

Surgical Approach to Left Common Carotid Arterial Dissection Complicated During Endovascular Intervention in a Patient with Takayasu Disease: Case Report and Review of Literature

Bir Takayasu Hastasında Endovasküler Müdahale Esnasında Oluşan Sol Ana Karotis Arter Disseksiyonun Cerrahi Tedavisi: Olgu ve Derleme

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ABSTRACT Takayasu arteritis is a rare vasculitis of unknown etiology. Inflammation primarily involves aorta and its branches in this disease. In our case, multislice computerized tomographic angiography showed total occlusion of right, and critical stenosis of left internal carotid and proximal part of left subclavian arteries. A conventional angiography was planned to implant a stent to left internal carotid artery, and to screen any coronary lesions. There was osteal stenosis of left anterior descending artery (LAD) on coronary angiography. Takayasu arteritis was diagnosed regarding Ishikawa criteria, and the patient was administered corticosteroids. After 3 weeks of corticosteroid treatment, it was decided to implant a stent to LAD and left internal carotid artery. Although coronary intervention was successful, the carotid intervention with stent was unsuccessfully due to rupture of the intimal plaque. The patient was taken into operating room urgently due to stent failure. First, saphenous vein was prepared from upper segment of knee of left leg. However diameter of the vein was insufficient to be used as a vascular graft. Left internal carotid artery was reconstructed with a patch of saphenous vein. Additionally, a cross over bypass was performed from right common carotid artery to left common carotid artery using a 7 mm polytetrafluoroethylene graft over saphenous vein.

Key Words: Endovascular procedures; Takayasu arteritis; carotid artery, internal, dissection

ÖZET Takayasu arteriti, sebebi bilinmeyen nadir bir vaskülitir. Bu hastalıkta inflamasyon esasen aorta ve dallarında hasar oluşturur. Olgumuzda, çok kesitli bilgisayarlı tomografik anjiyografide sağ internal karotis arterde tam tıkanıklık, sol internal karotis arterde ve sol subklavian arterde de kritik darlık tespit edilmişti. Sol internal karotis darlığını için stent, ve koroner damarlarda lezyon tespiti için konvensiyonel anjiyografi planlandı. İshikawa kriterlerine göre hastaya Takayasu arteriti tanısı konulması üzerine, üç hafta steroid tedavisi uygulandı. Daha sonra koroner anjiyografide sol ön inen koroner arterde osteal darlık tespit edildi ve başarılı stent yerleştirildi. Ancak sol internal karotis artere stent yerleştirilmesi sırasında, plak rüptüründen dolayı disseksiyon gelişti. Böylece stent yerleştirilemedi ve hasta acil opereyona alındı. Ancak safen ven çapı, vasküler greft kullanımı için yeterli değildi. Sol internal karotis arter proksimal kısmındaki kritik darlık safen ven ile genişletildi. Sağ ana karotis arterden sol ana karotis arter artere 7 mm politetrafloroetilen greft ile safen ven yaması üzerine doğru bypass uygulandı.

Anahtar Kelimeler: Endovasküler prosedürler; Takayasu arteriti; karotis arter, internal, disseksiyon

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Ulusal Vasküler Cerrahi Derneği

Takayasu arteritis (TA) is a rare vasculitis of unknown etiology. In TA, the inflammation primarily involves aorta and its main branches, but rarely damages pulmonary artery. The main intention

of treatment is to control inflammation and to prevent further damage to the blood vessels, however the disease may lead to stenosis or aneurysms and eventually may cause death due to rupture of thoracic aorta.^{1,2} Surgery may be needed in those cases. Recently, surgical approaches are performed less owing to improvement of endovascular techniques in management of stenosis or aneurysms of arteries. Surgical reconstruction techniques usually include carotico-subclavian bypass and transposition in cervical vascular approaches. Carotico-carotid bypass and axillo-axillar bypass are rarely performed techniques for cervical vascular pathologies.

