

Revascularization of the Subclavian Artery

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Abstract

Introduction: The incidence of stenosis of the subclavian artery represents 3-4% of the general population; atherosclerosis is the most common cause. We conducted this study to review the stenocclusive pathology of the subclavian artery, and to expose our experience in surgical and endovascular management.

Material and methods: It is a retrospective and analytical study conducted within the department of vascular surgery of Mohammed VI CHU concerning four observations of patients hospitalized between September 2014 and October 2016 for symptomatic subclavian artery stenosis.

Results: The average age of our patients was 78 years, 3 women and one man; atheroma was the cause of the stenosis in all cases. Surgical treatment consisted of subclavio-carotid transposition in 2 cases, carotid-bypass grafting in one case and angioplasty with stent placement in the latter case.

Conclusion: It is important for the surgeon to have a thorough understanding of the anatomy and etiology of subclavian artery stenosis, while considering the surgical options. This case series presents some of the treatment options available to vascular surgeons for the management of symptomatic subclavian artery disease.

Keywords: Subclavian artery; Stenosis; Surgical options; Endovascular treatment

Introduction

The incidence of stenosis of the subclavian artery represents 3 to 4% of the general population [1]; atherosclerosis is the most common cause. Depending on the degree of stenosis, it can remain asymptomatic or lead to neurological disorders with vertigo and instability (vertebrobasilar insufficiency), an upper limb claudicating (pain, muscle cramp) with a tension asymmetry between the two arms. Therapeutic management is essentially based on open-air revascularization (bypass and transposition) or endovascular procedures.

We conducted this study to review the stenocclusive pathology of the subclavian artery, and to expose our experience in surgical and endovascular management.

Material and Methods

It is a retrospective and analytical study conducted within the department of vascular surgery of Mohammed VI CHU concerning four observations of patients hospitalized between September 2014 and October 2016 for symptomatic subclavian artery stenosis (Figures 1-4).

Results

The average age of our patients was 78 years, 3 women and one man; atheroma was the cause of the stenosis in all cases. Two patients

consulted for vertebral-subclavian syndrome and the other two for ischemia of the upper limb. All the stenosis sat on the prevertebral segment of the artery. Surgical treatment consisted of subclavio-carotid transposition in 2 cases, carotid-bypass grafting in one case and angioplasty with stent placement in the latter case. The follow-up was simple for the 4 patients with an average duration of hospitalization of seven days. The clinical and radiological controls were satisfactory for the four patients over an average follow-up period of 24 months.

Discussion

Hemodynamically significant stenosis of the subclavian artery is usually present with signs of upper limb ischemia or signs of vertebrobasilar insufficiency [2]. Atherosclerosis is the most common etiology [3], subclavian artery involvement during the course of



Figure 2: CT angiography showing the carotid-subclavian bypass; A/B: proximal and distal anastomosis.



Figure 1: (A) Stenosis of ASC (B) Control CT scan showing left subclavio-carotid transposition.

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Received January 25, 2018; **Accepted** February 19, 2018; **Published** February 26, 2018

Citation: Abdellah R, Oussama A, Taha A, Houssam A, Adnane B, et al. (2018) Revascularization of the Subclavian Artery. J Vasc Med Surg 6: 359. doi: 10.4172/2329-6925.1000359

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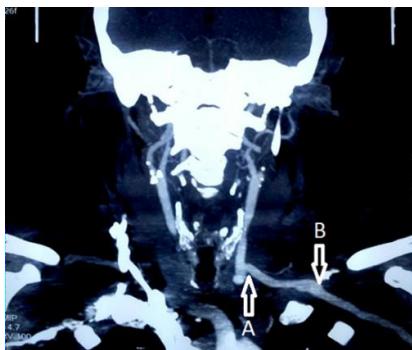


Figure 3: Intraoperative images showing left subclavio-carotid bypass in grand saphenous vein.

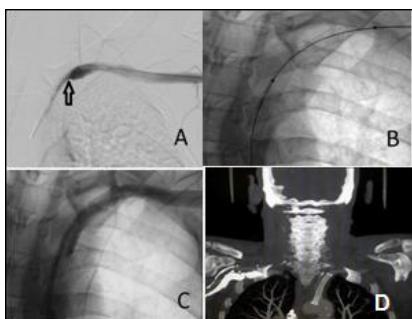


Figure 4: A-C show endovascular procedure showing angioplasty and placement of a right subclavian artery stent and D shows CT control.

inflammatory diseases such as Takayasu's disease remains rare, especially in the elderly. A small percentage of etiology is represented by congenital malformations (arteria lusoria) [4]. Through this study, the authors have described the three methods of restoring blood flow to the upper limb in four patients with ischemic symptoms on subclavian stenosis. It is widely accepted that subclavian artery stenting should be a first-line treatment. Angioplasty can, however, cause intraluminal hyperplasia and the levels of re-stenosis are greater than those of extrathoracic surgical revascularization [5].

The transposition of the subclavio-carotid artery is particularly justified if there is a proximal stenosis of the subclavian artery, the existence of embolism pathology of the upper limb, the need to revascularize at best a vertebral artery in the presence of vertebrobasilar ischemia. It is a safe technique with low reocclusion rates [6], and an

actuarial permeability ranging from 95 to 100% for mean follow-ups beyond 50 months [7], it is the technique of choice for treating subclavian steal due to an aberrant right subclavian artery [8]. The last method is represented by the carotido-sub clavian bypass. A wide range of grafts can be used, including Dacron, autologous vein and PTFE however this technique remains fraught with complications with mortality rates of 0 to 3% and a risk of stroke of 0-5% [9,10]. Subclavio-carotid transposition is today the standard surgical correction technique for these lesions, to which the endovascular procedures should be compared especially with regard to the primary and secondary permeability.

Conclusion

It is important for the surgeon to have a thorough understanding of the anatomy and etiology of subclavian artery stenosis, while considering the surgical options. This case series presents some of the treatment options available to vascular surgeons for the management of symptomatic subclavian artery disease.

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