Evaluation of the Safety and Efficacy of Catheter Ablation Following Left Atrial Appendage Occlusion Using the WATCHMAN FLX Device

Clinical Trial Protocol

Protocol Version and Date	**V1.1. 20250320**
Clinical Research Unit	**Affiliated Hospital of Nantong University**
Principal Investigator	**Prof. Lu Qi**
Sponsor	**Affiliated Hospital of Nantong University**

Confidentiality Statement

The information contained in the clinical protocol can only be provided to the investigator, other personnel involved in the clinical trial and the ethics committee. Except for the informed consent of the subjects, the information contained in this document shall not be disclosed to any third party not related to the clinical trial without the written consent of the sponsor.

Table of contents

List of abbreviations

No.	abbreviations	the complete English alphabet
1	NMPA	National Medical Products Administration
2	EC	Ethics Committee
3	ICF	Informed Consent Form
4	CRF	Case Report Form
5	SOP	Standard Operating Procedure
6	LAA	Left Atrial Appendage
7	TTE	Transthoracic Echocardiography
8	TEE	Transesophageal Echocardiography
9	LVEF	Left Ventricular Ejection Fraction
10	LAFF	Left Atrial Flow Fraction
11	DSA	Digital Subtraction Angiography
12	AF	Atrial Fibrillation
13	AE	Adverse Event
14	MAE	Major Adverse Event
15	SAE	Serious Adverse Event
16	DRT	Device Related Thrombosis
17	ICE	Intracardiac Echocardiography
18	EDC	Electronic Data Capture System
19	BMI	Body Mass Index
20	LAAO	Left Atrial Appendage Occlusion

Summary of the Trial Protocol

Test Name	Evaluation of the Safety and Efficacy of Catheter Ablation After Left Atrial Appendage Occlusion with the WATCHMAN FLX Device
Sponsor	Department of Cardiology, Affiliated Hospital of Nantong University
Principal Investigator	Professor Lu Qi
Purpose of the test	**1. Main Purpose：** To evaluate the safety and efficacy of catheter ablation performed one month after WATCHMAN FLX left atrial appendage occlusion (LAAO) in patients with non-valvular atrial fibrillation(AF). **2. Secondary Purpose：** To investigate the impact of a two-surgery sequential treatment regimen on the recurrence rate of atrial fibrillation, the incidence of stroke, and the quality of life of patients, and to provide evidence-based support for decision-making in the clinical application of combined therapy.
Trial Population	Patients diagnosed with non-valvular AF who are scheduled to undergo sequential LAAO using the WATCHMAN FLX device and catheter-based ablation.
Trial Design	This study is a prospective, single-arm, multicenter clinical trial designed to evaluate the safety and efficacy of catheter ablation performed one month after LAAO with the WATCHMAN FLX device. Approximately 210 patients with non-valvular AF who meet the indications for both transcatheter LAAO and catheter ablation will be enrolled across 10 research centers in China. The study procedures are outlined as follows:： 1. **Patient Screening and Enrollment:** Eligible patients will undergo elective LAAO with the WATCHMAN FLX device (first procedure) after signing the informed consent form (ICF). 2. **Postoperative Management:** Following the LAAO with the WATCHMAN FLX device, patients will undergo standard anticoagulation therapy for one month. If transesophageal echocardiography (TEE) reveals no device-related thrombosis (DRT) or residual flow >5 mm, the patient will undergo catheter ablation for atrial fibrillation (second procedure) one month after the initial LAAO.

