

Giant Aortic Pseudoaneurysm and Dissection Following Bentall Procedure

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Abstract: Composite graft replacement of the ascending aorta and aortic valve has become the procedure of choice for patients with annuloaortic ectasia including those with Marfan's syndrome, ascending aortic dissection and other disorders of the ascending aorta and aortic valve. A complication of the aortic valve and ascending aorta replacement is the development of pseudoaneurysm, which is the result of suture line dehiscence in the aortic annulus, the coronary ostia, or the distal graft anastomosis. The clinical symptoms associated with pseudoaneurysm formation vary. Some patients have nonspecific symptoms or may be completely asymptomatic; other patients may be severely limited by dyspnea and fatigue. Echocardiography with Doppler and more recently TEE have had a significant impact on the detection of pseudoaneurysm and the evaluation of patients with composite graft.

Key words: Aortic pseudoaneurysm, bentall operation, dissection, echocardiography

INTRODUCTION

Composite graft replacement of the ascending aorta and aortic valve, first described by Bentall and De Bono, or its modifications have become the procedure of choice for patients with annuloaortic ectasia including those with Marfan's syndrome, ascending aortic dissection and other disorders of the ascending aorta and aortic valve. The original Bentall procedure consists of replacing the aortic root and valve with a composite aortic graft (ascending aortic graft and prosthetic aortic valve) and the aorta is wrapped around the graft to improve haemostasis^[1].

A complication of the aortic valve and ascending aorta replacement is the development of pseudoaneurysm, which is the result of suture line dehiscence in the aortic annulus, the coronary ostia, or the distal graft anastomosis^[1,2,3]. Rarely the pseudoaneurysm is due to graft infection^[4]. The clinical symptoms associated with pseudoaneurysm formation vary. Some patients have nonspecific symptoms or may be completely asymptomatic, other patients may be severely limited by dyspnea and fatigue. Echocardiography with Doppler and more recently TEE have had a significant impact on the detection of pseudoaneurysm and the evaluation of patients with composite graft^[1].

Case report: A 49-year-old man was admitted to our hospital, because of cough, exertional dyspnea and orthopnea for three months. He had undergone Bentall surgery 8 years before for aneurysm of ascending aorta and severe aortic insufficiency. Native aortic wall was preserved around Dacron graft with coronary arteries reimplantation. The first follow up transesophageal echocardiography was done 3 years ago because of dyspnea on exertion which showed large pseudoaneurysm of ascending aorta secondary to partial dehiscence of aortic annulus and mild to moderate paravalvular leak from posterior side of aorta with mild LV enlargement (Fig. 1). The patient refused re-do operation and closed medical follow up was recommended.

Second TEE was done after admission which showed:

- Significant increase in ascending aortic diameter (11.5 cm),
- A dissecting intimal flap with large (2.8 cm) entry site on posterior side of aorta, beginning 0.5-1 cm above aortic annulus which extending up to 10 cm to distal portion of ascending aorta
- A large (6 cm) thrombosed false lumen on posterior side of aorta with significant compressive effect on Dacron tube graft and adjacent organs especially LA,
- A large true lumen was seen on anterior side and a small (7 mm) true lumen with smookey appearance on posterior side (Fig. 2, 3)

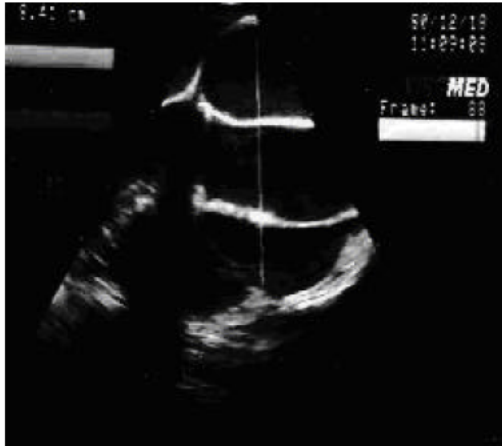


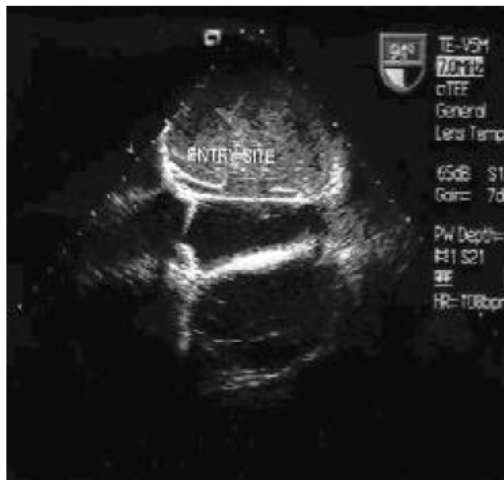
Fig. 1: TEE view shows large echolucent space around dacron graft compatible with pseudoaneurysm



