

Simultaneous totally thoracoscopic 3D augmented coronary artery bypass grafting and left atrial appendage occlusion to avoid complex antithrombotic therapy in a fragile high risk patient

STRESZCZENIE

Migotanie przedsionków jest najczęstszą klinicznie istotną arytmia, której najcięższym powikłaniem jest udar mózgu. Z drugiej strony złożona terapia przeciwkrzepliwa, szczególnie u pacjentów starszych i „kruchych” pozostaje ogromnym wyzwaniem. Prezentujemy, według naszej wiedzy, pierwszy opis zabiegu jednoczasowego całkowicie torakoskopowego z użyciem wizualizacji trójwymiarowej (3D), pomostowania naczyń wieńcowych (EACAB) i zamknięcia uszka lewego przedsionka.

Słowa kluczowe: migotanie przedsionków, udar, antykoagulacja, uszko lewego przedsionka, zamknięcie, EACAB, torakoskopowo 3D

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ABSTRACT

Atrial fibrillation (AF) as the most prevalent arrhythmia has the most impact on morbidity and mortality. The worst complication of AF is stroke. On the other hand, the double or triple antithrombotic therapy especially in fragile and elderly patients becomes a challenge. Here we present, to our knowledge the first description of a simultaneous totally thoracoscopic three-dimensional (3D) augmented coronary artery bypass grafting and left atrial appendage occlusion.

Key words: atrial fibrillation, stroke, anticoagulation, left atrial appendage, occlusion, EACAB, thoracoscopic 3D

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Background

Atrial fibrillation (AF) as the highest prevalent arrhythmia has the most impact on morbidity and mortality. In senescent human population it occurs concomitant to other heart diseases like coronary artery disease. The worst complication of AF is stroke. Approximately 90% of thromboembolic material originates from left atrial appendage (LAA). During classical coronary artery bypass grafting (CABG) there are many ways to exclude the LAA. However, recently minimally invasive coronary artery bypass grafting (MIDCAB) or even less invasive — endoscopic atraumatic coronary artery bypass grafting (EACAB) gain in feasibility and popularity. Here we would like to present first totally thoracoscopic LAA occlusion during another thoracoscopic procedure, which was EACAB.

Materials and methods

89-year-old woman with unstable coronary artery disease and persistent atrial fibrillation was admitted to our department after the Heart Team decision. Her medical history included previous stroke due to arrhythmia, heart failure and hypertension. Her CADs2-VASc Score was 7 and HAS-BLED Score was 4. Patient was placed in supine position with slightly elevated left side of the chest and under

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general anesthesia intubated with a double lumen intratracheal tube. A probe for transesophageal echocardiography (TEE) was introduced. On single right lung ventilation 3 thoracoscopic ports were placed — one through the fourth intercostal space in anterior axillary line (for camera), and two through third and sixth intercostal spaces at the midaxillary line into the left pleura (working ports). Working space was created with CO₂ insufflation. The 3D augmented endoscopic system (Einstein 3D, Storz, Germany) was used. As a first step left internal mammary artery (LIMA) was taken totally thoracoscopic with harmonic knife (Fig. 1). In second step pericardiectomy was performed parallel to the phrenic nerve to visualize the LAA and stay suture was placed on its lower edge to unveil LAA. The diameter of the base of the LAA was measured with dedicated selection guide. The AtriClip®PRO was introduced through the incision in sixth intercostal space enlarged to 3 cm and was deployed at the base of left atrium appendage under TEE control with special care not to leave stump. In third step 3 cm left minithoracotomy in fifth intercostal space under the mammary was done. After administration of adequate dose of heparin anastomosis between left anterior descending artery (LAD) and LIMA was performed. Perioperative period was uneventful. The patient was extubated 2 hours after the procedure. The total drainage was minimal — 200 ml. Chest tubes were taken out the next day. We observed neither bleeding nor stroke complications. Due to high frailty score (7) patient was transferred on 7th postoperative day to further cardiological rehabilitation. Only aspirin was prescribed from day 0.