CASE REPORT

Our case was 39-year-old female, and she had dizziness and syncope, and weakness in her left arm. Her symptoms became more severe in the previous month, and she had two syncope attacks in the previous six months. On examination, she had no pulse in her left upper extremity, and a systolic murmur at left side of neck on auscultation. Laboratory tests revealed a high sedimentation rate and C-reactive protein level. Electrocardiography showed T wave negativity at anteroseptal derivations (V1-V3). There were no pathological findings on echocardiography, and the movements of heart walls were normal. Multislice cervical computerized tomographic angiography revealed total occlusion of right internal carotid artery (ICA), and critical stenosis of left ICA as well as stenosis of proximal part of left subclavian artery (Figure 1A). Osteal stenosis of left anterior descending artery (LAD) was detected on coronary angiography. Takayasu arteritis was diagnosed regarding Ishikawa criteria, and the patient was administered corticosteroids. After 3 weeks of corticosteroid treatment, it was decided to implant a stent to LAD and left ICA. The stent implantation to LAD was successful whereas intervention to left common carotid artery was unsuccessful due to osteal dissection that occurred due to rupture of the plaque (Figures 1B, C). The patient was taken into operating room urgently due to stent failure.

OPERATIVE TECHNIQUE

Under general anesthesia, an incision parallel to medial site of sternocleidomastoid muscle was made on both sides of the neck. Bilateral carotid arteries were dissected after injection of 5000 IU heparin. A 7 mm ringless PTFE graft was anastomosed end to side to right CCA due to inappropriate calibration of vena saphena magna. The other end of the graft was tunneled pretracheally to the left side, and via Inahara carotid shunt, distal perfusion of left ICA was supplied through the graft (Figure 1D). Proximal segment of ICA was enlarged with saphenous vein, and then distal part of the graft was anastomosed to vein patch. During operation, cerebral oxygenation was monitored via near infrared spectroscopy (NIRS, INVOS 5100, Cerebral Oximeter). The patient was followed up in the intensive care unit for one day, and then she was transferred to inpatient clinic. She was discharged on postoperative 5 day without any cardiac or neurological complications.

DISCUSSION

TA is a rare form of vasculitis and it generally involves aorta and its main branches. It is usually seen in young females. Previous studies showed that most frequently affected arteries were supraaortic arteries including innominate, carotid, and vertebral arteries, with an incidence of 31-54%.^{1,2} The clinical findings vary from asymptomatic form to stroke.³ Clinical findings, severity of vasculitis and increased number of damaged arteries increase mortality and morbidity of surgical interventions. Although patency of surgically managed arteries is higher, postoperative complications are fewer and less severe in endovascular interventions.⁴ Neurological findings of TA occur due to the stenosis of aortic arc and cervical arteries. These symptoms include dizziness, headache, visual impairment, transient ischemic attack and stroke.⁵ First-line treatment of TA is immunosuppression, primarily with corticosteroids. With glucocorticoid treatment, remission occurs in 40-60% of the patients. About 40% of all steroid-resistant patients respond to the addition of cytotoxic agents. Approximately 20% of all patients are resistant to

