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## Aortic valve sparing operations versus composite graft implantation in acute aortic dissections

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## ABSTRACT

**Objectives:** Type A acute aortic dissection is life threatening disease requiring urgent operation. This type of the operation is often a subject of discussion. In our study we present our first experience with two different types of operations with and without preservation of the aortic valve.

**Patients and methods:** From January 2009 to December 2011 fifty six patients underwent the operation due to the acute aortic dissection type A. Ascending aorta was replaced in 32 cases and more complex operation was performed in 24 patients due to the simultaneous severe aortic root damage by dissection (study group). In eleven patients (group A) replacement of aortic valve, aortic root and ascending aorta by composite graft (modified Bentall procedure) was performed and in 13 patients (group B) valve sparing operation (reimplantation according to David) was carried out.

**Results:** There were no significant differences between the groups in preoperative variables. The only significant difference was mean duration of hospitalisation;  $26.7 \pm 13.7$  days in group A and  $16.4 \pm 7.7$  days in group B. Hospital mortality was 18.2% ( $n=2$ ) after Bentall procedure, no patient died in group B. There were no or minimal aortic regurgitation in all patients of group B on echocardiography before discharge. The mean follow-up was 17.6 months (3.6–35.8) in group A, and 23.5 months (7.9–38.9) in group B. During this period of time three patients in group A and one patient in group B died; two of cardiac and two of noncardiac reasons. In group B no patient had aortic regurgitation higher than grade I and all patients were in New York Heart Association functional class I or II.

**Conclusion:** Aortic valve reimplantation in patients with type A dissection can be performed with excellent early and mid-term results. In the hands of an experienced surgeon it represents a good alternative to the Bentall operation. Its main advantage is the preservation of the native valve without the necessity of anticoagulation therapy.

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## 1. Introduction

Type A acute aortic dissection (AAD) (according to Stanford classification) is life a threatening disease requiring urgent operation. The extent of the operation is still the subject of the debates. The minimal extend of the operation covers the replacement of the ascending aorta. In case of aortic regurgitation the resuspension of the commissures should be added. The leaving of the aortic root in place can be followed by dilatation of sinuses of Valsalva and development of aortic regurgitation [1-3]. Increased pressure on the wall of the aortic root has been described as a main risk factor for the development of the secondary aortic regurgitation after operation for AAD [4]. In case of the damage of the aortic root caused by acute dissection, the modified Bentall operation has been considered as the method of choice. Replacement of the entire dissected wall of the root and ascending aorta by the conduit with the artificial valve provides very good results from long-term perspective. The disadvantage of such operation is the presence of mechanical or biological valve and its consequences [5,6].

This disadvantage can be overcome by valve sparing operations. This type of operation has recently gained an increasing importance, even in acute situations. Two types of this operation is possible to use in case of AAD and damage of the root; reimplantation described originally by David and Feindle [7] and remodelling technique described by Yacoub et al. [8]. The main advantage of these valve sparing operations is the absence of

artificial valve but the durability of the competence of the aortic valve is questionable. The long-term results of Yacoub's operation are to certain extent inferior [9]. In our retrospective analysis we present the comparison of early results of modified Bentall operation and reimplantation in AAD.

## 2. Material and methods

From January 2009 to December 2011 fifty six patients underwent an operation due to the acute aortic dissection type A. Ascending aorta and part of the aortic arch (when needed) was replaced in 32 cases. The study group comprised of twenty four patients with the impairment of aortic root and aortic regurgitation. In eleven patients (45.8%), the replacement of aortic valve, aortic root and ascending aorta by composite graft (modified Bentall procedure) was performed (group A). The valve sparing operation (reimplantation according to David) was carried out in 13 patients (54.2%) (group B). The diagnosis of AAD was based on the CT angiography and/or echocardiography. The preoperative status and hemodynamic profile of the patients is described in Tables 1 and 2. There was no significant difference observed between the both groups.

The final decision about the operation type was based on the surgeon's preference. The transoesophageal echocardiography was performed at the end of all valve sparing operations as well as the transthoracic echocardiography before the discharge and one year after the operation.

**Table 1 – Preoperative demographic and clinical data.**

	Group A n=11	Group B n=13	p
Gender: male	10 (90.9)	11 (84.6)	0.642
Age, mean ± SD	53.1 ± 11	50.8 ± 14.7	0.744
BSA (m <sup>2</sup> ), mean ± SD	2.1 ± 0.2	2.1 ± 0.2	0.947
Marfan syndrome	1 (9.1)	1 (7.7)	0.902
Hypertension	8 (72.7)	7 (53.8)	0.341
Previous cardiac surgery	2 (18.2)	0 (0.0)	0.108

Values in parentheses represent percentages except where indicated.

BSA—body surface area.

## 3. Surgical technique

After the heparinisation, the axillary and/or femoral artery were cannulated. After median sternotomy the cannulation of aortic arch (in two patients) for the arterial line and right atrium for cardiopulmonary bypass was performed. Left heart vent was introduced through the right upper pulmonary vein. After the clamping, the aorta was opened above the commissures, and antegrade cardioplegic solution was introduced. In all but two patients the deep hypothermia (24–26 °C) was used. The distal anastomosis of the prosthesis was performed openly with clamp on the truncus

**Table 2 – Preoperative hemodynamic data.**

	Group A n=11	Group B n=13	p
LV EF (%), mean ± SD	56.2 ± 8.8	57.7 ± 11.5	0.611
Aortic insufficiency			
- Grade 0 (none)	1 (9.1)	1 (7.9)	0.903
- Grade I (minimal)	3 (27.3)	3 (23.1)	0.813
- Grade II (mild)	2 (18.2)	1 (7.9)	0.439
- Grade III (moderate)	4 (36.4)	5 (38.5)	0.916
- Grade IV (severe)	1 (9.1)	3 (23.1)	0.360
Preoperative cardiogenic shock	2 (18.2)	4 (30.8)	0.477
Preoperative malperfusion	4 (36.4)	3 (23.1)	0.476
Interval between first symptoms and operation <24 h	6 (54.5)	10 (76.9)	0.247

Values in parentheses represent percentages except where indicated.

LV EF—left ventricle ejection fraction.

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