Bypasses vs. Endovascular Treatments For Symptomatic Takayasu’s Arteritis (TA): Pros And Cons Of Each

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DISCLOSURE OF CONFLICTS OF INTEREST

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Title: Bypasses vs. Endovascular Treatments For Symptomatic Takayasu’s Arteritis (TA): Pros And Cons Of Each

I do not have any relevant financial relationships with any commercial interests.

Takayasu’s Arteritis (TA)

- Takayasu’s (TA) is a rare form of ‘systemic’ vascular disease of nonspecific inflammatory nature, affecting entire wall of the aorta and its main branches as a nonspecific pan-arteritis leading to occlusive disease or aneurysm formation.
- Hence, its clinical manifestations are varied and related to the vessel that presents the stenotic or occlusive lesions, such as the aortic arch, descending thoracic or abdominal aorta, renal arteries, coronary arteries, and pulmonary arteries.
- Therefore, same principle/indication to relieve ischemic symptoms based on the atherosclerosis should NOT be applied to TA because TA and atherosclerosis are two fundamentally different vascular disorders!!!

Takayasu’s Arteritis (TA)

- By the unique disease nature, the inflammatory status of TA waxes and wanes with active or chronic systemic inflammation so that it is essential to suppress it pharmacologically, with determination of serum C-reactive protein concentration and erythrocyte sedimentation rate (ESR).
- Strict control of acute/subacute condition with medical regimen is warranted for all the TA lesions before any non-medical, surgical/endovascular, management is considered, after all, TA is a medical condition, and NOT a surgical one from the outset.
- Its complication only is indicated for surgical intervention to relieve ischemic complication by occlusive lesions.

Takayasu’s Arteritis (TA)

- For example, most of the TA lesions look serious by narrowing, but they usually do NOT have any symptoms, if not, very minimal by its strong nature of the collateral development to provide excellent natural compensation.
- Since these collaterals are sufficient to relieve the symptoms in general, independent surgical intervention is seldom indicated/perform ed. However, occasionally, subclavian lesion is indicated for the treatment to improve the subclavian to vertebral flow to relieve cerebral hypoperfusion symptoms.

Takayasu’s Arteritis (TA)

- Another words, not all occlusive TA lesions are indicated for the relief and a simple fact of stenosis/occlusive lesions is NOT an indication for the intervention on the TA.
- Therefore, TA is generally indicated for the intervention ONLY when three conditions are met:
  1. Definitive lesion(s)
  2. Equivalent ischemia condition, and
  3. Functional impairment which does NOT respond to the medical/pharmaceutical treatment.
- Open surgical bypass has been able to relieve most of the occlusive lesion to cause acute/chronic arterial insufficiency.
However, to make the TA condition vulnerable to handle surgically, a perfectly normal part of the artery today will get involved by TA tomorrow to become abnormal with the stenosis/occlusion and/or dilatation. Naturally, there is no guarantee to the anastomotic site of the bypass to remain free from the TA through the rest of life, and depending upon the anastomotic site of the artery, there will be higher chance to be involved to TA sooner or later.

Unfortunately, proper identification of an ‘unaffected’ area of disease-free artery required for bypass surgery is often difficult, if not impossible. Besides, when ‘inactive’ stage flares up to full blown ‘active’ stage, previously healthy area of the vessel wall, selected for the bypass surgery, would become vulnerable to subsequent risk of the involvement.

For the inflow/proximal anastomotic site (e.g. ascending aorta), choose the site of anastomosis along the region which shows least wall thickening on the CT/MRI and/or PET. For the outflow/distal bypass site, choose technically feasible site for the anastomosis with least wall thickness on CTA.

Hence, not only careful selection of the bypass anastomotic sites, free from the TA involvement, but also a strict life-time control of TA with adequate immunosuppressive therapy is equally important, if not more. Following the surgery, the patient has to remain under constant vigilance to monitor the status of TA to provide a timely control of the flare/recurrence of TA besides regular evaluation on the anastomotic sites to abort their progress to the stenosis/occlusion.

Therefore, bypass surgery is NOT a panacea to relieve the occlusive lesion to cause acute/chronic arterial insufficiency permanently but remains vulnerable for the future involvement to T.A. especially when done during the remission period along relatively early stage of the T.A. Hence, a new approach of less invasive nature was mandated to bridging the gap till the disease reaches to its late/end stage to become safe for the bypass on completely burned-off artery as a permanent solution.

Together with the bypass, the endovascular management of TA lesions with PTA/percutaneous transluminal angioplasty/stenting is now well accepted as an alternative option.

The main indication for the PTA and/or stent includes clinically significant ischemia involving one or more vascular beds, renal-vascular hypertension, cerebro-vascular ischemia, and upper extremity ischemia. Intervention was made to a single vessel lesion with critical stenosis over 75%, or involvement of at least three cerebrovascular vessels with greater than 50% luminal diameter narrowing.

Indications for stenting include the presence of a post-angioplasty flow-limiting dissection, residual stenosis greater than 30%, and pressure gradient greater than 5 mm Hg.

The endovascular management of Takayasu’s Arteritis (TA)
Our own results of balloon angioplasty and stenting on N=35 lesions among N=24 patients in ‘inactive’ chronic stage fulfilled the role as an interim measurement if not a semi-permanent solution to restore the hemodynamic status and to relieve clinical symptoms especially for the condition of multiple vessel involvement during 11 year period. (January 1995 to December 2005) as previously reported. (Lee BB, Laredo J, Neville R, Villavicencio JL: Endovascular Management of Takayasu Arteritis: Is It a Durable Option? Vascualr, Vol. 17, No. 2, pp.1–10, 2009)

A further extended assessment (average of 76.2 months follow up) on the long term efficacy of endovascular approach upheld the initial results. Numano’s classification of Takayasu’s arteritis

Satisfactory hemodynamic correction of the pressure gradient by the procedure was achieved in its majority (N=30 out of total N=35) with excellent to good target lesion revascularization with no to minimal residual stenosis, comparable to other study outcomes.

However, steady recurrence of symptoms and stenosis was observed in both the angioplasty alone group and angioplasty and stenting group (11 out of 35) within the 48 month follow up period to require reintervention.

An additional retrospective review (January 2006 to December 2010) on same N=24 patients with N=35 lesions for further ‘extended’ period for 5 years revealed more recurrence of the stenosis in both the angioplasty alone group (12/18) and angioplasty and stenting group (7/17) as a total of 19 out of 35 : N=12 (N =4 in addition to initial N=8) among angioplasty alone group (N=18); N=7 (N=4 in addition to initial N=3) among angioplasty and stenting group (N=17).

Hence the surgical bypass remains a gold standard for the management of TA especially for its end stage with excellent track record with durable long term results in its majority although the endovascular intervention gains popularity especially as an interim management for the unsettled case with multiple lesions.

A diffuse long segment lesion of Carotid Artery should be treated with the bypass, while short Renal Artery lesions are generally suitable for the PTA since its majority belongs to the ostial lesion. Coronary Artery seems to respond to the stenting better from the beginning.

Symptomatic Takayasu Arteritis (T.A.) lesions in inactive chronic stage can be managed safely either with surgical bypass or endovascular therapy with angioplasty with/out stenting, to providing excellent to good clinical improvement in its majority.

However, endovascular therapy accompanies high rate of the recurrence to require re-intervention as less ideal for long term care regimen.

Surgical bypass remains a gold standard as excellent treatment modality with durable long term results. But it accompanies higher risk of serious early and postprocedural surgical complications.

Thank you for your attention!