	3. **Follow-up:** Baseline patient data will be collected prior to the first procedure. Follow-up visits will occur within 7 days post-LAAO or at discharge, and at 1 month (i.e., time of the second procedure), 3 months, and 12 months post-procedure. Follow-up will focus on device endothelialization at 12 months, recurrence of atrial fibrillation, and occurrence of related complications. Postoperative Medication Management Strategy: Patients will receive anticoagulation therapy for 1 month following LAAO with the WATCHMAN FLX device. If no thrombosis or significant residual flow is detected, catheter ablation for atrial fibrillation will be performed. After the ablation procedure, anticoagulation therapy will be continued for an additional 2 months. Antiarrhythmic drugs (AADs) may be used within 90 days post-ablation in accordance with AF management guidelines.
Primary endpoint	The success rate of complete left atrial appendage (LAA) closure within 12 months following LAAO with the WATCHMAN FLX device, as assessed by LAA computed tomography angiography (CTA).
Secondary endpoint	**Safety Endpoints:** Incidence of procedure-related complications and adverse events within 30 days after LAAO and radiofrequency ablation, including rates of pericardial effusion, access site complications, vascular complications, and infections. The incidence of procedure-related complications and adverse events within 12 months following LAAO and radiofrequency ablation will be evaluated. These include major bleeding events (defined as those requiring blood transfusion or surgical intervention), cardiac tamponade, systemic embolism (including ischemic stroke and other embolic events), device-related thrombosis (DRT), new or enlarged peri-device leak (PDL, defined as >5 mm), acute postoperative left heart failure, and rehospitalization. **Efficacy Endpoints:** 1. Treatment success rate within 3 months after radiofrequency ablation (Early recurrence): No recurrence of atrial arrhythmias ≥30 seconds. 2. Treatment success rate between 4 to 12 months after ablation (Late recurrence): No recurrence of atrial arrhythmias ≥30 seconds during this period. 3. Incidence of stroke within 12 months following LAAO: No occurrence of stroke.

	4. Quality of life improvement at 12 months measured by the Atrial Fibrillation Effect on Quality-of-Life (AFEQT) questionnaire: Improvement in quality-of-life score from baseline to 12 months following index ablation or AAD treatment, with a possible score range of 20 to 140 (higher scores indicate worse outcomes).
Entry Criteria	1) Age ≥18 years with a diagnosis of nonvalvular AF; 2) Eligible for indications for treatment with WATCHMAN FLX LAAO and transcatheter atrial fibrillation ablation; 3) Preoperative imaging evaluation showed that the LAA anatomy was suitable for WATCHMAN FLX device implantation; 4) Patients agreed to participate in the study and signed an ICF.
Exclusion criteria	Patients meeting any of the following criteria were not eligible for this study: 1）Presence of valvular heart disease or other structural heart disease that causes atrial fibrillation; 2）Preoperative detection of LAA thrombus or acute thrombotic event; 3）The patient has a severe bleeding tendency or a recent major bleeding event (e.g. gastrointestinal hemorrhage, cerebral hemorrhage, etc.); 4）Patients who are unable to complete postoperative follow-up (e.g. life expectancy less than 1 year or poor compliance); 5）Other serious diseases (e.g. liver and kidney failure, active infections, etc.) detected on preoperative examination; 6）Women who are pregnant or breastfeeding.
statistical analysis	**1. Sample size calculation:** The sample size was calculated based on the primary endpoint. The primary endpoint of this study was "12-month rate of complete closure of the block after WATCHMAN FLX LAAO (CT assessment)." Hypothesized target incidence P0= 74.3% and test incidence P1= 84.3%. The significance level $\alpha = 0.05$ (one-sided) and test efficacy $1-\beta = 80\%$ were calculated to be 200 cases able to fulfill the hypothesis test. Considering the 5% shedding rate, the total sample size was 210 cases. **2. Descriptive Statistics:** Patient baseline characteristics (e.g. age, sex, history of AF) were expressed as mean± standard deviation or median (quartiles) for continuous variables,

	and frequency and percentage for categorical variables. **3. Primary endpoint analysis:** The 12-month complete closure rate of the WATCHMAN FLX device was characterized by point estimates and their 95% confidence intervals and tested against the target value of $P_0 = 74.3\%$ in a one-sample hypothesis test ($\alpha = 0.05$). **4. Secondary endpoint analysis:** Safety events (e.g.pericardial effusion, puncture site complications) were described by incidence rates and their 95% confidence intervals were calculated. Changes in quality of life were analyzed by chi-square test or paired t-test for time effects.

