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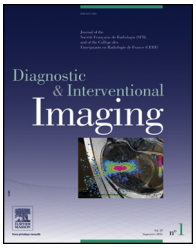

LETTER / *Cardiovascular imaging*

Clinical presentation and percutaneous endovascular management of acute left subclavian artery thrombosis: Report of two cases

Keywords: Left acute upper extremity ischemia ; Thrombosis ; Endovascular

Acute subclavian artery thrombosis is a rare cause of upper extremity or cerebral ischemia. Diagnosis and origin must be rapidly established, to allow an appropriate management in order to prevent catastrophic vertebro-basilar stroke. Surgery is often complex and inappropriate in emergency. Angioplasty and stenting are widespread used, in the management of subclavian artery stenosis [1—3]. Stenting an acute subclavian artery thrombosis is technically feasible, in intention to trap thrombus underlies. However, protection to vertebro-basilar embolism or treatment is a remaining successful key-point of endovascular management. Herein, we report two cases of acute subclavian thrombosis treated by percutaneous endovascular stenting of a culprit lesion, while technique to treat (1st case) or to prevent vertebra-basilar embolism (2nd case) were deployed.

Case No. 1

This is a 43-year-old woman referred in emergency by her general practitioner to our department. Since 2 hours after awakening, she presents an acute left arm pain associated to nausea. Clinical examination shows an acute left upper extremity ischemia associated with abnormal neurologic examination. Soon after her admission, she developed left hemiplegia, dysphagia and fell into a deep coma. On the immediately performed non-contrast enhance cerebral computed tomography (CT) scanner no abnormality was observed. A chest and neck CT angiography (CTA) revealed a left subclavian artery extensive thrombosis of the two proximal centimeters (Fig. 1a). Because of patient clinical status, deep and fast deterioration, an endovascular management was proposed in emergency. The global aortic arch angiography showed a proximal subclavian artery occlusion. By a right selective vertebral angiography, a basilar trunk embolic occlusion was found. This occlusion was one centimeter above the postero-inferior cerebellar artery takeoff (Fig. 1b). Basilar trunk was super-selectively catheterized with a 3 Fr microcatheter (Renegade® HI-FLO™ Boston Scientific Natick, MA US), through the right vertebral artery by the right humeral artery. The microcatheter was positioned above the postero-inferior cerebellar artery takeoff, and then a local fibrinolysis with 1 million IU of urokinase was delivered over one hour. While thrombolysis was ongoing, the left subclavian artery was catheterized by a femoral approach. A self-expandable stent (8 ∅ × 30 ↔ mm Wallstent® Boston Scientific Natick, MA) was deployed over the lesion to trap the thrombus between the arterial wall and the stent (Fig. 1c). One hour after fibrinolysis onset, because neither clinical status nor angiographic findings had improved; a selective thrombus aspiration was performed as it:

- the left vertebral artery was catheterized with a 8 Fr 150 cm length sheath;
- a 4 Fr Glide catheter (Terumo Somerset, NJ US) was advance to the thrombus head;
- and then a gentle manual aspiration with a 20 mL Medallion® (Merit Medical South Jordan UT USA) syringe was performed.

Only one single aspiration fairway was needed to aspirate the occlusive thrombus. The post-aspiration angiogram performed confirms the basilar trunk full patency (Fig. 1d). The patient had a full recovery in the following 3 hours. Electrocardiographic monitoring and transthoracic and transesophageal echocardiograms were normal. She was placed for 6 months under curative anticoagulation with vitamin K antagonist the substitute by aspirin until the last follow-up available. Five years later, the patient's neurologic and left arm vascular statuses were normal.

Case No. 2

This is medical story of a 42-year-old woman referred for supra-aortic angiography. Forty-height before, a left arm pain, with cyanosis and paraesthesia suddenly appear. Clinical examination show:

- cold left hand with no left cubital pulse;
- normal neurological examination.

A non-fractioned heparin therapy was begun before her transfer to our department for supra-aortic angiography. One the aortic arch global angiography, nearly occlusive thrombus was observed into the left subclavian artery ostium (Fig. 2a). Because of the high risk of cerebral embolization and after a multidisciplinary discussion, an endovascular approach as a treatment was decided.