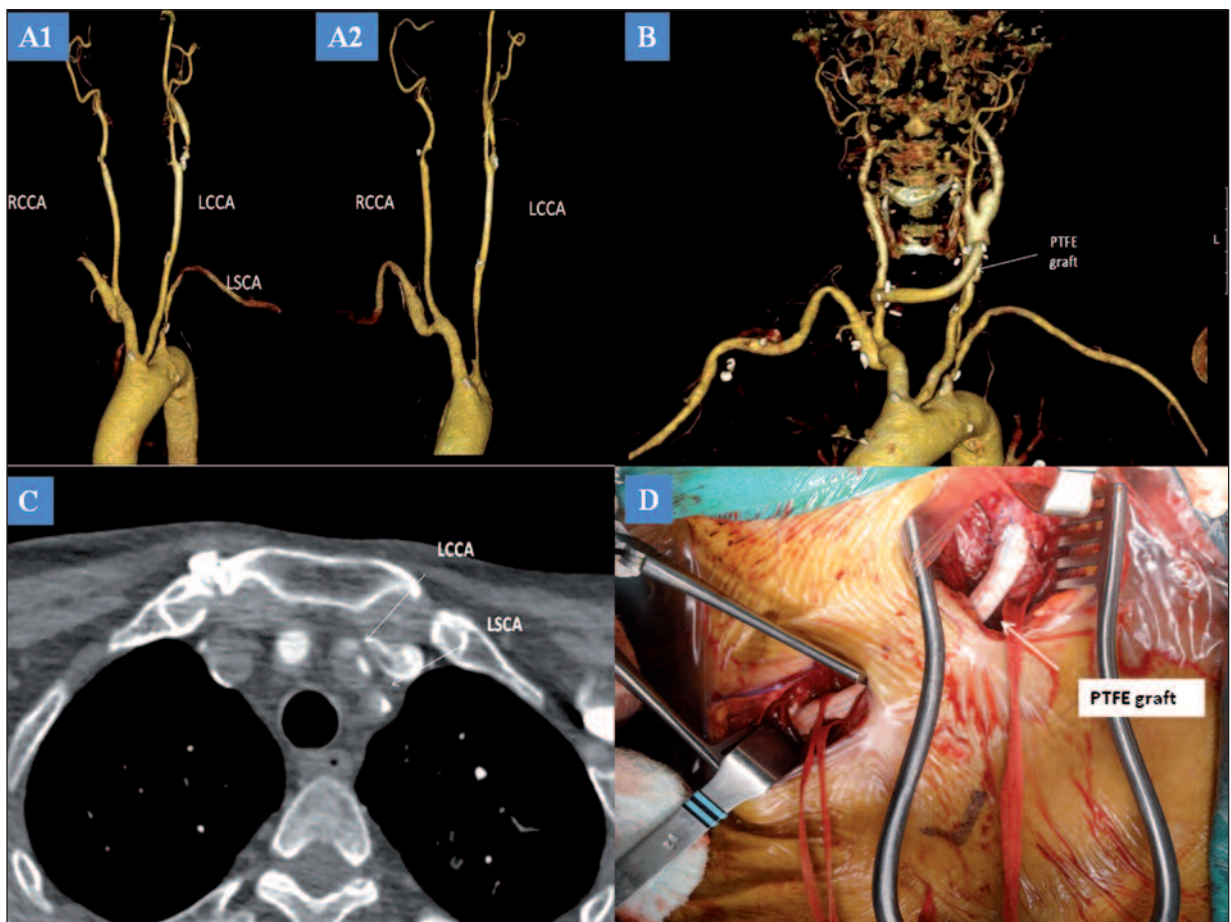


FIGURE 1: A1. Total occlusion of right internal carotid artery, and 90% stenosis of left internal carotid and proximal part of left subclavian arteries. A2. Iatrogenic dissection of the proximal segment of left common carotid artery on multislice computerized tomography angiography. B. Postoperative control angiography of carotico-carotid bypass. C. Three dimensional appearance of dissection of left common carotid artery after an unsuccessful endovascular procedure. D. Peroperative appearance of carotico-carotid bypass performed using a 7 mm ringless polytetrafluoroethylene graft between right and left common carotid arteries.

any kind of treatment.⁶ Therefore, aggressive medical and surgical treatment is required for patients suffering from major complications, and a progressive disease course. Recent advancements in medical and surgical treatments, including endovascular interventions, have improved the prognosis of patients with TA. Surgical interventions are also performed in severely occluded or dilated arteries.⁷ Sharma et al. reported that the noncompliant and fibrotic nature of the vessel walls in TA requires higher balloon inflation pressure, and this may render the vessel wall to increased risk of injury.⁸ Stenotic vessels in TA were often long lesions, and it has been noted that higher rates of restenosis correlate with the length of lesions in both atherosclerosis and TA. Better results

of percutaneous transluminal angioplasty in TA were observed in renal arteries when lesions were short and focal. However, long-term follow-up of stent patency and the management of restenosis are the most difficult issues to be faced in the future. Bypass surgery remains the gold standard for achieving long-term patency. Endovascular treatment provides symptom relief in a shorter period for those who are reluctant to undergo this operation. Moreover, physicians should always preserve the anastomosis sites for future bypass surgery when they perform endovascular stent placement.⁹ There have been sporadic cases of drug eluting stents (DES) implantation over carotid arteries in TA. The long-term patency rates have been variable, and further studies are needed to determine

the effectiveness of DES in those patients.¹⁰ In their large series on patients with TA, Berguer et al. reported that 27% of surgical interventions on 173 patients were supratruncal, and most of these procedures were subclavian-carotid bypass graft. Only 4 (2%) of 182 operations on 173 cases were carotico-carotid bypass graft in 16 years.¹¹ This procedure is useful if endovascular interventions and direct reconstructions are unavailable, and if left subclavian artery is occluded or stenosed. Graft can be crossed over to other side from retrotracheal or pretracheal regions, as done in our case.

In case of total occlusion of opposite internal carotid artery, a carotico-carotid crossover bypass can be applied safely without any need for sternotomy, as in our case.

Acknowledgement

Informed consent was obtained from patient in line with the Declaration of Helsinki, 1975.

Conflict of Interest

Authors declared no conflict of interest or financial support.

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