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Left subclavian-carotid bypass in a 38-year old female with brain ischemic symptoms secondary to Takayasu's arteritis: A case report

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ABSTRACT

INTRODUCTION: Takayasu's arteritis (TA) is a rare form of vasculitis that affects the aorta, its branches and pulmonary arteries. TA is primarily treated by pharmacologic therapy; however revascularization procedures may be required to treat organ ischemia. Evidence-based consensus regarding the indications for surgical or endovascular therapy for patients with supra-aortic vessels lesions remains unclear.
PRESENTATION OF CASE: We herein present a female patient with known TA since 2000, who experienced progressive and frequent episodes of amaurosis fugax in the left eye for 4 months. Computed tomography angiography (CTA) revealed focal stenotic segments in the right common carotid artery (CCA) and internal carotid artery (ICA) and near occlusion of the proximal left CCA. We opted to treat the left side first with open revascularization, and a subclavian-carotid bypass was performed using a 6 millimeters (mm) externally supported ePTFE graft. Patient recovered well from the surgery, her neurological exam was normal and she was discharged home in stable condition in postoperative day three. At three months she remains symptoms-free and her bypass is patent.
DISCUSSION/CONCLUSION: This case illustrates the clinical presentation of TA affecting both carotid arteries; open revascularization via carotid subclavian bypass grafting was successfully performed with minimal morbidity, complete resolution of symptoms and improvement of the patient's quality of life. Revascularization procedures when indicated should be performed while the disease is inactive and close surveillance is mandatory.

1. Introduction

Takayasu's disease (TA) is likely an autoimmune arteritis that causes inflammation of the aorta, its major branches, and pulmonary arteries [1]. This nonspecific inflammatory process affects predominantly Asian or Latin American young women with a female-to-male ratio of 5.8–1; the onset is typically during the second or third decade of life [2]. Estimates of incidence vary widely depending on the geographic region; [3] in North America has been estimated in 2.6 cases per million per year [4]. The classic description of the clinical manifestations include 3 phases: the first is characterized by acute inflammation with constitutional symptoms such as fever, arthralgias and weight loss. The second phase characterized by vessel inflammation, accompanied by vessel pain and tenderness, and the third and final phase (called the burn-out phase) is characterized by vessel fibrosis and/or aneurysmal degeneration [5]. However, many patients do not follow this clinical presentation, and up to 57% do not develop constitutional symptoms. Ischemic neurologic symptoms associated with occlusive lesions in supra-aortic trunk vessels as transient ischemic attacks (TIA) or stroke are uncommon, affecting approximately 6% of patients with these lesions [6].

TA is primarily treated by pharmacologic therapy; however revascularization procedures may be required to treat organ ischemia. Evidence-based consensus regarding the indications for surgical or endovascular treatment for patients with occlusive lesions of the supra-aortic vessels remains unclear [7]. We herein present a case of Takayasu's arteritis with bilateral involvement of the carotid arteries and ischemic neurologic symptoms treated with open revascularization via left subclavian-carotid bypass; we briefly discuss the clinical presentation, angiographic findings, differential diagnosis, surgical decision-making, revascularization technique and clinical outcome.

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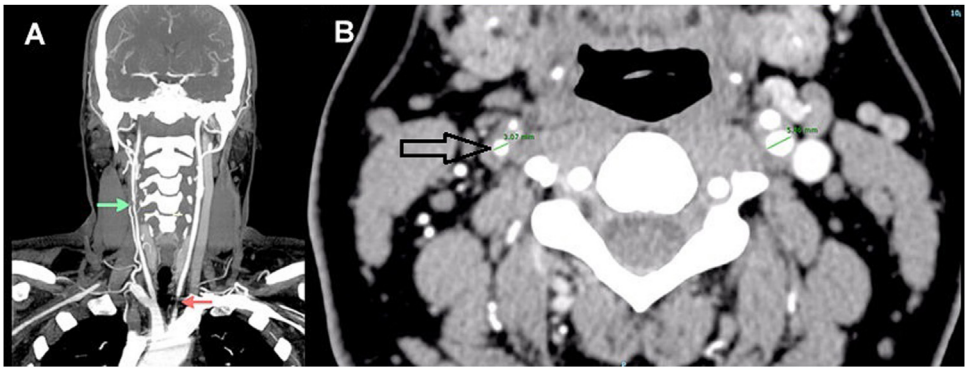

Fig. 1. Computed tomography angiography (CTA), coronal view demonstrated focal stenosis in the right common carotid artery (CCA) (Green arrow) and near occlusion of the proximal left CCA. (Red arrow) (A). Axial view shows focal stenosis in the right internal carotid artery (ICA) (Black hollow arrow) (B).