Discussion

The expected length of life in developed countries is still rising due to more effective health care system. However, it is connected with higher and multiple comorbidity and higher frailty score of patients referred to surgical treatment. The most common structural heart disease is coronary artery disease, and the most common arrhythmia is atrial fibrillation. Moreover, the first one is the risk factor of the second one. As the frequency of both illnesses rises with the age, cardiology and cardiac surgery is facing the rising number of patients with coronary artery disease concomitant to atrial fibrillation. The most important aspect of therapy of AF is stroke prevention, especially in elderly patients in which ablation is connected with higher risk of complications and failure. The necessity of complex antithrombotic therapy is a huge challenge leading in such a group of patients to significant number of major, often fatal complications [1].



Figure 1. Thoracoscopic LIMA harvesting using 3D augmented endoscopy.

Recently more data shows significant profits with LAA occlusion in stroke prevention in patients with atrial fibrillation [2]. The most important question is about the most effective and safe way to exclude the LAA. It was prove that its incomplete occlusion is even higher risk factor for thromboembolic events than leaving it open [3]. The technique should be both safe for the patient and effective in closing the connection between atrium and LAA without residual stump.

Here presented AtriClip (Atricure, USA) used in terms of first experience with LAA occlusion during minimally invasive coronary artery bypass grafting is promising and recently one of the most effective systems for LAA exclusion in patients with atrial fibrillation. The available data shows up to 100% efficacy both in short and long-term observation over few years [4–8]. Furthermore no early or late complications have been revealed over the time of 3 years [9]. The most important is that during this period no stroke was observed event though the mean CHADS2VASC Score was 4 (about 10% of yearly stroke risk) and half of the patients was off oral anticoagulation therapy [9]. A significant clinical advantage in such patients is that aspirin could

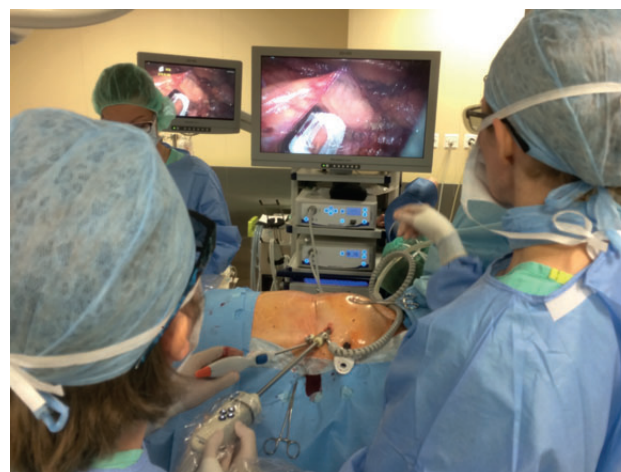


Figure 2. Thoracoscopic left atrial appendage occlusion using a clipping device (3D augmented endoscopy)

be given right away without any dual antiplatelet therapy bridging.

Traditionally complex heart operations are connected with full sternotomy which may significantly weaken vital forces of older patients, delay the recovery or even discourage from undertaken the risk of recommended surgical treatment. This concerns led to more dynamic progress in developing the minimally invasive and hybrid techniques in cardiac surgery and cardiology in order to balance the pros and cons and not to refuse this group of patients the optimal treatment.

Here presented approach allowed not only to omit the sternotomy but also using video-assisted totally thoracoscopic techniques to harvest the LIMA and deploy the AtriClip to reduce the traumatization of the chest. The postoperative rehabilitation and recovery was faster and less problematic for the elder patient.

As the limitations of the procedure should be mentioned the very limited but still invasiveness. The objective contraindication for the totally thoracoscopic LAA clipping is the presence of thrombus within the LAA. The subjective contraindications for thoracoscopic access are the history of the operation within pericardium and/or left pleural cavity.

Conclusion

The above presented case is to our knowledge the first described simultaneous totally thoracoscopic coronary artery bypass grafting and left atrial appendage occlusion. Such treatment offers the elderly patients minimal surgical injury, diminish the risk of delayed rehabilitation and wound healing with significant health benefits like revascularization and secondary prevention of stroke, avoiding complex antithrombotic therapy.

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