Text of the Trial Protocol

1. Study information

Name of Sponsor：Affiliated Hospital of Nantong University

Principal Investigator: Prof. Lu Qi

2. Background

Atrial fibrillation (AF) is one of the most common persistent arrhythmias in clinical practice, and its prevalence increases significantly with age, posing a serious threat to public health globally [1]. One of the most serious complications in patients with AF is thromboembolic events, especially cardioembolic stroke. Cardioembolic strokes due to AF account for 20-30% of all strokes and are associated with significantly higher rates of mortality and disability in post-stroke patients [2]. Studies have shown that approximately 90% of blood clots in patients with nonvalvular atrial fibrillation originate from the left atrial appendage (LAA) [3]; therefore, preventing stroke by isolating the LAA from the atria has become an important strategy in the management of patients with AF, a surgical procedure known as left atrial appendage occlusion (LAAO) [4]. Furthermore, international and national guidelines for arrhythmia management state that rhythm control and stroke prevention are equally important in patients with AF . Although LAAO has been shown to be effective in reducing the risk of stroke associated with AF [5], it does not address the arrhythmia of the patient. In contrast, catheter ablation is one of the most effective treatments for rhythm control, and has been shown in several randomized controlled trials (RCTs) to significantly improve sinus rhythm maintenance and quality of life in patients with AF [6-9]. These studies have shown that catheter ablation is the method of choice for rhythm control in patients with paroxysmal AF, with better long-term outcomes compared with pharmacologic therapy. To address rhythm control and stroke prevention in patients with AF in an integrated manner, combining catheter ablation and LAAO is a feasible and promising therapeutic strategy. Catheter ablation aims to restore sinus rhythm by intervening in the triggering mechanism of AF, whereas LAAO reduces the risk of stroke by isolating the main site of thrombus formation . The combination of the two surgical approaches not only improves the maintenance of sinus rhythm in patients, but also significantly reduces the risk of stroke and all-cause mortality [10].

Currently, the use of combinations of these two procedures is increasing in clinical practice. Some studies and expert consensus suggest that the goal of integrated therapy can be achieved by "one-stop surgery" (performing both catheter ablation and LAAO in a single operation) or staged surgery (performing one procedure before the other) [11].

However, there are no uniform conclusions regarding the optimal sequence of procedures. Some studies have shown that concurrent "one-stop" surgery may reduce hospitalization time, surgical risk, and patient financial burden [12], while staged surgery allows physicians to better assess outcomes after the initial surgery and reduces the overall surgical risk to the patient [13].

The 2021 expert consensus on the management of atrial fibrillation in China made a class IIb recommendation for "one-stop surgery", suggesting that for some patients with nonvalvular AF who have indications for both catheter ablation and LAAO, it is reasonable to perform LAAO at the same time as catheter ablation . Nevertheless, there is a lack of trials to validate the advantages and disadvantages of different procedural sequences in terms of safety and efficacy.

Therefore, the aim of this study was to evaluate the safety and efficacy of transcatheter AF ablation 1 month after WATCHMAN FLX LAAO, to provide an evidence-based medical rationale for optimizing the comprehensive management of patients with AF, and to further explore the optimal combined strategy of the two surgical approaches in patients with nonvalvular AF.

3. Study design

3.1 Purpose

3.1.1 Main Purpose

To evaluate the safety and efficacy of catheter ablation performed one month after WATCHMAN FLX left atrial appendage occlusion (LAAO) in patients with non-valvular atrial fibrillation (AF).

3.1.2 Secondary Purpose

To investigate the impact of a two-surgery sequential treatment regimen on the recurrence rate of atrial fibrillation, the incidence of stroke, and the quality of life of patients, and to provide evidence-based support for decision-making in the clinical application of combined therapy.

3.2 Selection of subjects

3.2.1 Entry Criteria

1) Age ≥18 years with a diagnosis of nonvalvular AF;
2) Eligible for indications for treatment with WATCHMAN FLX LAAO and transcatheter atrial fibrillation ablation;
3) Preoperative imaging evaluation showed that the LAA anatomy was suitable for WATCHMAN FLX device implantation;
4) Patients agreed to participate in the study and signed an ICF.

3.2.2 Exclusion criteria

Patients meeting any of the following criteria were not eligible for this study:

1）Presence of valvular heart disease or other structural heart disease that causes atrial fibrillation;

2）Preoperative detection of LAA thrombus or acute thrombotic event;

3）The patient has a severe bleeding tendency or a recent major bleeding event (e.g. gastrointestinal hemorrhage, cerebral hemorrhage, etc.);

4）Patients who are unable to complete postoperative follow-up (e.g. life expectancy less than 1 year or poor compliance);

5）Other serious diseases (e.g. liver and kidney failure, active infections, etc.) detected on preoperative examination;

6）Women who are pregnant or breastfeeding.

