DOI - 10.37951/CEREM-2021-V2I1-19-22

CASE REPORT

LEFT ATRIAL APPENDAGE CLOSURE: CASE REPORT

DÉBORA FREIRE RIBEIRO ROCHA [1], LEONARDO VELOSO DO AMARAL [1], MAURÍCIO LOPES PRUDENTE [1], HENRIQUE LIMA GUIMARÃES [1], FERNANDO HENRIQUE FERNANDES [1], ADRIANO GONÇALVES DE ARAÚJO [1], JOÃO BATISTA MASSON SILVA [1], GIULLIANO GARDENGHI [1]

ABSTRACT

People with atrial fibrillation (AF) have five times greater risk of having a stroke than people who do not respond to this problem. Stroke secondary to AF has been associated with mortality rates and high permanent disability, since its effective prevention is important. Mechanical methods for the occlusion of the LAA have been developed as an alternative to oral anticoagulation for patients with contraindications or complications derived from anticoagulation. The case is a male patient, 86 years old, hypertensive and with AF who was admitted to our service on 06/07/2020 with a picture of lipothymia, dyspnea and chest pain associated with bradycardia (HR of 32bpm) and rhythm of total atrioventricular block with AF, he was admitted to the ICU, a transvenous transient pacemaker was passed, atenolol was suspended and full anticoagulation with enoxaparin was started. However, he developed an important melena condition on 12/06/2020 with a hematimetric fall and the need for blood transfusion, with anticoagulation and investigation with EDA and colonoscopy being suspended. He underwent a transesophageal echocardiogram and an electrophysiological study to assess cardioversion and AF ablation. Two protections from electrical cardioversion were performed without success. Patient is discharged from the hospital on 06/21/2020 using Eliquis 5mg twice a day associated with clopidogrel. However, on 06/07/2020, the patient evolved with a hematoma contained in a retropeitorial right hemithorax, a dose of Eliquis® was reduced to 2.5 mg twice a day, the patient maintained a persistent hematoma and the anticoagulant was then suspended and scheduled to close the LAA.

KEYWORDS: ATRIAL FIBRILLATION, CORONARY DISEASE, ANTICOAGULANTS, ATRIAL APPENDAGE.

INTRODUCTION

Atrial fibrillation (AF) is prevalent in developed countries from 1% to 2.5%, being the fifth leading cause of death in Brazil and the fifth leading cause of hospitalization in the SUS. And the incidence of stroke increases substantially with age, being attributable to AF in about 1.5% of patients aged <60 years and in more than 20% of patients aged> 80 years [1,2].

In patients with AF, most thrombi are formed inside the left appendage, which, in the presence of AF, reduces blood flow velocities within it, which favors the formation of the clot. The left atrial appendage (LAA) is a structure that presents a great anatomical variability, with the possibility of having at least four different morphologies that imply different risks of thrombosis, even after adjustment for different covariates, such as the CHADSVASC score [3].

This scenario determined the possibility of intervening on the LAA, aiming to eliminate the main site of thrombus location. The closure of LAA as a prophylaxis strategy for thromboembolic events in patients with AF has been carried out for decades; initially during mitral valve repair surgeries and, more recently, in patients with non-valvular AF who are at high risk of embolism and who cannot tolerate the use of oral anticoagulants [4,5].

Considering that more than 90% of the thrombi identified in patients with non-valvular AF originate from the LAA, several techniques have been developed to dry or exclude this appendix from circulation: surgical resection, isolation with direct suture or closure with clips (in patients who must undergo concomitant cardiac surgery) or exclusion through endovascular implantable devices[4,6].

There are several devices for excluding the catheter appendage: PLAATO™ system (the first device developed), Amplatzer™ cardiac plug, WATCHMAN™, ACP / AMULET™, Wavecrest™ system, LAMbre™. They are implanted by venipuncture and approaching the left atrium through the transeptal route, controlled with transesophageal echocardiogram (TEE). Before implantation, it is necessary

1. Hospital ENCORE

ADDRESS
GIULLIANO GARDENGHI
Rua Gurupi, R. 109, 06/08 - S/N - Quadra 25 - Vila Brasilia
Aparecida de Goiânia - GO, 74905-350
E-mail: ggardenghi@encore.com.br

to know the anatomy of the appendage, which is achieved with magnetic resonance imaging (MRI) or multi-section tomography (CT) to decide whether the patient is a candidate for the procedure and thus choose the type and size of the device [7].

