The axillary vein and its branches were undamaged.

Figure no. 1. Arteriography showing poor collateral circulation



In addition to the vascular system findings an old right clavicle fracture in the middle third set incorrectly (partial displaced) was found (figure no. 2) The patient reported a

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childhood trauma at that level that was not treated in a medical facility.

Figure no. 2. Old right clavicular fracture located near the subclavian artery



A mechanical transbrahial thrombectomy was performed in local anesthesia using a Fogarty catheter, followed by an intraarterial thrombolysis with Actilyse, concluded by PTA - Stent implantation (type Express LD 8x27mm) at the level of the axillary artery. But, after the stent implantation, the radiological examination showed the stenosis of the stent due to an extrinsic compression (figure no. 3) Consecutive reinterventions were necessary because of rethrombosis, which required surgical embolectomy and stent-removal.

Figure no. 3. Radiological exam showing the stenosis of the stent

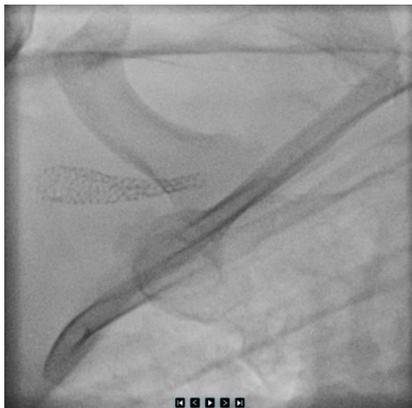
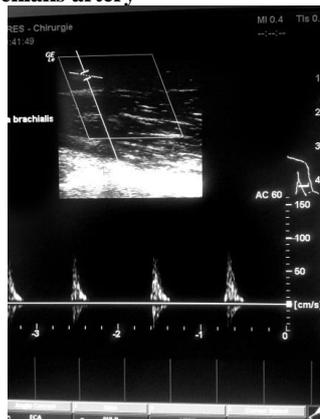


Figure no. 4. Postoperative Doppler ultrasound showing an open right brachialis artery



In the previous debate with our colleagues from the orthopedic department we established that there is no indication of an intervention to restore bone continuity at the level of the collarbone. An adequate postoperative anticoagulation therapy with heparin, followed by oral anticoagulation using warfarin maintaining an international normalized ratio between 2.0 and 3.0., and Prostaglandine (Pridax 2x2 amp. /day) brings an improvement to the clinical aspect of the patient, with adequate distal reperfusion. Postoperative Doppler ultrasound of the arm showed a biphasic and monophasic blood flow in the brachial, radial and ulnar arteries, respectively (figures no. 4-6).

Figure no. 5. Postoperative Doppler ultrasound showing an open right ulnar artery

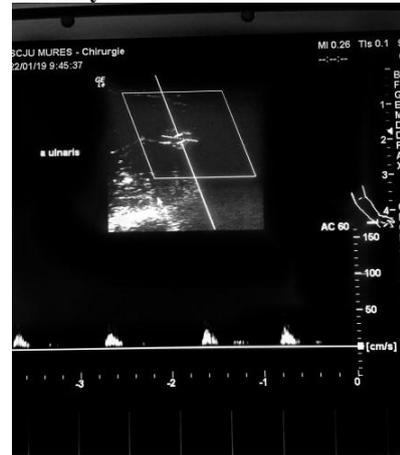
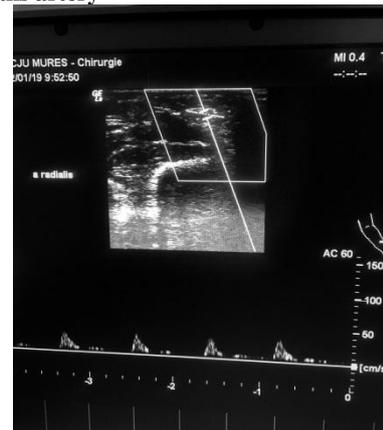


Figure no. 6. Postoperative Doppler ultrasound showing an open right radial artery



As a postoperative complication, a moderate reperfusion edema occurs, without any signs of compartment-syndrome, that was treated conservatively. The patient was discharged on the 21th postoperative day with persisting minor reperfusion edema and a fully functional right arm. Brachial and radial pulse was palpable, the blood pressure was measurable in the right arm with a minimal interarm systolic blood-pressure difference (SBP) of 5 mmHg. The patient continued treatment at home with oral anticoagulant, antiplatelets, gastroprotective medicine, lipid-lowering drugs, antihypertensive drugs.

DISCUSSIONS

Fractures of the clavicle are quite common, representing 2% to 10% of all fractures, and affect 1 in 1000 people per year. Clavicle fracture is the most common fracture in a childhood and middle age, but most of them evolve without complications. However, the most common documented

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complication in this case is a subclavicular stenosis and results from the vessel compression with localized thrombogenesis. Despite the close proximity of major vessels these are, rather surprisingly, very rarely injured and a search through the literature reveals only isolated case reports of such injury. Initial and ultimate outcomes of vascular injuries are determined in large part by the mechanism of injury.(2,3,6) In our case, the mechanism of injury was an extrinsic compression by an old clavicle fracture causing progressive local stenosis of the artery.

The patient was asymptomatic throughout 20 years as long as an acute events occur, developing critical upper limb ischemia with a combination of arterial thrombosis and distal embolization.(3)

In cases of upper limb ischemia, the subclavian artery is often affected. In a study performed in the USA, the prevalence of subclavian artery stenosis in the general population was 1.9%, with no significant difference between the sexes. Prevalence increased with age from 1.4% in those <50 years of age to 2.7% in those aged over 70 years. Subclavian stenosis was defined in this study as an inter-arm pressure difference of ≥ 15 mmHg, but, using angiography as the gold standard, the sensitivity of this definition has been shown to be only ~50% and specificity 90%. Thus the true prevalence of subclavian artery stenosis may be much higher than that observed in the cohorts. The majority of these cases are asymptomatic. Significant associations were found between both increasing age and higher systolic blood pressure with the presence of upper extremity artery disease (UEAD).(1)

An inter-arm pressure difference must be a warning sign for upper limb arterial stenosis and must be diagnosed. In these situations, color Doppler ultrasonography is a gold standard examination.(1,7) We used as first option the peripheral arteriography in view of evidence of the diagnosis and the possibility of simultaneous combination of diagnosis and therapy. After an accurate diagnosis and an unsuccessful interventional thrombectomy, a mechanical thrombectomy was performed combined with an intraoperative selective thrombolysis and a consecutive Stent-Implantation. A Stent-explantation was necessary because of stent-thrombosis. In this case a surgical thrombectomy proved to be superior over endovascular therapy.

An oral anticoagulation therapy in combination with antiplatelets therapy is essential in critical limb ischemia. Oral anticoagulation can be expected to reduce the risk for arterial embolisation.(8) We used coumarin-deriving (Trombostop 2mg) adjusted to an INR between 2.0 and 3.0 and Aspenter 75mg.

CONCLUSIONS

The failures (bad outcomes) of the endovascular management require open surgery when the damage of arterial axis is severe without sufficient collateral circulation. In the absence of any other cause for arterial thrombosis in the upper limbs one must thought of bone traumatism, respectively extrinsic compression.

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