

Efficacy and Safety of Primary Stenting in Takayasu Arteritis: Report of Four Cases

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Abstract

Background—

Takayasu arteritis (TA), an inflammatory disease of unknown origin, frequently affects major aortic branch vessels and causes many symptoms, including brain and retinal ischemia and hypertension.

Methods—

Four patients with Takayasu arteritis (TA) underwent angioplasty and stent placement in the renal arteries due to uncontrolled hypertension. Complications of the procedure include transient bradycardia and mild hypotension, probably due to contrast agent; however, there was no major complication.

Results—

No restenosis has been reported in the six-month follow up of the patients with angiography. Serum creatinine levels remained unchanged in the four patients. The difference between pre- and post- interventional arterial blood pressures was measured. Mean systolic blood pressure changed from 227.5 mmHg to 150mmHg and mean diastolic pressure dropped from 122mmHg to 85 mmHg.

Conclusion—

The stenotic lesions in TA can be managed successfully with angioplasty and stent placement. Short-term follow up showed stenting had increased the success rate of the procedure, achieved larger luminal diameters and it seemed to decrease the incidence of restenosis. However long-term follow up is suggested to determine the restenosis rate.

INTRODUCTION

Takayasu arteritis (TA), an inflammatory disease of unknown origin, frequently affects major aortic branch vessels and causes many symptoms, including brain and retinal ischemia and hypertension.¹

Revascularization procedures are usually performed for significant lesions in Takayasu's disease.² Although percutaneous transluminal balloon angioplasty (PTBA) is a treatment for the management of arterial lesions, restenosis remains a major concern with PTBA.^{3,4}

Stent-supported angioplasty achieves better luminal diameters and decreases the rate of restenosis.^{4,5} The authors hereby report four angioplasty and stenting and were followed for a period of 6 months.

METHODS

Angiography was performed in 5 patients suffering from obstructive lesions of the renal arteries caused by Takayasu arteritis from 2002 to 2004

One of these patients was not a candidate for angioplasty due to a minor lesion without clinical relevance. In four patients the vasculitic disease could be treated by endovascular technique. The mean age of the patients was 23, and ranged from 20 to 26 (all females). All cases met the criteria of the American College of Rheumatology for classification of vasculitis (Table I).

Figure 1

Table I. Vasculitis-specific anamnesis and additional supportive clinical findings of four patients suffering from Takayasu arteritis

Age/ Sex	ACR* criteria	Additional Clinical Features	BP
22/F	>10 mmHg difference in SBP (arms), Claudication of upper extremities, Evidence of narrowing of large arteries.	Carotid lesion, Right and left renal lesion	220/120 mmHg
20/F	>10 mmHg difference in systolic blood pressure (arms), Evidence of narrowing of large arteries.	Subclavian lesion	230/130 mmHg
24/F	Decreased brachial artery pulse, Angiographic evidence of narrowing of large arteries.	Renovascular hypertension	210/110 mmHg
26/F	Evidence of narrowing of large arteries.	Renovascular hypertension, Subclavian and coronary lesion	250/130 mmHg

* American College of Rheumatology

In patients with active disease (systemic complaints and marked elevation of ESR and CRP), intervention took place when general condition had improved. There were no signs of atherosclerotic vessel disease. All patients had long-standing arterial hypertension, which was difficult to control with medications (SBP > 160mmHg and/or DBP > 100mmHg). Mean systolic value was 227.5mmHg and ranged from 210 to 250mmHg and mean diastolic value was 122mmHg and ranged from 110 to 130mmHg. There was no renal insufficiency, with mean serum creatinine being 1.1 (range 1 to 1.2).

Before the interventional procedure, angiographic hemodynamically significant renal artery stenosis was present and one patient had subtotal ostial occlusion of the left renal artery.

Our technique included pre-dilation of the lesion in all patients, because lesions were involving the ostium, producing irregularity and also the vessels were firm and fibrotic. Dissection occurred in one patient but residual obstruction was seen after PTBA in others. PTBA and stent support were performed with the trans-femoral approach, 6 Fr sheath, guide wire 0.018 and bridge stent X in two cases, 7 French sheath, guide wire 0.035 and bridge stent flexible in other cases. After anticoagulation (5000 units of UFH),

the lesion was crossed carefully with a guidewire. Passing the lesion successfully, balloon angioplasty was performed with high pressure followed with balloon expandable bridge stent. The size of the balloon and stent was chosen based on the normal diameter of the lumen either proximal or distal to the lesion before PTBA and stenting (6-8 mm). 12,000 units of UFH were given intravenously for 12 hours to elevate PTT (60-80 seconds) after the intervention. Preexisting specific medications as long-term steroid therapy was also given to four patients. ASA and ticlopidine were administrated as long-term therapy before and after intervention to inhibit platelet aggregation. Stenting was performed with a peripheral stent. (Medtronic).