In patients who cannot tolerate the chronic use of oral anticoagulants, the occlusion of the LAA through the placement of a prosthesis by percutaneous route has been shown to be an interesting strategy for the prevention of stroke, and has been evaluated by several observational and randomized clinical studies [8].

The aim of this study is to report a case of percutaneous closure of LAA in a patient with AF and coronary heart disease with contraindication to full anticoagulation.

The Research Ethics Committee of the Hospital de Urgências de Goiânia approved this study (CAAE: 94882318.7.0000.0033).

CASE REPORT

Male patient, 86 years old, hypertensive, ex-smoker with a 40-pack/year smoking load (stopped 34 years ago), alcoholic (daily use of one to two doses of hard liquor), previous history of prostate cancer treated with radiotherapy for 4 years that complicated with actinic rectitis and proctitis, obstructive pulmonary disease (COPD) and AF with CHA2DS2VASc equal to 3 and HAS-BLED equal to [1]. He entered the emergency department of our service on 06/07/2020 with a picture of lipothymia, dyspnoea and chest pain, with a heart rate of 32bpm and complete atrioventricular block rhythm (CAVB) associated with AF on that occasion, was admitted to the ICU, a transvenous transient pacemaker was passed, atenolol was suspended and full anticoagulation with enoxaparin was started. The patient evolved with an adequate ventricular response after the suspension of the beta blocker and the provisional pacemaker was then removed. Cardiac catheterization was performed on 06/10/2020, which showed coronary artery disease with severe injury of 80% resulting in the right coronary and injury of 50 % in the middle third of the circumflex artery (Figures 1A and 1B). The patient developed an important melena condition on 06/12/2020 with a hematimetric fall and need for blood transfusion, anticoagulation was suspended and the right coronary angioplasty schedule was suspended. He underwent upper gastrointestinal endoscopy on 06/16/2020 with no signs of bleeding and as the patient had already undergone colonoscopy less than a year ago and without changes, he chose not to undergo a new colonoscopy. TEE (Figure 2A) and subsequent electrophysiological study (EPS) were performed on 06/19/2020 to assess the possibility of cardioversion and AF ablation and measure HV to assess the need for a pacemaker (showed HV of 38, within the normal range). The echocardiogram did not demonstrate the presence of thrombi and vegetation, two attempts of electrical cardioversion were performed during the EPS, but without success, with the patient remaining in an AF rhythm. He is discharged on 06/21/2020 using Eliquis 5mg twice a day associated with clopidogrel. The patient evolved on 06/07/2020 with a hematoma contained in a retropeitorial right hemithorax, the dose of Eliquis was reduced to 2.5 mg twice a day, the patient maintained a persistent hematoma and the anticoagulant was then suspended and the closure of the LAA was scheduled. On 08/07/2020, the patient underwent cineangiocoronariography (Figure 2B) with left right catheterization followed by percutaneous closure of the LAA by LAmbre ™ prosthesis 32 x 26 mm (Figures 3A and 3B), guided by 3D TEE (Figures 4A, 4B and 4C), without residual shunt and without clinical or angiographic complications, to perform the procedure, orotracheal intubation and general anesthesia with sevoflurane were performed, being extubated in the operating room. He was discharged on 08/09/20 asymptomatic, Eliquis 2.5mg was prescribed until his return with an assistant cardiologist. On the outpatient return of 10/02/2020, the patient presented conjunctival erythema, Eliquis was then suspended and dual antiplatelet therapy with ASA and Clopidogrel was started. The patient progresses with intestinal bleeding, then the ASA was suspended and only clopidogrel was maintained and the new angioplasty schedule was also suspended.

DISCUSSION

ACO agents remain the main therapeutic option in the prevention of embolic phenomena in patients with AF. However, the use of anticoagulants poses significant risks. The most feared are the occurrence of hemorrhagic stroke and other potentially serious hemorrhages, such as gastrointestinal bleeding [9].