4. Study process

4.1 Test flow

Visiting time / Visiting Program	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7
	screening period	intraoperative (LAAO)	LAAO postoperative to discharge or 7 days postoperative	1 month after surgery (ablation)	Post-ablation to discharge or 7 days post-procedure	3 months after surgery	1 year after surgery
informed consent	▲[1]						
Inclusion/exclusion criteria	▲						
Demographic information	▲						
Medical history [2]	▲						
Surgical information [3]		▲		▲			
CHA_2DS_2-VASc score	▲						
HAS-BLED score	▲						
MRS Rating Scale [4]	△		△		△	△	△
routine blood test	▲		▲		▲	▲	▲
Renal function[5]	▲		▲		▲	▲	▲
Coagulation INR	▲		▲		▲	△	△

TEE	△		△		△	△	△
CT	△		△		△	△	▲
12-lead electrocardiogram[6]	▲		▲		▲	▲	▲
Combined medication [8]	▲		▲		▲	▲	▲
adverse event	▲	▲	▲	▲	▲	▲	▲

Remarks:

1. For the active collection of information, the examination items were completed according to the needs of patients' diagnosis and treatment evaluation and clinical research; △ For the selective collection of information, the researcher judged and chose to complete these examination items according to the actual health status of the patients, and this study did not intervene/require the patients to complete these examination items.
2. Medical history: including past medical history, family history, history of atrial fibrillation, personal history, medication history, surgical history, history of hypertension, diabetes mellitus, coronary artery disease, heart failure, peripheral vascular disease, history of hepatic and renal disease, stroke or systemic embolism, and cardiovascular-related surgery
3. Surgical information: intraoperative imaging such as DSA, other intraoperative information such as anesthesia, anticoagulant dosage, perioperative surgical complications, surgical approach, etc.
4. Evaluate when a neurological event occurs
5. Renal function: creatinine, creatinine clearance
6. 12-lead electrocardiogram: the most recent occurrence was recorded during both the screening and follow-up periods.

Combined medications: record of anticoagulants, antiplatelet agents, antihypertensive agents, lipid-lowering agents, hypoglycemic agents, and medications to treat surgical complications.

4.2 Subjects completion/withdrawal from the trial

4.2.1 Completion of studies

Patients met inclusion/exclusion criteria and signed ICF until completion of 1 year of follow-up.

4.2.2 Termination of treatment

Patients have the right to withdraw from the study at any time without any reason and their subsequent treatment will not be affected in any way by this. Subjects should discontinue study treatment if any of the following occurs:

(1) Significant protocol violations (including poor adherence, failure to meet inclusion criteria or meeting exclusion criteria for enrollment, etc.) as confirmed by the principal investigator (PI);

(2) Serious procedure-related complications during percutaneous LAAO;

(3) Patients who are no longer suitable for continued participation in the study due to adverse events for patient safety reasons;

(4) The patient refuses to participate or refuses to continue to participate in this study;

(5) Pregnancy.

4.2.3 Exit trial

This subject will be withdrawn from the trial for the following reasons:

(1) Death;

(2) Lost visits;

(3) Withdrawal of ICF.

Subjects who terminate or withdraw early from the study are required to be contacted by research center staff making every effort to determine the reason for early termination or withdrawal and the presence of any adverse events. Subjects who terminate or withdraw early from the study need to be thoroughly evaluated at the final visit and documented as thoroughly as possible. The reason for early termination or withdrawal from the study, the date, and the final evaluation must be documented in the study materials.

5. Data management and statistical analysis plan, information confidentiality plan

A clinical trial summary report will be written based on the statistical analysis report. The investigator maintains all study materials, including confirmation of all participating subjects (able to effectively verify different recorded information, such as original hospital records), all original informed consent forms signed by the patient, and all case observation forms. The investigator will keep the information about the subjects closely until its final destruction, during which time it will not continue to use or disclose the information.