Fig. 3: Transesophageal echocardiography; short axis view shows aortic dissection with true lumen and large thrombosed false lumen. There is compressive effect of aneurysm on Dacron tube graft



a



b

Fig. 2: Transesophageal echocardiography; short axis (a) and long axis (b) of ascending aorta showed the entry site of dissecting flap

- Mild LV enlargement with moderate LV systolic dysfunction.
- Moderate paravalvular leak from posterior side at previous dehiscence site.
- Severe TR with severe pulmonary hypertension (PAP = 65 mmHg).

The button-shaped reimplemented coronary ostia were seen on either sides of the tube graft but the remainder of coronary arteries could not be seen by echocardiography. Aortography and coronary angiography was recommended, but selective coronary angiography could not be performed secondary to technical difficulty and aortography was not diagnostic.

Repeat surgery was performed and all above mentioned data besides the dehiscence of coronary ostia from implantation site were confirmed. Modified Bentall operation was successfully done with second tube graft for connection the LAD ostium to ascending aortic graft. Unfortunately the patient died after two days because of bleeding.

DISCUSSION

In patients with composite grafts who underwent the original Bentall procedure, pseudoaneurysm of ascending aorta was reported to occur at a rate of 7-25% [1,2,5]. This occurs secondary to dehiscence of the suture line at aortic annulus, the coronary ostia and distal graft anastomosis. With modification of the operation, the incidence of pseudoaneurysm formation has decreased to less than 6% (1). The clinical symptoms associated with pseudoaneurysm formation vary. Some patients have

nonspecific symptoms or may be completely asymptomatic, other patients may be severely limited by dyspnea and fatigue.

Early diagnosis of pseudoaneurysm is essential, because of potentially lethal complication. Echocardiography with Doppler and more recently, Tee has had a significant impact on the detection of pseudoaneurysm and the evaluation of patients with composite grafts^[6]. In patients whose native aorta wrapped around the grafts, a small echo free space between the cm). In all cases with normal composite graft Doppler examination showed no evidence of flow in this small echo free space^[1,6] grafts and the wall of the aorta was seen in most patients (80%) and usually was small (0-1.4cm, mean: 0.6

A pseudoaneurysm is diagnosed as an enlarged ascending aorta with an echo free space between the aortic graft and the wall of aorta, along with demonstration of flow into the echo free space^[7]. In a series of patients the maximal diameter of ascending aorta ranged from 6-14cm^[1,8]. The maximal echo-free space between the aortic graft and the wall of ascending aorta ranged from 2-7cm. The space may be eccentric or concentric around the graft, the demonstration of flow into the space outside the graft is essential for the diagnosis, irrespective of the size of the echo-free space. If any suspicious about the presence of a pseudoaneurysm, a TEE is clearly indicated.

In our case, three years after Bentall operation, a giant pseudoaneurysm (8.5cm) and dehiscence of aortic annulus anastomosis diagnosed by Tee. The patient was mildly symptomatic and refused reoperation. He was admitted because progressive dyspnea in our hospital six years after operation. Tee and Tee demonstrated a large (11.5 cm) pseudoaneurysm of ascending aorta.

Dehiscence of aortic annulus identified by color Doppler with a systolic jet from posterior side of annulus directed into the pseudoaneurysm. Other diastolic flow identified by color doppler from both posterior and anterior periprosthetic area into the LV which estimated moderate degree by color doppler mapping. A dissecting intimal flap was seen on posterior side of pseudoaneurysm which starting 0.5-1 cm above aortic annulus and extending to distal portion of ascending aorta. A large intimal tearing site (about 2.8 cm)

demonstrated by 2D and color Doppler with a very large partially thrombosed false lumen on posterior side which compressed Dacron graft and LA. Reimplanted coronary arteries ostia demonstrated in transverse plane of ascending aorta. Pseudoaneurysm and dissection of ascending aorta and dehiscence of aortic annulus confirmed during surgery but coronary arteries dehiscence diagnosed in operating room. Repeat Bentall operation with second tube graft for anastomosis of LAD to ascending aortic graft was performed successfully.

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