Even for direct oral anticoagulants (DOACs), the need for suspension, due to side effects and hemorrhagic events, reaches 25% in large studies recently conducted. Such therapeutic limitations, associated with the severity of embolic events related to AF, motivated the development of new strategies in order to reduce the rate of thromboembolic phenomena. Thus, the occlusion of the LAA emerged as an important therapeutic alternative [9].

The II Brazilian Guidelines for Atrial Fibrillation recommend percutaneous occlusion of the LAA for patients at high risk for thromboembolic phenomena and contraindication for the use of OC (Class IIa Level of Evidence B) [9].

In the last decade, several devices for percutaneous occlusion have been developed. Each system has its own characteristics, but the implantation method is similar for all of them. These devices are released using a technique that uses venous vascular access and transeptal puncture, usually under the guidance of transesophageal and/or intracardiac echocardiography. Currently, there are two ways of approaching percutaneous occlusion of the LAA. The first strategy uses devices that are inserted in the LAA in order to occlude it in its endocardial face. The other uses

a percutaneous epicardial ligation technique, designed to exclude LAA externally [9].

There are two devices with the highest number of cases performed around the world, both with totally percutaneous implantation. WATCHMAN™ (Boston Scientific) and Amplatzer™ (St. Jude Medical).

In the PROTECT-AF randomized study, 707 patients with CHADS-VASC score ≥ 1 were randomized 2:1 to occlude the LAA with Watchman (n = 463) or Warfarin (n = 244). Watchman-treated patients were maintained on anticoagulation with Warfarin after the procedure and reevaluated with transesophageal echocardiography after 45 days. If the appendage occlusion was satisfactory (prosthesis well placed, without blood flow / leak into the LAA), the anticoagulation was suspended and exchanged for Aspirin ad eternum. The primary endpoint was the combination of stroke, cardiovascular or unexplained death, and systemic embolization. The mean follow-up time was 18 months. The study showed non-inferiority of the occlusion of the LAA against Warfarin. However, the incidence of complications related to the procedure was worrying (particularly the rate of 5.2% of pericardial effusion requiring intervention) [10].

The PREVAIL trial included 407 patients with AF and the highest mean CHADS-VASC score (3.8 and 3.9 in the intervention groups and Warfarina, respectively) who were randomized to occlude the LAA with Watchman (n = 269) versus Warfarina (n = 138). This study failed to demonstrate Watchman's non-inferiority versus Warfarina in preventing the primary outcome (combination of stroke, cardiovascular or unexplained death, or systemic embolization), basically due to a much lower incidence of events in the Warfarina group. The results in absolute value were very similar but did not reach the non-inferiority p (6.4% in the device group versus 6.3% in the control group - RR: 1.07 [95% CI: 0.57 to 1.89) [11].

The ASAP trial was a non-randomized study conducted to test the safety of the Watchman device and its effectiveness in reducing the same combined outcome of PROTECT-AF and PREVAIL in patients with this higher risk profile. We included 150 patients with non-valvular AF, with elevated CHADS-VASC (mean: 4.4) and with contraindications for oral anticoagulation (mostly due to severe bleeding), who underwent Watchman implantation and were maintained only with DAPT for 6 months. after implantation, and ASA ad eternum after the initial 6 months. After an average of 14 months, the incidence of ischemic and hemorrhagic strokes was 1.7% and 0.6%, respectively. The rate of ischemic stroke was much lower than expected for the cohort (7.3%) [12].

The LAmbre™ (LifeTech Scientific, Shenzhen, China) is a new device, specially developed to adapt to the different anatomical variations of the LAA and facilitate its implantation. It is a self-expanding nitinol and polyester device, composed of two parts: the Umbrella, which has eight small distal hooks that engage the wall of the LAA and eight "U" -shaped endings, which are attached to the trabecular part of the LAA (double stabilization); and the disk that covers the LAA ostium. Studies have shown that this device is effective in preventing cardioembolic events and has high implant success rates, with rare cases of embolization [13].