However, in the rare cases listed below, the investigator will continue to use or disclose information about a subject even if the subject has withdrawn from the study or the study has been completed. These situations include: when the removal of the subject's information would affect the scientific validity of the results of the study or the evaluation of the safety of the data; to provide some limited information for research, teaching, or other activities (this information will not include names, identification numbers, or other personally identifiable information); when government regulators need to oversee the study, they will ask to see all of the information about the study, which will also include information about the subject's information about their participation in the study at that time.

6. Statistical analysis

6.1 Sample size calculation

The sample size was calculated based on the primary endpoint. The primary endpoint of this study was "12-month rate of complete closure of the block after WATCHMAN FLX LAAO (CT assessment)".

Assuming that P0is the target incidence rate and P1is the trial incidence rate, P0was set to 74.3% (95% confidence interval: 65.9%～ 82.7%) based on the literature reports*and expert recommendations, the hypothesis testing was as follows:

$$H0: P1 \leqslant 0.743$$

$$H1: P1 > 0.743$$

A P1of 84.3% was set, significance level $\alpha = 0.05$ (one-sided), and test efficacy $1-\beta = 80\%$. According to the sample size formula, 200 patients were needed in a single group to fulfill the statistical requirements. Considering a 5% loss-to-follow-up rate, the total sample size was set at 210 cases.

**Yoon SH, Amoah JK, Galo J, Dallan LAP, Arruda M, Rashid I, Rajagopalan S, Filby SJ. Incidence, progression, and predictors of left atrial appendage sealing after Watchman FLX device implantation with computed tomographic assessment. Catheter Cardiovasc Interv. 2024 May;103(6):995-1003. doi: 10.1002/ccd.31044. Epub 2024 Apr 25. PMID: 38662126.*

6.2 Methods of statistical analysis

6.2.1 Analysis sets

The Intent-to-Treat (ITT) set includes all participants who signed the ICF and meet inclusion/exclusion criteria.

6.2.2 Data analysis

Descriptive Statistics:

Patient baseline characteristics (e.g. age, sex, history of atrial fibrillation) were expressed as mean± standard deviation or median (quartiles) for continuous variables, and frequency and percentage for categorical variables.

Primary endpoint analysis:

Analyses of the primary endpoints will be performed based on mITT, with the 12-month complete closure rate of the WATCHMAN FLX device described by point estimates and their 95% confidence intervals, and a one-proportional hypothesis test (α = 0.05) against a target value of P_0 = 74.3%.

Secondary endpoint analysis:

Safety events (e.g. pericardial effusion, puncture site complications) were described by incidence rates and their 95% confidence intervals were calculated. Changes in quality of life were analyzed by chi-square test or paired t-test for time effects.

7. Ethical requirements and informed consent form

7.1 Ethics Committee

Prior to the clinical study, the investigator is required to submit the clinical study protocol, informed consent and other relevant documents to the ethics committee of the hospital where the unit responsible for the clinical study is located. The clinical study can only be started after obtaining the approval of the ethics committee (sub-centers can also start the clinical study after accepting the ethics of the group leader center). Any modification of the study protocol must be approved by the Ethics Committee before implementation. Serious adverse events in the course of the clinical study should be submitted to the Ethics Committee in writing in a timely manner (each center will report according to the ethical requirements of each center, and back up to the group leader unit at the same time).

7.2 Informed consent form

Prior to enrollment in this study, the investigator must inform the subjects and their relatives about the details of the clinical study, including the content of the study, the purpose of the study, the expected efficacy, possible adverse events and countermeasures. Subjects will be enrolled only after they fully understand the study and sign an informed consent form. The informed consent form will be signed in duplicate by the study physician and the subject himself/herself or his/her legal representative, and each party will keep a copy.

8. Definition of adverse events and response measures

8.1 Adverse events

8.1.1 Definition of adverse events

An adverse event is an adverse medical condition or a worsening of a pre-existing medical condition that occurs after the implantation of an investigational device or during the course of treatment, whether or not there is a causal relationship between the condition and the investigational device. This adverse medical condition can be a symptom (e.g., nausea, chest pain), sign (e.g., tachycardia, hepatomegaly), or an abnormal test result (e.g., laboratory result, electrocardiogram). In a clinical study, an AE can encompass an adverse medical condition that occurs at any time, including the introductory or washout period, even when no study treatment is given.

