Aorto carotid bypass in Takayasu's disease

Seyed M. Alamshah, MD, Amanollah Heydari, MD.

Takayasu's disease is a young age female predominant (9/1 F/M ratio) nonspecific arteritis of unknown etiology affecting primarily the aorta and its main branches.[1,2] Its clinical presentation is confined to acute or chronic symptoms and signs related to ischemia due to stenosis, occlusion, Arterial dilatation or aneurysm formation. It also defines as asymptomatic pulseless disease and has other synonyms: aortic arch syndrome, Martorell's syndrome, atypical coarctation, brachiocephalic arteritis and idiopathic aortitis.[2] The yearly incidence is approximately 2.6-6.4 per million and occurs most prevalent in the Far East.[1] Basically, in spite of unknown origin, few kinds of genetic and autoimmune predisposition with strong relation to tuberculosis have been considered.[1] Patients may sustain some inflammatory symptoms include: fever, myalgia, arthralgia, malaise and weight loss that usually have been presented in rheumatological features. It may also presents with a various spectrum of ischemia, unexpected hypertension or specific vascular carotodynia complaints. Most patients present with arterial insufficiency symptoms. There are 4 types based on local arterial involvement: Type I, localized to aortic arch and its branches. Type II, is involvement of descending and abdominal aorta and its branches (coarctation form). Type III, reveals types I and II manifestations. Type IV, presents types I through III combined with pulmonary artery involvement. Type III of Takayasu's disease is the most common type and always contains a variety of clinical manifestations responsible for more affected arteries that are being occluded due to prevalent pan arteritis which is seen during early or late course of the disease. There is no any specific laboratory test which be able to confirm it[1,2] but in general, the tests related to the form of acute or chronic rheumatic or non specific collagen illnesses may become positive.[2] Almost always, ESR could be the best available denominator for following up in acute phase and relapse. However, it is far from using the tests for prompt decision making. Still, angiography remains the most valuable technique for diagnosis, otherwise, magnetics resonance angiography can be the alternative.

This report introduces a rare clinical presentation of an angiographically confirmed (26-years-old) female patient; a case of Takayasu's disease type III, under management of rheumatologist who diagnosed her 3 months before admission. Her chief complaint was dizziness and severe continuous headache, repeated fainting on standing or erect position, and dark-blurred vision for one week during her housekeeping before admission. She was already admitted for acute abdomen and passed a surgical procedure of 70 cm small intestinal resection for unknown etiology of bowel gangrene in Tehran with no other past history or considerable medical problem. On physical examination she had no any thrill or bruit to be considered in bilateral carotid palpation or auscultation and also no radial, ulnar, brachial, axillary and carotid pulses bilaterally; whereas, her lower extremities pulses were normally detected. Her laboratory tests revealed normal, and so emergency (closed cerebral supported) angiogram under the impression of acute carotid occlusion was requested as in our sense, there was no preferred indication for duplex scanning. The angiography showed complete aortic branches occlusion **(Figure 1)** except for the only appearance of 90% narrowed run off flow to right common carotid and vertebral artery via brachiocephalic artery. Also, subdiaphragmatic supra renal aortic aneurysm and left renal artery stenosis, complete original obstruction of celiac and superior mesenteric arteries with delayed appearance of superior mesenteric had been shown.

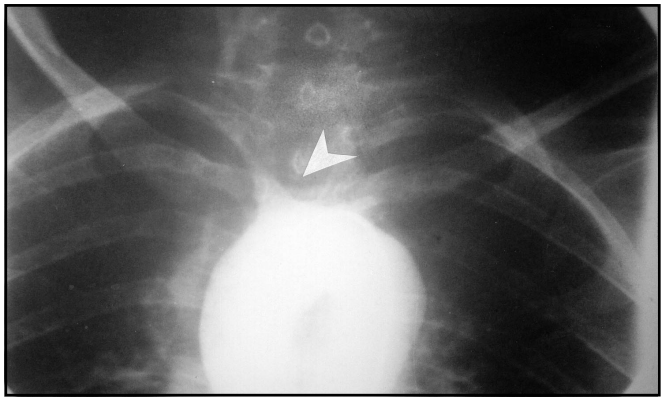

Figure 1 - Arrow shows appearance of the base of severe stenosed brachiocephalic artery and no other branches.