In a randomized study carried out in China, which included 152 patients with non-valvular AF who underwent LAA occlusion with the LAmbre™ device, a 1.97% stroke incidence was demonstrated during a one-year follow-up, while the estimated risk with based on the CHA2 DS2 -VASc score was 5.2%. The success rate of the procedure was 99.4%, with a low rate of complications and no cases of embolization of the device were reported [14].

CONCLUSION

Percutaneous LAA occlusion is technically feasible in most patients, but proper patient selection, execution by trained operators and the use of echocardiography during and after the procedure are crucial to minimize complications and/or treat them immediately. The complication rates of the procedure must be weighed against the risks, discomforts and limitations associated with continuous and uninterrupted exposure to OAC to assess the indication of occlusion of the LAA. This procedure proved to be effective in the population with high-risk AF because it significantly reduced the annual rate of stroke and bleeding compared to the rates predicted by the CHA2DS2-VASc and HAS-BLED scores.

REFERENCES

1. Verhoef T, Redekop WR, Daly AK, Van Schie RMF, Boer A, Zee AM. Pharmacogenetic-guided dosing of coumarin anticoagulants: algorithms for warfarin, acenocoumarol and phenprocoumon. Br J Clin Pharmacol 2014; 77(4):626-41.
2. Quizhpe AR, Cadavid AF, Córdova MA, Vintimilla J, Ortega C, Vázquez X, González MF, Salto E, Astudillo A, Córdova D. Oclusão do Apêndice Atrial Esquerdo com Prótese Watchman®. Rev Bras Cardiol Invasiva. 2014; 22(1):56-63.
3. Taser CD & Rosende A. Dispositivos de exclusão do apêndice atrial esquerdo em pacientes com fibrilação atrial não valvular: uma visão a partir da cardiologia clínica. Sociedad Latinoamericana de Cardiologia Intervencionista 2014; 95:17-19.
4. Chamié F, Guérios E, Fuks V, Bösiger A, Carvalho M, Araujo JOQ. Oclusão percutânea do apêndice atrial esquerdo com AMPLATZER® Cardiac Plug para prevenção de fenômenos tromboembólicos na fibrilação atrial crônica. Rev Bras Cardiol Invasiva. 2015;23(3):177-182.
5. Pisani CF & Scanavacca M. Oclusão Percutânea do Apêndice Atrial Esquerdo: Expericiência Clínica Crescente e Carência de Estudos Clínicos Multicêntricos e Randomizados. Arq Bras Cardiol 2019; 113(4):722-724.
6. Montenegro MC, Quintella EF, Damonte A, Sabino HC, Zajdenverg R, Laufer GP, Amorim B, Estrada APD, Armas CPY, Sterque A. Oclusão Percutânea do Apêndice Atrial Esquerdo com o Amplatzer Cardiac Plug™ na Fibrilação Atrial. Arq Bras Cardiol 2012; 98(2):143-150.
7. Wang Y, Di Biase L, Natale A, Horton RP, Nguyen T, Morhanty P. Left atrial appendage studied by computed tomography to help planning for appendage closure device placement. J Cardiovasc Electrophysiol 2010; 21:973–982.
8. Nunes GF. Dispositivos para oclusão do apêndice atrial esquerdo: há evidências que sustentam sua utilização? Relampa 2017; 30(2):41-2.
9. Magalhães LP, Figueiredo MJO, Cintra FD, Saad EB, Kuniyoshi RR, Teixeira RA, Lorga Filho AM, D'Avila A, de Paola AAV, Kalil CA, Moreira DAR, Sobral Filho DC, Sternick EB, Darrieux FCC, Fenelon G, Lima GG, Atié J, Mateos JCP, Moreira JM, Vasconcelos JTM, Zimerman LI, Silva LRL, Silva MA, Scanavacca MI, Souza OF. II Diretrizes Brasileiras de Fibrilação Atrial. Arq Bras Cardiol 2016;