8.1.2 Determination of severity of adverse events

Mild: Does not interfere with daily activities;

Moderate: interferes with daily activities;

Severe: Loss of ability to perform daily activities.

8.1.3 Response to adverse events

All adverse events occurring during the study period must be faithfully recorded in the Adverse Event Form, and the investigator should give targeted treatment for the adverse event and follow up until the symptoms have disappeared or stabilized.

8.2 Serious Adverse Events

8.2.1 Definition of serious adverse events

A serious adverse event is defined as an AE that occurs within any study phase (i.e. introductory, treatment, washout, follow-up) that meets 1 or more of the following criteria.

- Lead to death
- Immediately life-threatening
- Subject hospitalization or extension of existing hospitalization is required
- Cause permanent or significant disability or dysfunction
- Cause congenital malformations or birth defects
- Significant medical events that may jeopardize the health of the subject or require medical intervention to avoid the above outcomes

8.2.2 Reporting process

In the event of a serious adverse event in a clinical trial, the investigator shall immediately take appropriate therapeutic measures for the subject, and at the same time report in writing to the drug clinical trial management department of the clinical trial organization to which it belongs, and by which the sponsor shall be notified in writing. The clinical trial management department shall, within 24 hours, report in writing to the appropriate ethics committee as well as the food and drug supervision and management

department of the province, autonomous region and municipality directly under the central government where the clinical trial organization is located and the competent department of health and family planning. In the case of a death, the clinical trial organization and the investigator shall provide the ethics committee and the sponsor with all the information required.

8.3 Unintended Adverse Reactions

Unintended adverse reactions are defined as serious adverse reactions affecting health, safety, or any life-threatening, death-causing problems or deaths arising from or associated with the investigational device, which were not identified in the prior study plan or application with respect to their severity or occurrence; or any other unintended serious device-related problems associated with patient rights, safety.

During the study, the investigator must, as far as possible, refer any occurrence of unintended adverse reactions to the Principal Investigator and the Ethics Committee. Serious adverse reactions were reported within 24 hours. The Principal Investigator and Ethics Committee inform the investigator of any unintended device adverse reactions that occur.

8.4 Expected adverse reactions

The following anticipated complications may result from the occluder or antithrombotic medications:

1, Device related thrombosis 2, Ischemic stroke 3, Pericardial effusion 4, Hemorrhagic stroke 5, Cardiac tamponade 6, Nuisance bleeding 7, Hemorrhage 8, Death

8.5 Duration of follow-up after adverse events

All adverse events are to be followed until resolved or until a stable clinical endpoint is achieved

8.6 Security incident audits

To ensure the safety of subjects during the conduct of the study, the safety of the clinical trial will be assessed by analyzing and reviewing major safety events at regular intervals during the conduct of the study. Given that all-cause mortality, ischemic stroke, and major bleeding events are the most relevant adverse events related to device or procedure safety, the focus will be on monitoring and evaluating these three types of events. Once the number of subjects with safety events reaches or exceeds the expected number of cases, safety investigations and appropriate treatment measures will be triggered.

References:

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Researcher's statement

I agree:：

1. The clinical trial was conducted in strict accordance with the requirements of the Declaration of Helsinki, current Chinese regulations and the trial protocol.

2. The investigator writes a summary report of the clinical trial based on the statistical analysis report.

3. Test medical devices are used only for this clinical trial, and complete and accurate records of the receipt and use of test medical devices are kept in the course of the clinical trial.

4. Strictly fulfill the terms of the clinical trial contract/agreement signed by all parties.

I have read the clinical trial protocol in its entirety, including the above statement, and I agree with all of the above.

