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Review – *Special issue: Novel methods in interventional cardiology and cardiac surgery*

Percutaneous exclusion of the left atrial appendage in prevention of systemic embolism

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ABSTRACT

Left atrial appendage is the most frequent place of blood clot formation in heart cavities. The thrombus formation increases a risk of a systemic embolism especially in patients with a permanent atrial fibrillation. The standard preventive treatment is the oral anticoagulation therapy. Another possible a treatment is an exclusion of a left atrial appendage. We present current overview a risks and benefits of surgical and percutaneous elimination of a left atrial appendage. We present the first experience with Amplatzer Cardiac Plug system in an elimination of a left atrial appendage. We concluded that an exclusion of left atrial appendage could become a useful possibility of prevention of systemic embolization in patients with an atrial fibrillation, but is not still an alternative therapy for anticoagulation therapy at present.

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1. Introduction

Systemic embolism, especially cerebral embolism, is a very serious health problem. Approximaly 15–20% of ischemic strokes are caused by an atrial fibrillation (AF) according to the literature. AF occurs in 3–5% of people older than 65 years with a 5% risk of stroke per year. The risk increases up to 30% per year in octogerians or elderly [1–4]. The most frequent

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location of a thrombus is a left atrial appendage (LAA). In people with a permanent AF combined with the rheumatic valve disease, LAA is a region of formation of thrombus in about 57% of cases and in about 90% in cases of non-rheumatic AF [4,5]. The oral anticoagulation therapy (AT) is nowadays a standard treatment diminishing the risk of ischemic stroke. Hart's meta-analysis shows that AT decreases the risk of ischemic stroke by about 64%, while the antiplatelet therapy only by about 22% [6–9]. However a significant group of high risk people with a permanent AF is contraindicated to AT and in some other cases AT is unsatisfactory and insufficient [10].

The location of LAA has led to the idea that the risk of stroke in patients with AF operated for a valve heart disease could be reduced by eliminating LAA. Although a surgical elimination of LAA has been made since late 1940s, there is still a lack of data about benefits and effectiveness of this procedure. The standard techniques of the LAA elimination are the excision, ligation, suture or stapler. In accordance to published studies, the LAA elimination is not always successful. The range of successful complete elimination fluctuates between 0–73%, regarding a type of procedure [11–15]. It is evident that in a standard clinical practice a success of LAA is influenced either by a type, quality and accuracy of procedure.

Most recently, some less invasive thoracoscopic technics have been invented and introduced into a clinical practice. The LAA elimination is performed solely, or together with the MAZE ablation of AF. The data are limited also in case of this procedure [16–20].

The last possibility of the LAA elimination is the percutaneous closure via a transseptal puncture. The combined transseptal and transpericardial accesses are also tested—Lariat® Suture Delivery Device (Sentreheart, Inc.; Palo Alto, Calif).

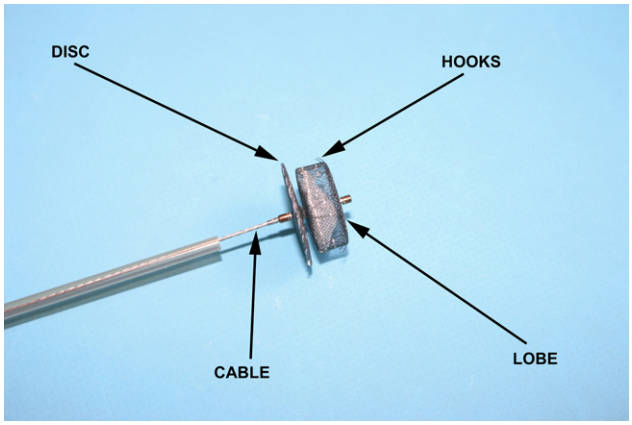

Fig. 1 – AMPLATZER Cardiac Plug.

2. Percutaneous closure of a left atrial appendage

First experiences with the percutaneous closure of LAA were released shortly after 2000—the first dedicated system was PLAATO [21,22]. Meier et al. published first experiences with the LAA closure by Amplatzer ASD Occluder in 2003 [23]. There are currently two dedicated systems on the market—WATCHMAN (Atritech Inc., Plymouth, Minnesota) and AMPLATZER Cardiac Plug (Amplatzer® Cardiac Plug

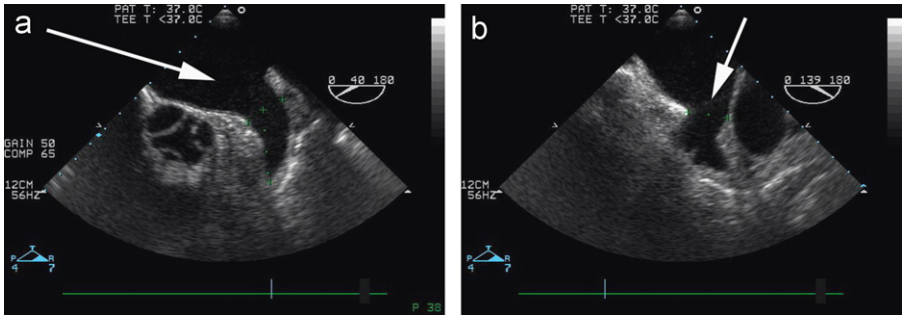

Fig. 2 – (a) and (b): TEE picture and the LAA—measurement.

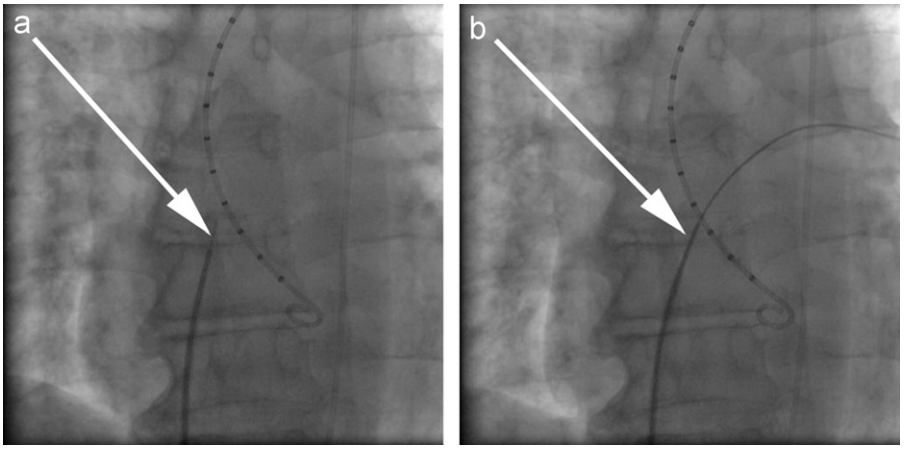

Fig. 3 – (a) and (b): Transseptal puncture.