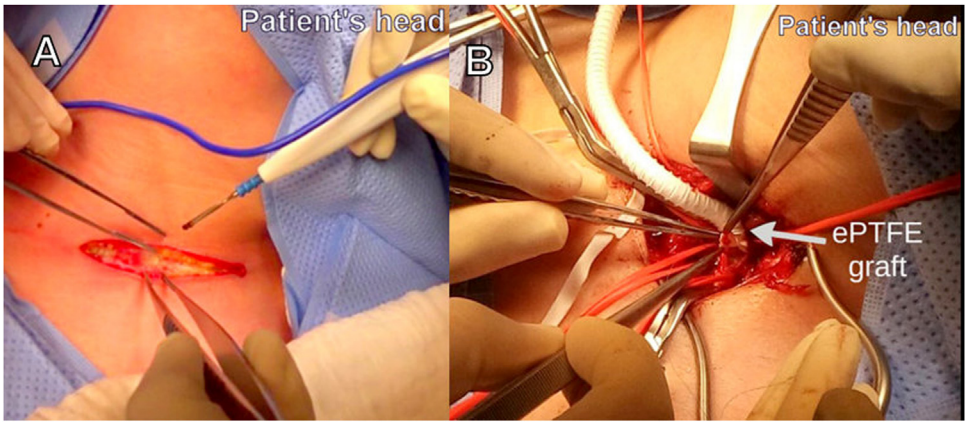

Fig. 2. A six centimeters (cm) left supraclavicular incision was performed (A); and end to side anastomosis to the subclavian artery was performed using a 6 mm externally supported ePTFE graft (B).

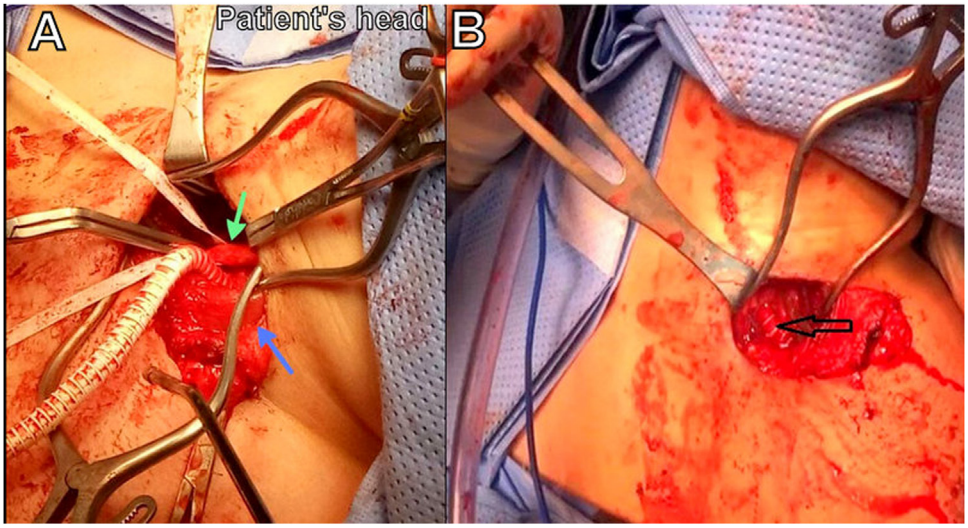

Fig. 3. The graft was passed underneath the sternocleidomastoid muscle (Green Arrow) and the internal jugular vein (Blue arrow) (A), and the anastomosis was completed in an end to side fashion with the left CCA (B).

2. Presentation of case

A 38-year-old female with known diagnosis of TA [Based on the American College of Rheumatology criteria (ACR)] [8], and followed in our Institution since 2000 was referred to our vascular surgery clinic with 4 months-history of progressive and frequent episodes of amaurosis fugax in the left eye. A computed tomography angiography (CTA) revealed focal stenotic segments in the right common carotid artery (CCA) and internal carotid artery (ICA); near occlusion of the proximal left CCA was also present (Fig. 1A, B). Her physical exam was notable for bilateral carotid bruits, more accentuated on the left side. She had normal peripheral pulses and equal arterial blood pressure gradient in upper and lower extremities, no visual acuity disturbances were noted on exam. Her Erythro-