Researcher's opinion   Signature: Date

Opinions of Medical Device Clinical Trial Organizations

Signature (stamp)

Date

Annex I: CHA_2DS_2-VASc Score for Nonvalvular Atrial Fibrillation Stroke Risk

risk factor	**Scoring (points)**
Congestive heart failure/left ventricular dysfunction (C)	1
Hypertension (H)	1
Hypertension (H)	2
Diabetes (D)	1
Stroke/TIA/thromboembolism history (S)	2
Vascular disease history（V）	1
Age 65-74 (A)	1
Sex (Female, Sc)	1
maximum	9

Annex II: HAS-BLED Score

Clinical features	**Scoring (points)**
Hypertension (H)	1
Abnormal liver and kidney function (1 point each, A)	1 or 2
Stroke(S)	1
Bleeding (B)	1
INR values are volatile (L)	1
Elderly (e.g. age >65 years, E)	1
Drugs or alcoholism (1 point each, D)	1
maximum	9

Annex III: PASS Principles

Position	The shoulder of the occluder is located at the atrial appendage opening. "Three-position" angiography can be performed under X-ray fluoroscopy to check the positional relationship between the upper and lower edges of the occluder and the left atrial appendage opening. It is recommended that the height of the shoulder exposure be controlled within 1/3 of the occluder diameter. The shoulder exposure is usually adjusted at CAU20°+RAO0°-45° to clearly display the tangent position of the atrial side umbrella surface of the occluder, and the result is consistent with the corresponding angle of TEE.
Anchor	Slightly unscrew the hemostatic valve, withdraw the outer sheath about 2 cm away from the occluder umbrella, pull the release handle back 1.0-1.5 cm with moderate force, and release it immediately. There is obvious pulling resistance in this process. Under X-ray fluoroscopy, it is observed that the occluder and the atrial appendage wall move synchronously, and the occluder rebounds significantly after pulling, and there is no position change (contrast agent can be injected at the same time), and the device is stable. When the stability of the occluder is in doubt, it can be pulled again for verification. It is easier to judge the position change of the occluder by pulling at the tangent position of the side umbrella.
Size	The compression ratio is measured under X-ray fluoroscopy. Exposure can be performed in the right foot or right shoulder position (adjusted to the tangent position of the occluder), and the maximum diameter of the occluder is measured to calculate the compression ratio. The compression ratio is calculated as follows: (original size - expanded diameter) / original size × 100%, and the recommended value is 10% to 30%. At LAO 40°-50°, the entire umbrella surface on the atrial side of the occluder can be observed, and the maximum diameter can be measured through the center connection cap to calculate the compression ratio.
Seal	Determine whether PDL exists after implantation of the occluder. "Three-position" angiography can be performed under X-ray fluoroscopy. During angiography, check the positional relationship between the edge of the occluder and the atrial appendage orifice, and pay attention to whether

	contrast agent enters the left atrial appendage from around the occluder. If PDL is ≥3mm, adjust the position of the occluder or replace the occluder.

Annex IV: Atrial Fibrillation Effect on Quality-of-Life questionnaire (AFEQT)

Atrial Fibrillation Effect on Quality-of-Life questionnaire (AFEQT)	☐No ☐Yes IF yes,please complete the AFEQT

In order to better understand the impact of AF on your health-related quality of life, we would like to ask you to answer the following questions and tick the appropriate box!

(1) Palpitations: Panic, rapid heartbeat
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(2) Irregular heartbeat
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(3) Dizziness and blurred vision
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(4) Chest tightness, chest pain
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(5) Worried that atrial fibrillation may strike at any time
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(6) Worry that atrial fibrillation will worsen the disease in the long run.
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(7) Concerns about side effects of drugs
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(8) Concerns about interventional procedures such as radiofrequency ablation, surgery, implantation of pacemaker
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(9) Worried about the side effects of anticoagulant drugs, such as nosebleeds, bleeding gums when brushing teeth, heavy bleeding or bruising from wounds
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(10) Fear that treatment will affect daily life
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(11) Recreation, leisure, sports, ability to engage in hobbies and interests
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(12) Ability to get along with family members and do things together
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(13) Limitations on mobility due to perceived fatigue
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(14) Limitations on mobility due to shortness of breath
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(15) Sports Exercise
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(16) Go fast
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(17) Climbing hills/carrying things/climbing stairs at a brisk pace without stopping for a break
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(18) Strenuous activities such as lifting heavy furniture, running, and strenuous sports such as squash/tennis/swimming/basketball.
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(19) Effectiveness of current therapeutic measures to control housing fibrillation
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely

(20) Effectiveness of therapeutic measures in relieving symptoms associated with atrial fibrillation
☐ Not at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐ Extremely