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Effectivity of left atrial appendage occlusion with AtriClip in 155 consecutive patients – Single center study

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ABSTRACT

Objectives: Left atrial appendage (LAA) plays a crucial role in the etiopathogenesis of the stroke in patients with non-valvular atrial fibrillation. Different methods of surgical occlusion of the LAA have been associated with different levels of acute and chronic success rate. This paper presents our experience with LAA occlusion using the AtriClip.

Methods: 155 patients undergoing cardiac surgery procedures with epicardial AtriClip exclusion of the LAA were enrolled in the study. The AtriClip was placed via a sternotomy, thoracotomy or from a thoracoscopic approach. Postoperative variables such as thromboembolic events, clip stability, and endocardial leakage around the device were examined by transesophageal echocardiography (TEE) and/or computed tomography (CT). Patients were then contacted via telephone and questionnaire regarding episodes of stroke and actual anticoagulation therapy was completed.

Results: Avg. age of the study population was 66.9 years (102 males). Clip was implanted from sternotomy or thoracotomy in 77 patients and from thoracoscopy in 78 patients. The perioperative success rate of clip implantation was achieved in 98% of patients. 10 patients (6.4%) were revised for bleeding, but none of the revisions were due to clip implantation. During the hospitalization and follow-up period, consisting of 2422 patient-months, 4 of the cardiac patients experienced transitory ischemic attacks and 2 patients experienced a cerebrovascular attack.

Conclusions: Epicardial clip exclusion of the LAA appears to be a reproducible and safe surgical method with a high success rate. Our follow-up confirmed clip stability, complete occlusion of the LAA, and absence of any AF-related thromboembolic events. These results support regular usage of AtriClip during LAA closure.

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Introduction

The left atrial appendage (LAA) is the most frequent source of thromboembolism (TE) in patients with non-valvular atrial fibrillation (AF), in whom the risk of TE is five times greater than in patients without AF [1]. Thrombi in left atrium (LA) are located in 9.8% patients with non-valvular AF and despite the anticoagulation therapy, 3.4% of patients are presented with thrombus in LAA [2]. For this reason, the guidelines of the European Society of Cardiology [3] recommend the exclusion of LAA during the surgical treatment of AF. The advantage of LAA removal during the surgical treatment of AF was confirmed in several non-randomized studies [4,5] and it is also an important part of Cox-MAZE IV procedure [6,7].

LAA occlusion may also play a role in treatment option for patients with chronic AF, who are contraindicated to anticoagulation therapy. This subset of patients with warfarin usage may be as high as 14–44% of cardiac patients [8,9]. The purpose of the study was to evaluate the efficiency (no cul de sac, no flow through the clip) and safety (no revision or bleeding due to the clip implantation) of AtriClip implantation.

Material and methods

Between July 2012 and September 2016, a total of 155 patients underwent a cardiac surgery procedure with AtriClip implantation at the Cardiac Surgery Department, Hospital of České Budějovice, Czech Republic. All patients had preoperative transesophageal echocardiography (TEE) to document and confirm the absence of pre-existing LAA thrombus. The AtriClip was standardly implanted using the thoracoscopic approach, thoracotomy approach or through sternotomy during concomitant procedures.

For purposes of this study, all LAA occlusions were with the AtriClip, or the second generation – AtriClip Pro (AtriCure, West Chester, OH, USA). The implantable device is a self-closing external LAA occluder that is available in 4 sizes, from 35 mm to 50 mm. It consists of two nitinol springs joined by two titanium parallel rods covered with Dacron polyester fabric.

Our postoperative anticoagulation strategy followed the hospital protocol. After the MAZE procedure, patients are administered warfarin with a target INR range between 2 and 3. After 3 months, if the patient is in sinus rhythm, warfarin is discontinued and the patient's medication is changed to antiaggregation therapy.

Follow-up to assess LAA closure was performed by TEE and some patients from the beginning of the study had also CT examination at 1- to 3-month postoperatively. Criteria of successful LAA occlusion were defined as absence of residual stump or pouch smaller than 1 cm and no persistent flow into the LAA using Doppler echocardiography. Telephone questionnaires focused on documenting any postoperative events – TIA/CVA or intracranial/internal bleeding as well as to confirm compliance with anticoagulation/antiaggregation therapy regimen were administered.

Results

A total of 155 patients were included in this study. Patients were mainly male (65.8%) and the average age was 66.9 years. 21.9% of patients had suffered from TIA/CVA preoperatively and the average CHA₂DS₂-VASc score was 2.7 (Table 1). The majority of cases were performed off-pump – during thoracoscopic AF ablation (45.8%) or as a standalone AtriClip implantation in 4.5% of patients (Table 2).

Periprocedural success rate was defined as complete LAA occlusion with no persistent flow into the LAA using Doppler echocardiography and residual stump smaller than 1 cm. The periprocedural success was achieved in 98% of the patients. Three patients who did not meet this criterion had residual stumps of 18 mm, 15 mm and 14 mm (Table 3). These patients were operated thoracoscopically and the two cases were among the series of first ten cases. These failures could be attributed to the learning curve of the procedure.

Table 1 – Preoperative characteristics.

Variables	No. = 155
Male	102 (65.8%)
Mean age	66.9 ± 6.9
Diabetes mellitus	39 (25.2%)
Hypertension	117 (75.5%)
Renal insufficiency	20 (12.9%)
TIA/CVA preoperatively	34 (21.9%)
Peripheral vascular disease	10 (6.5%)
COPD	40 (25.8%)
Paroxysmal AF	35 (22.6%)
Persistent AF	111 (71.6%)
Atrial flutter	9 (5.8%)
LVEF	59.6 ± 7.0
Mean CHA ₂ DS ₂ -VASc score	2.7 ± 1.5

TIA, transitory ischemic attack; CVA, cerebrovascular event; COPD, chronic obstructive pulmonary disease; AF, atrial fibrillation; LVEF, left ventricle ejection fraction.

Table 2 – Perioperative characteristics.

Variables	No. = 155
CABG	32 (20.6%)
Valve procedure	39 (25.2%)
Combined procedure	6 (3.9%)
Thoracoscopic AF ablation + AtriClip	71 (45.8%)
AtriClip as a lone procedure	7 (4.5%)

CABG, coronary artery bypass grafting.

Table 3 – Periprocedural success rate.

Variables	No. = 155
Complete LAA occlusion	152 (98.0%)
LAA leak	0 (0%)
LAA residual stump >1 cm	3 (1.9%)

LAA, left atrial appendage.

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