106(4Supl.2):1-22.
10. Holmes DR, Reddy V, Sick P et al. Percutaneous closure of the left atrial appendage versus warfarin therapy for prevention of stroke in patients With atrial fibrillation: a randomised non-inferiority trial. The PROTECT AF trial. Lancet 2009; 374:534–42.
11. Holmes DR, Kar S, Price MJ, Whisenant B, Sievert H, Doshi SK, Huber K, Reddy VY. Prospective Randomized Evaluation of the Watchman Left Atrial Appendage Closure Device in Patients With Atrial Fibrillation Versus Long-Term Warfarin Therapy (The PREVAIL Trial). JACC 2014; 64:1-12.
12. Reddy V, Möbius-Winkler S, Miller M A, Neuzil P, Schuler G, Wiebe J, Sick P, Sievert H. Left Atrial Appendage Closure With the Watchman Device in Patients With a Contraindication for Oral Anticoagulation (The ASAP Study). J Am Coll Cardiol 2013; 61(25):2551-6.
13. Torres RF, Silva GB, Torres RA, Balbi Filho EM, Marques GL, Chamié F. Oclusão percutânea complexa do apêndice atrial esquerdo com o dispositivo LAmbre™ em paciente com antecedente de correção cirúrgica de comunicação interatrial. J Transcat Interven 2019; 27:1-5.
14. Huang H, Liu Y, Xu Y, Wang Z, Li Y, Cao K, et al. Percutaneous Left Atrial Appendage Closure With the LAmbre Device for Stroke Prevention in Atrial Fibrillation: A Prospective, Multicenter Clinical Study. JACC Cardiovasc Interv 2017; 10(21):2188-94.

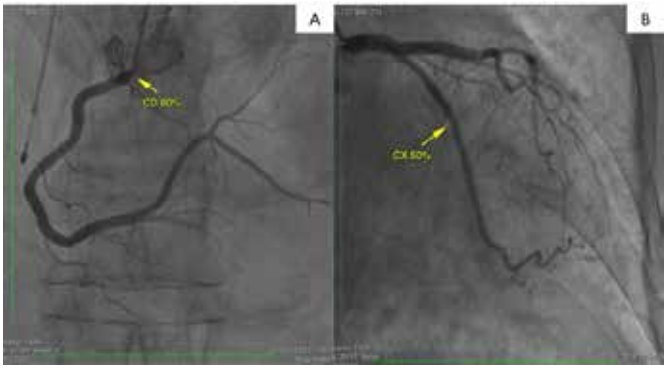

Figure 1 - Cineangiocoronariography of 06/10/2020. A - Right coronary artery (CD); B - Circumflex artery (CX).

Figure 2 - Visualization of the left atrial appendage (LAA). A - 2D echocardiogram; B - Cineangiocoronariography.

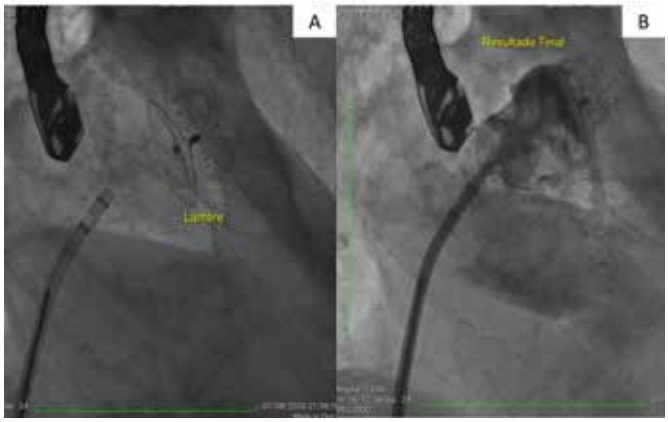

Figure 3 - Prosthesis implantation. A - LAmbre ™prosthesis 32x26 mm; B - Final result of percutaneous closure of the left atrial appendage (LAA).

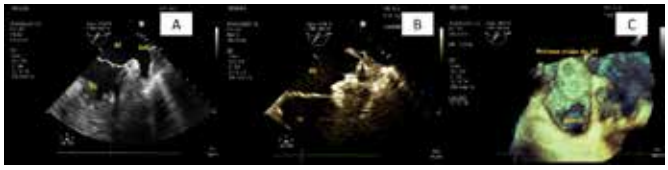

Figure 4 - Echocardiogram (ECO) images. A - Pre procedure for closing the left atrial appendage (LAA) to 2D ECO; B - 2D ECO after LAA closure procedure; C - 3D ECO after the LAA closure procedure.