Case report

Left atrial epicardial ablation associated to a Bentall procedure

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Abstract

Aortic coarctation is quite a common congenital disease and very often associated with other cardiac malformations. A 21-year-old patient presented to our observation with aortic coarctation, aortic valve regurgitation on a dilated aortic root and chronic atrial fibrillation. We performed a two-step operation: the aortic coarctation was treated first and 1 month later a Bentall procedure associated to an epicardial ablation was performed. Since most of the ablation was performed before aortic cross clamping, the ischemic time was only slightly increased. At 3 months follow-up the patient is still on normal sinus rhythm.

Keywords: Atrial fibrillation; Epicardial ablation; Microwave; Bentall procedure

1. Introduction

Aortic coarctation is a quite common congenital abnormality, accounting for 8% of congenital heart diseases [1] and is very often associated with other congenital diseases of the aortic root or valve. It has been previously described the association of aortic coarction and aortic valve insufficiency and the patho-physiology associated with this condition, characterized by the massive dilation of left ventricle (LV) and atrium, eventually leading to congestive heart failure (CHF) [2]. Usually the development of chronic atrial fibrillation (CAF) in these patients depresses significantly the cardiac function, worsening the heart failure symptoms.

2. Case report

A 21-year-old male in CAF presented to our observation with an aortic coarctation distal to the left subclavian artery, associated to a bicuspid aortic valve and severe aortic regurgitation (AoR). The patient was re-hospitalized in NYHA class III, the echo at admission showing a 62 mm dilatation of the first tract of the ascending aorta and severe AoR, the LV was globally moderately hypokinetic and a mild mitral valve insufficiency was also present, the left atrial (LA) diameter was 40 mm. On the next day the patient underwent an aortic-isthmus plasty, with a Vacutek® patch. The post-operative period was uncomplicated. The discharge echo showed a low ischemic gradient (18 mmHg).

One month later, the patient was re-hospitalized to undergo a Bentall procedure. At the same time the patient underwent an epicardial LA ablation, to treat the CAF by means of microwave (AFx Inc. Fremont, CA, USA). The heart was accessed through a median sternotomy, the aorta was cannulated just proximal to the brachiocefalic branch and the right atrium was cannulated with a dual-stage single cannula. After initiating the cardiopulmonary by-pass, a first set of lesions was performed on the septal surface of the LA, i.e. on the anterior surface of right inferior and superior pulmonary veins (PV) by means of a 40 mm length probe (Flex) with a power set of 60 W for 90 s (Fig. 1). At this point the aorta was clamped and the heart was arrested by retrograde cold crystalloid cardioplegia. The heart was tilted to display the inferior portion of the LA and perform a lesion joining laterally the left superior and inferior PVs, and the latter to right inferior PV (posteriorly to the inferior vena cava). Schematics of the ablation lines are available in Fig. 2. The LA appendage was legated and left in place. A linear lesion was performed from the left inferior PV to the atrioventricular groove (45 s) paying attention to the circumflex coronary artery. The ascending aorta and the aortic valve were removed and the coronary buttons prepared. Selective crystalloid cardioplegia was delivered through the coronary ostia. Finally, a lesion was performed on the dome of the LA from behind the superior vena cava to the left appendage. The removal of the aortic arch aneurysm greatly facilitated
this last lesion, allowing a perfect dominance of the transverse sinus. (see Fig. 1).

After the ablation a valved-conduit (Carbomedics™ 27/30) was implanted in the aortic position and the coronary arteries were re-implanted according to the Bentall technique. Weaning from the cardiopulmonary by-pass was uneventful and the patient recovered normal sinus rhythm (NSR). After a regular post-operative period the patient was discharged on post-operative day 9 in NSR. At 3 months follow-up the patient is still in NSR (Fig. 3).

3. Discussion

AF is an important independent prognostic factor for either mortality or morbidity. Indeed the mortality rate is doubled in the affected population compared to control
while the stroke rate is significantly increased and lifetime anticoagulation therapy is required [3]. The endocardial ablation, by different energy sources, has produced good results with less complications than the original Maze III. These procedures are safe, the overall procedure time is limited to few minutes and the ablation efficacy is confirmed by an average success rate of about 70% in 2 years follow-up [4,5]. Recently, a new energy source, the microwaves, that can be delivered through a flexible probe has become available. Microwaves can generate efficacious lesions in 60–90 s. The epicardial approach does not require any atriotomy, minimizing the bleeding complications in the immediate post-operative period and can be extended to all the patients undergoing any open chest cardiac procedure. Furthermore, most of the preparation and the ablation may be performed before the aortic cross clamp.

The Bentall procedure is a well-established technique [6]. Adding an extra procedure is not welcome because of the already long cross-clamp time. Our technique added only 7 min to the cross-clamp time, that was 107 min in total. Restoration of NSR is important in patients suffering from CHF, given that AF can worsen the NYHA class up to two steps. In this patient, because of the young age, a mechanical prosthetic valve has been preferred; this forced choice does not allow withdrawal of anticoagulation. Otherwise, the restoration of atrial contractility in presence of a bioprosthesis, would require anticoagulation only for the first few weeks after the operation. This would avoid the complications of being anticoagulated, and definitely improve the quality of life of the treated patients.

References