cyte sedimentation rate (ESR) and C-reactive protein (CRP) were within normal limits. Following discussions with the patient and her family regarding the different therapeutic options, we decided to perform a revascularization procedure on the left side first in order to minimize the possibility of hyperperfusion syndrome, and depending on the clinical outcome to evaluate need for treatment of the lesions on the right CCA and ICA. The patient was taken to the operating room (OR), her neck was turned to the contralateral side and a 6 centimeters (cm) left-sided supraclavicular incision was performed (Fig. 2A). Surgical dissection was carried out lateral to the clavicular head of the sternocleidomastoid muscle. The carotid sheath was identified and incised, and the carotid artery was mobilized circumferentially and controlled. After identifying the phrenic nerve, the anterior scalene muscle was divided with electrocautery exposing the left subclavian artery. Mobilization and control of the left subclavian artery and its branches was performed, followed by heparinization and vessels clamping. An end-to-side anastomosis was completed in the subclavian artery using a 6-mm ePTFE graft (Fig. 2B). Subsequently, an end-to-side anastomosis to the carotid artery was created (Fig. 3A, B). Doppler signals were obtained demonstrating adequate blood flow through the graft and the CCA (Video S1 in the online version at DOI: http://dx.doi.org/10.1016/j.ijscr.2016.07.047), and finally the wound was closed by layers.

Her hospitalization course was uneventful, following the surgery her full neurological exam was normal and she was discharged in stable condition in postoperative day number three. At six months, she remains symptoms-free and her bypass graft is patent on antiplatelet therapy with aspirin.

3. Discussion

First described in 1908 by Takayasu [9]; TA is a progressive inflammatory disease that affects blood vessels. During the “early” phase, the media layer undergoes destruction of the elastic fibers and inflammatory cells are present; the “late” or chronic phase is characterized for retraction of the scar leading to vessel narrowing and occlusion with absence of inflammatory cells [10]. Although the pathogenesis of this rare disease appears to be clearly autoimmune, the precise cause remains elusive and is likely multifactorial: genetics, immune-mediated mechanisms, estrogens and mycobacterial infections have been implicated [10].

TA is characterized by a waxing and waning course, and patterns of disease have been described with a clear association with geography: arterial stenotic lesions are thought to be more common in Japan, whereas aneurysmal disease is more frequent in India, Thailand and Mexico [5]. Although multiple diagnostic criteria have been proposed for TA, there is no global consensus on which to use best; both the modified Ishikawa criteria and the diagnostic criteria proposed by the American College of Rheumatology (ACR) are widely used among institutions [11].

Neurologic ischemic symptoms are fairly uncommon despite the involvement of supra-aortic trunk vessels and 3–12% of patients present with symptoms [12]. In a study by Mwipatayi et al. that included 272 patients with diagnosis of TA, 17% of these experienced acute stroke or TIAs, and these events accounted for 9.5% of deaths in their series [13]. Indications for surgery in this clinical scenario are ill-defined, as the natural history of these symptoms without surgical intervention is not entirely known. Differential diagnosis may include atherosclerotic carotid disease, carotid artery fibromuscular dysplasia, giant cell arteritis and other vasculitides. TAA patients differ from those with atherosclerotic disease, in that the clinical manifestations can cause global hypoperfusion of the brain rather than cerebral infarction due to embolic cause [7].

Most patients with TA will require some regimen of immunosuppression to control disease activity, since only about 12% have a self-limited illness which may obviate the need for medical treatment [14]; once the disease activity is minimal or absent, the need for revascularization should be evaluated. It is never advised to perform a surgical procedure with active disease or during inflammatory phase, since these procedures are more likely to require revision, and activity has been associated with significant decrease in 5-year patency rates, from 88% to 53% [15]. Even when the procedure is deemed successful, long-term follow up is mandatory in patients with TA, since 40% of patients exhibit progression requiring intervention in another vascular bed or revision of the original procedure [16].

With respect the durability of open surgery versus endovascular approaches, authors as Liang [17] assessed long term results after surgical bypass and endovascular revascularization; they observed that particularly after the use of stents, endovascular techniques were associated with higher rates of failures compared to bypass surgery. In the present case, we opted for an open revascularization given its durability; in our experience with aortic reconstructions, open techniques have demonstrated to be durable with secondary patency rates of almost 5 years [18]. Recently, Chen [19] reported 11 cases of endovascular recanalization of carotid arteries in Takayasu. During the following up of 31.6 months 7 cases of carotid occlusion and 2 of severe stenosis were successfully recanalyzed and experienced clinical remission. Eight were patent during follow up and recanalization failed in two due to a long segment of the artery. In another study, Kim et al. [7] reported no ischemic symptoms after bypass surgery, although neurologic deficits occurred in 40% of patients after endovascular treatment.

4. Conclusion

This case illustrates the clinical presentation of TA affecting both carotid arteries; open revascularization via carotid subclavian bypass grafting was successfully performed with minimal morbidity, complete resolution of symptoms and improvement of the patient’s quality of life. Revascularization procedures when indicated should be performed while the disease is inactive and close surveillance is mandatory.

Conflict of interest

The authors have no conflict of interest.

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Ethical approval

None.

Consent

Written informed consent was obtained from the patient for publication, as part of our routine consent for anonymized data collection for scientific purposes.

Author contribution

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