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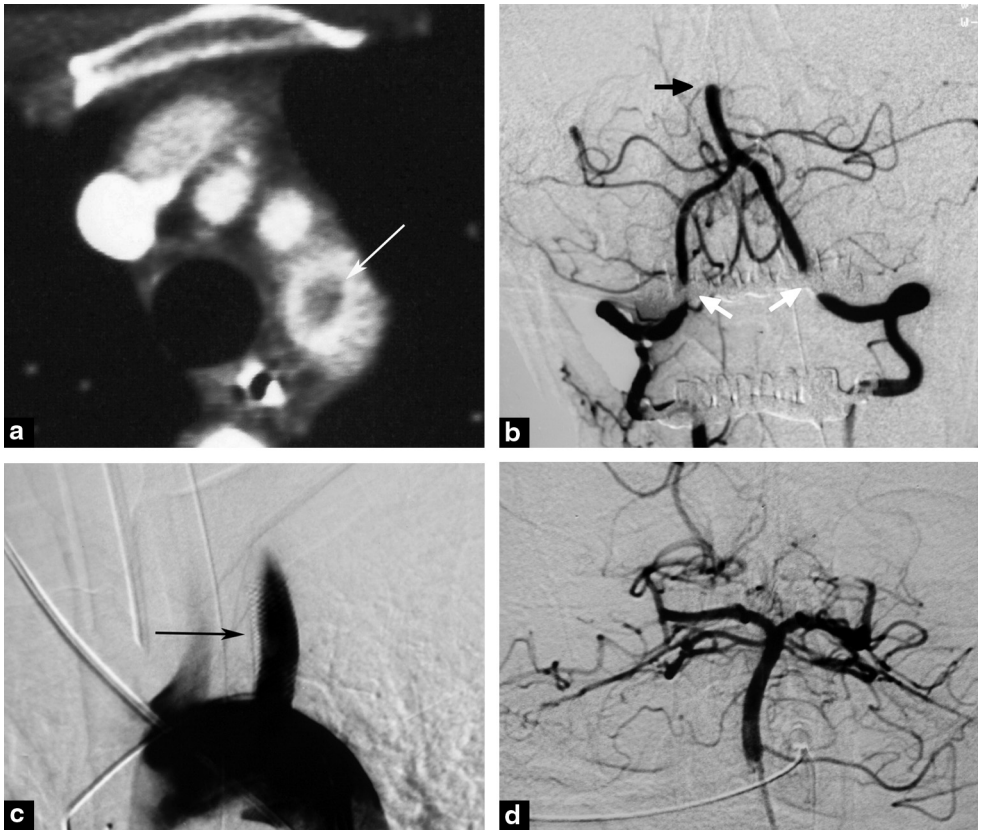

Figure 1. Patient No. 1 with an acute subclavian artery thrombosis, associated with vertebro-basilar embolism: a: chest CTA shows a large thrombus in the left subclavian artery (white arrow); b: black arrow shows the total occlusion of the basilar trunk above the PICA; c: the white arrows point to dental artifacts. After left subclavian artery stenting the global aortic arch angiogram show the full patency of this artery. Because of persistent basilar trunk occlusion despite local thrombolysis, a manual percutaneous was performed; d: shows the post-aspiration results with a complete arterial patency.

By a left humeral artery approach, a 4×20 mm angioplasty balloon, was inflated as a cerebral protection against thrombus migration into the left vertebral close to the ostium. Then, a 6 Fr femoral-armed 150 mm length sheath (Cook Flexor® Cook Medical Bloomington, IN 47402-4195 USA) was advanced in front of the left subclavian artery. Thrombus was crossed by a 0.035 J glide guide wire. Then two self-expandable (Absolut®, $10 \varnothing \times 20 \leftrightarrow$ mm Abbott Vascular, Abbott Park, IL) were deployed, to trap thrombus underlies. After stenting, balloon ($10 \varnothing \times 20 \leftrightarrow$ mm) inflation was performed to shape correctly the two stents (Fig. 2b). During the balloon inflation, the vertebral protection balloon was deflated to wash out potential embolized thrombi, by reversal flow through the vertebral artery. The last angiogram performed shows the full patency of the subclavian and vertebral artery (Fig. 2c). No cerebral embolism was observed. An occlusion of the cubital artery, with the full patency of radial and deep palmar arch was finding on the angiography. Transthoracic and transesophageal echocardiograms showed mild left ventricular hypertrophy and 24-h electrocardiographic monitoring was normal. The patient was placed on long-term anticoagulation with a vitamin K antagonist for 6 month, substituted by aspirin. The 2 years last follow-up available demonstrate that the patient was in stable health and vascular status of her left arm was normal.

Discussion

Acute thrombosis of the subclavian arteries is a rare cause of upper limb ischemia, usually promoted by an underlying abnormality of the aortic arch, aortic arch syndrome, trauma, arterial catheter or a pre-existing atheromatous stenosis [4—10]. In the two cases presented, no prothrombotic hematologic abnormality was found. Cardiac origin of embolism could not be firmly excluded. However both cardiac statuses were almost normal. Despite of a definitive diagnosis was not possible; an underlying localized atheromatous plaque might responsible of the two cases of acute thrombosis. Subclavian artery ostium is one of the preferential location of early atheromatous lesion [11]. Three management strategies could be proposed in such cases:

- medical therapy, using heparin, aspirin, clopidogrel, intravenous thrombolysis and glycoprotein IIb/IIIa antagonism;
- surgical procedures, including embolectomy and bypass grafts;
- percutaneous endovascular procedures.

In our first case, a life-threatening basilar trunk stroke imposed an emergent life-saving therapy. In the second case, patient was considered to have a high surgical risk because of overweigh and of short neck. Medical treatment might be