Interactive CardioVascular and Thoracic Surgery

Bicuspid aortic valve and acute aortic dissection in the young is long-term surveillance beneficial?

Frank Edwin

Interact CardioVasc Thorac Surg 2011;12:198-
DOI: 10.1510/icvts.2010.245225A

postoperative course and can be treated either by open or more and more often by endovascular approaches.

Finally, it can be concluded that young patients having survived an initial emergency surgical aortic repair after type A dissection, present excellent long-term survival. The principal and the most severe complications of the survivors are neurological disorders and sequels causing late death in the worst case. Root preserving surgery in cases of connective tissue abnormalities and BAV goes ahead with an elevated risk for root-dilatation, but re-operation is feasible and does not influence long-term mortality. Valve preserving aortic root replacement would probably have better long-term outcome in terms of degradation but is limited by the emergency situation and the surgeon's experience. The preferred initial operation should be tailored to patients' pathologies with root-reconstruction as a Bentall or Tirone David procedure in the case of obvious root aneurysms or in patients presenting a Marfan syndrome. More patients' data are certainly mandatory to obtain precise results.

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eComment: Bicuspid aortic valve and acute aortic dissection in the young – is long-term surveillance beneficial?

Author: ***Frank Edwin***, *Walter Sisulu Pediatric Cardiac Center, Sunninghill Hospital, Johannesburg, South Africa*

doi:10.1510/icvts.2010.245225A

Acute aortic dissection (AAD) is generally held to be a disease of the elderly. As highlighted by Niclauss and colleagues [1], when AAD occurs in the young, our traditional understanding of the disease is challenged.

Three factors are at play when AAD occurs [2] – a predisposing factor, a vascular injury factor, and a propagating factor(s). Predisposing factors generally weaken the aortic wall and thus reduce the tensile strength and dissection threshold of the aortic wall. In the elderly, long-standing poorly-controlled hypertension is the most important factor. In younger patients however, congenital cardiovascular disorder is far more important.

As demonstrated [1], bicuspid aortic valve (BAV) and coarctation constitute potent predisposing factors in young patients. Irrespective of the functional state of the valve, 75% of patients with BAV demonstrate grade 3 degenerative changes in the ascending aorta due to increased metalloproteinase activity and apoptosis of smooth muscle cells in the media [3, 4], processes that reduce the tensile strength of the aortic wall and predispose these patients to dilatation, aneurysm, and dissection of the ascending aorta.

One must wonder however why dissection does not uniformly occur in all patients with known predisposing factors and in some patients with apparently no known predisposing factors. The same concerns apply to patients who develop other cardiovascular catastrophes like acute myocardial infarction and aneurysmal rupture. The important role of clinical triggers (or precipitating factors) of AAD has been highlighted by some workers [5]. Sixty-seven percent of patients with AAD have clearly identifiable precipitating factors [5]. In these cases, physical exertion and severe emotional and mental stress acutely raise plasma epinephrine levels, blood pressure, and heart rate. For the aorta with an already compromised tensile strength as occurs in BAV, such an acute blood pressure rise may be sufficient to produce the initial injury upon which prevailing hyperdynamic hemodynamic factors act to propagate dissection. Contrariwise, pharmacologic agents (beta-blockers, calcium channel antagonists) that blunt this catecholamine response effectively reduce the incidence of such cardiovascular catastrophes.

In very rare cases of AAD, such as those associated with cocaine abuse [1], sildenafil (ab)use, swimming, heavy weight-lifting, and vigorous sexual activity [2], conventional predisposing factors are not identifiable. In these cases, one must speculate that even the normal aortic wall may succumb to dissection if a potent clinical trigger creates a hyper-acute hypertensive reaction.

The established predisposition of the Marfanoid patient to aortic dilatation, aneurysm, and dissection has led to the general acceptance of long-term surveillance of these patients and beta-blockers prophylaxis. BAV affects 1-2% of the population [3]. Niclauss and colleagues [1] have shown in their series that 22% of the AAD patients had BAV; the risk of AAD in BAV persists regardless of the functional status of the aortic valve and even after valve replacement [3]. The question that needs to be answered is whether regardless of symptoms, patients with BAV should have long-term aortic surveillance and beta-blocker prophylaxis for AAD?

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