Thus, she was prepared to have a bridge aortocarotid bypass. We used a straight 20 cm length, 8 mm diameter knitted Dacron graft as of improper saphenous vein and performed the procedure through mid sternotomy and upward continuous anterior sternocleidomastoid incision. In the operating field we measured the distal pressure of right common carotid artery before bifurcation. The post stenotic pressure which was the only accessible cerebral circulation indicator, was unbelievably zero, but when we pressed the artery, at the mid common carotid point, the pressure gradient was kept around 30-34 mm Hg. Presumably, the lack of the gradient indicated a negative circulatory balance, perhaps due to the short of velocity and consequently, induced rapid blood evacuation toward the circle of Villis as the hanger of brain circulation. At the end of reconstruction, distal

native artery pressure was 63-65 mm Hg and in the graft was approximately 80, in spite of 130 mm Hg via femoral artery. We could not take any aortic wall biopsy due to severe fibrosis. Immediately post operative, all the symptoms relieved and she discharged on her fifth post operative day uneventfully and followed for 4 months by physical examination and confirmation of color doppler and found her asymptomatic with normal activities.

Classically, it is not expected that anyone be able to predict the real incidence of specific arterial involvement in Takayasu's disease. Subclavian artery, descending aorta, renal artery, carotid artery, ascending aorta, and abdominal aorta are the most commonly affected arteries.[1,2] Carotid involvement can produce lethal complications, and usually the lateralizing stroke is the main presentation, while it may accompany with transient ischemic attack and amaurosis fugax. There is high incidence of dizziness and syncope.[1,2] Common carotid artery involves in the form of long area of stenosis without progression to bifurcation during the process. The intima is soft and smooth without any ulceration; therefore, thromboembolic process is unlikely.The best approach to tackle the problem is ascending aorta-carotid bridge graft bypass as the ascending aorta has only 5% incidence of involvement.[1] Reconstruction also can be achieved in the other manner of performing vertebral-carotid, subclavian-carotid, axillo-carotid, carotid-carotid, thyrocervical-carotid,[3] internal thoracic-carotid[4] and hypogastric-carotid bypass. It is preferred to use the autogenous saphenous graft[3] or PTFE for one side bypass in order to decrease surgical and post operative complications. However, following bilateral procedures there might be more possibility of problems like transient hyperperfusion syndrome.[5] Several notices should be considered for surgical decision making as following[1] : 1. Close coordination between medical and surgical team for treatment and follow up. 2. Consideration of systemic medical problems. 3. Avoiding urgent or emergency surgery. 4. avoiding surgical procedures during acute phase. 5. Synthetic graft material should be avoided if bepossible. 6. Consideration of hypercoagulopathy due to aortiris. Surgical graft bypass in Takayasu's arteritis has own technical complications related to disease behavior. Less thrombosis and more probable false aneurysm are considered. Regarding the survival, excellent long term graft patency may be obtained after arterial reconstruction. Conclusively, Takayasu's arteritis usually diagnoses at the time that the patient possesses the progressed complications of disease on her arterial system; therefore, meticulous history and angiogram are the key diagnosis. The surgeons should be aware of the process of the arteritis; besides, matched therapeutic team cooperation is crucial. Bypass grafting is always inevitable in critical occlusive features and predilection needs to be focused on producing normal distal arterial run off maintained by continuous effective steroid handling by internist. Although long patency is expected and obviously owes the effects of corticosteroid therapy but, recurrence during and after exacerbation have to be mentioned. It should be emphasis that this disease must be surgically differentiated from atherosclerosis as there is no place for attempting endartrectomy whatsoever.

Received 5th March 2003. Accepted for publication in final form 10th September 2003.

From the Department of Surgery, Golestan Hospital, Ahwaz University of Medical Science, Ahwaz, Iran. Address correspondence and reprint requests to Dr. Seyed M. Alamshah, Department of Surgery, Golestan Hospital, Ahwaz University of Medical Science, Ahwaz, Iran. Tel. +98 (611) 3343960. Fax. +98 (611) 3331928. E-mail: smalamshah@hotmail.com

References

1. Giordano JM, Hoffman GS. Takayasu's Disease: Nonspecific Aortoarteritis. Rutherford Vascular Surgery. Chap. 21. 5th ed. WB Saunders; 2000. p. 364-373.
2. Haimovici H, Mishima Y. Nonatherosclerotic Disease of Small Arteries. Haimovici's Vascular Surgery. 4th ed. Chap. 42. Blackwell Scientific Company; 1996. p. 555-580.
3. Taguchi J, Yamada K, Miamoto Y, Ito M, Kohmura E, Hayakawa T. Bypass surgery for aortitis syndrome: aortocarotid bypass with saphenous vein graft. ***Surg Neurol*** 1992; 37: 300-306.
4. Matsumoto T, Yamada K, Shimazu N, Mase M, Mishima A, As Ukai T et al. Internal thoracic-carotid bypass surgery for Takayasu's arteritis. ***Surg Neurol*** 1998; 49: 417-419.
5. Kawaguchi M, Yamada M, Furuya H, Kurehara K, Okuda T, Inoue T et al. Hyperperfusion syndrome following bilateral aorto-carotid bypass, a study of transcranial doppler. ***No To Shinkei*** 1991; 43: 555-558.