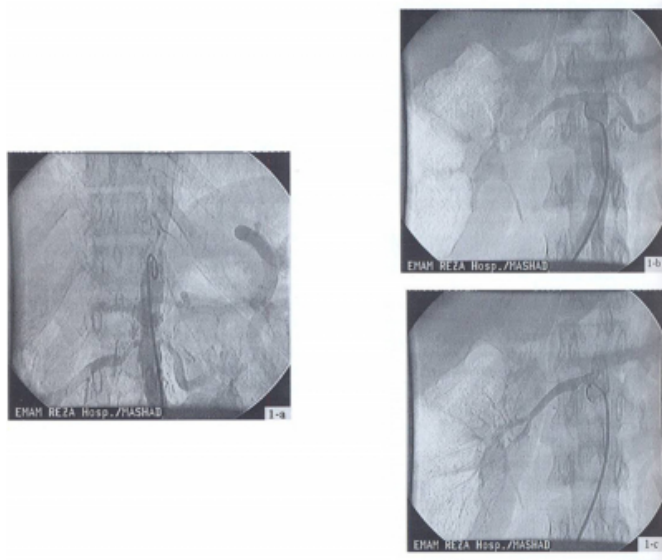
The intervention was considered to be technically successful in cases where the residual stenosis was less than 20% or the arterial lumen was at least 50% larger compared with the status before the treatment. Routine follow-up protocol included blood pressure measurements, determination of serum creatinine levels within the first three weeks and six months after intervention. Patients underwent angiography for evaluation of re-stenosis after six months.

RESULTS

Final angiography was performed immediately after stenting and it showed successful initial results in four of four lesions (100%). The degree of stenosis decreased from $89.75\% \pm 9.7\%$ to $17.5\% \pm 2.5\%$ in the lesions. No complication was seen during a six-month follow-up period. Stenting of the renal artery led to normal blood pressure within the three first weeks and six months after the procedure in two patients. Resolved stenosis led to incomplete improvement of blood pressure in the other two patients; however their blood pressures were controlled with anti-hypertensive agents very well. Their renal function did not get worse as their serum creatinine were unchanged. Four patients were followed with angiography and no stent migration, stent shortening or development of aneurysm was observed within the stent area. Restenosis of more than 50% of the measured diameter was not seen in four patients in the stent area (Fig. 1).

Figure 2

Fig. 1. Female patient, 22 years old, Takayasu arteritis. Successful stenting in severe stenosis (at least 75%) of right renal artery was done. There was additional mild stenosis of carotid, as a sign of generalized vasculitis process. The patient suffered from vertigo and headache. Her symptoms were improved after stenting and control of hypertension. before stenting, b: immediately after stenting c: after six months, no clinical relapse and no restenosis in secondary angiography.



DISCUSSION

The management strategies of TA include medical therapy with steroids or immuno-suppressive agents and revascularization procedures.⁷ During the active phase of the disease steroids have to improve the systemic inflammatory symptoms within a few days to weeks. In the chronic stage, the principal of treatment is revascularization of the affected organs, either with surgery or balloon angioplasty.⁵ PTR (percutaneous transluminal renal angioplasty) has become the initial choice treatment in patients with hemodynamically significant renal artery stenosis causing uncontrollable arterial hypertension and/or renal insufficiency. Initial technical success is impaired by residual stenosis, usually resulting in elastic recoil of the lesion or from an obstructing intimal flap at the PTR site.⁸ the PTR results are insufficient in up to 20% of lesions, with an especially high percentage (reaching 40%) in ostial lesions. The results of renal angioplasty in Takayasu are encouraging.^{10,11}

Sharmal et al. reported a technical success rate of about 95% combined with a clinical success rate of 89% after renal angioplasty. PTBA in our four patients showed that balloon angioplasty with stenting following is safe and effective in

the management of renal artery stenosis in TA with a success rate of 100%. Restenosis did not occur in the six-month follow up.

Our data suggests that primary stenting in Takayasu's is effective. It can be explained by three reasons; (I) tendency to vascular rupture due to the vasculitis process, (II) existence of lesions in the ostial sites of the vessels and (III) lower grade of balloon angioplasty efficacy in contrast to atherosclerotic lesions.

We have concluded that stenting is a safe and effective modality of treatment.

It increases the procedural success rate, and also it achieves a larger luminal diameter.

It seems that it decreases the incidence of re-stenosis in the six month follow up, however long-term follow up is awaited.

In our investigation, the limited number of patients decreases the sensitivity of our results to suboptimal. To improve the results in future we are going to include more cases and also choose a control group which undergoes statistical analysis.

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