

Application of Transesophageal Echocardiography in Observing Left Atrial and Left Atrial Appendage Before Radiofrequency Ablation in Patients with AF

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Abstract: Objective: To report and explain the significance of transesophageal echocardiography(TEE) in the observation of left atrium and left atrial appendage before radiofrequency ablation in patients with AF. **Methods:** 25 patients with AF were selected as the review objects who received echocardiography in our hospital during June 2018 to June 2019. They had routinely received transthoracic echocardiography (TTE) before preparing for radiofrequency ablation. Then TEE was selected to observe and compare the effect of two detection methods on left atrial and left auricular thrombosis. **Results:** TEE examinations were given to patients with atrial fibrillation before radiofrequency ablation. Compared with TTE examinations, the detection rate of left atrium and left atrial appendage thrombosis was significantly improved. The two detection methods are different and comparable($P<0.05$), which is of great significance in clinical application. **Conclusion:** The use of TEE has significantly improved the detection rate of left atrial and left atrial appendage thrombosis in patients with AF, and has become an important examination method before the implementation of radiofrequency ablation.

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1 Introduction

Atrial fibrillation refers to an inactive contraction of the atria or an atrial rhythm state of disordered activation. Atrial fibrillation has a high incidence in the elderly, which not only seriously affects the physical health of

patients, but also threatens their lives, and needs to be treated as soon as possible. Radiofrequency ablation is the main clinical method for the treatment of atrial fibrillation, but before the operation, the thrombosis in the patients needs to be eliminated to avoid the occurrence of pulmonary circulation and systemic circulation embolism^[1]. Echocardiography is the main clinical application of cardiac thrombosis. TTE is a traditional type of ultrasound examination application, but its limitations gradually appear. TEE is a special way of getting the probe into the esophagus to probe the heart. It can approach the heart to the greatest extent, so that the structure of the heart can be scanned in a multi-planar way, and because the probe is closer to the heart, it can be more clear to show the fine structure of the heart, so as to make up for the limitations of TTE, and avoid the interference of breathing, thoracic deformities and the gas in lung^[2]. To improve the safety and reliability in the treatment of patients with AF during radiofrequency ablation in our hospital, the research selected patients with AF who underwent echocardiography in our hospital during June 2018 to June 2019 as objects. A complete and detailed analysis and research was performed on them. The results of the research are reported below.

2 Clinical data

2.1 General data

25 patients with atrial fibrillation in our hospital during June 2018 to June 2019 who underwent two kinds of echocardiography before radiofrequency ablation were selected for analysis as retrospective case samples. Among the 25 patients, 13 were male patients and 12 were female patients. The maximum age of the patients

was 85 years old, the minimum age was 45 years old, and the average age was (64.92 ± 1.59) years old. The medical history was as short as 2 months and as long as 1.5 years.

2.2 Method

Patients underwent two types of echocardiography before radiofrequency ablation. The equipment used was PHILIPS IE33. All patients were routinely tested with TTE. The frequency of the probe was set to 1.0-1.5MHz to explore several major sections, and then TEE was performed on another day. All patients were strictly screened for indications and contraindications, and signed the informed consent of examination. The patients were fasted for solids and liquids before 12 hours of the examination, and anesthetized with oropharyngeal mucosa using lidocaine gel^[3]. Then keep the patients in a supine position and record the ECG simultaneously. The model of the instrument probe is S7-2omni. The frequency parameter of the probe is 2.0-7.0MHz and the depth of the probe is controlled at about 30cm. During the examination, the left atrium and left atrial appendage of the patient should be detected to

carefully observe the presence of thrombosis formation, blood flow stagnation, and echogenic conditions of spontaneous development, such as clumpy echoes, bright spots, and flocculent or foggy echo. The patients were fasted for solids and liquids for 2 hours after operation.

2.3 Statistical index

Statistical software SPSS 23.0 was used for data statistics in this experiment. T-test was used for measurement data and related medical index of each group, and chi-square test was used for counting data. The data difference between the two groups was measured by the P value. When $P < 0.05$, the data comparison between the two groups was comparable and the difference was statistically significant.

3 Results

In terms of left atrial thrombosis, left atrial appendage thrombosis, left atrial spontaneous echo contrast and left atrial appendage spontaneous echo contrast, the detection rate of TEE was higher than that of TTE ($P < 0.05$). (See Table 1 for details).

Table 1. Comparison of left atrial, left atrial appendage thrombosis and spontaneous echo contrast detected by TTE and TEE

methods	left atrial thrombosis		left atrial appendage thrombosis		left atrial SEC		left atrial appendage SEC	
	n	%	n	%	n	%	n	%
TTE	1	6.67	1	6.67%	2	13.33%	0	0
TEE	4	26.67	2	13.33%	4	26.67%	3	20.00%
χ^2	4.1256		3.5213		5.6245		5.4152	
<i>P</i>	<0.05		<0.05		<0.05		<0.05	

One of the two cases of left atrial thrombosis detected by TTE was false positive, and 1 case was false negative in SEC. Ultrasound images show that clump-shaped abnormal echoes appear in the left atrium and the inner wall of the left atrial appendage; the echo intensity varies, presents an irregular shape, and is at rest, which is the formation of thrombosis; cloud-shaped abnormal echoes appear in the left atrium and the left atrial appendage, which is in a state of high blood flow coagulation.

4 Discussion

Atrial fibrillation is a common persistent arrhythmia in clinical medicine. Older people have a higher prevalence of atrial fibrillation and the incidence is increasing year by year, reducing the quality of life of patients, and seriously threatening their lives.

Radiofrequency ablation is an important method for treating AF, but patients with AF often have thrombosis. Radiofrequency ablation is an important method for treating AF, but patients with AF often have thrombosis. The left atrial appendage is a muscular residue during embryonic development. It is the left wall structure of the left atrium, maintains the body's life by diastolic function and is the most common part. The left atrium and the left atrial appendage are one of the main sources of thrombosis. Thrombosis is a contraindication for the operation, and spontaneous echo contrast of the left heart is a high risk factor for thrombosis^[4]. Therefore, it is necessary to determine whether the patient's left heart has a thrombosis before surgery. When using TTE for examination, there is no wound but the probe is placed on the anterior chest wall and there is a certain distance from the left atrium, which causes the unclear detected

image and low sensitivity of the left atrial appendage thrombosis. This inaccurate inspection will show false positive and false negative results and misdiagnosis. According to the analysis in this study, the detection rates of TEE in the left atrium and left atrial appendage thrombosis and spontaneous contrast were significantly higher than those of transthoracic examination. TTE diagnosed a left atrial appendage thrombosis with 1 false positive case, and the TEE image was clear, which can be seen that TEE has a significant application effect. This method also has the advantages of non-invasive, high safety, and simple operation, *etc.* which is a good complement to TTE inspection^[5]. As the TEE test is a semi-invasive test, the basis is still TTE test. Therefore, a TTE examination must be performed to understand the basic condition of the patient's heart before the TEE examination, and the purpose of the examination should be clearly defined^[6]. Before the examination, strict indications and contraindications must be performed to avoid the risk of surgery. During the TEE inspection, the probe chip should be rotated, the angle should be changed, and continuous and multi-plane scanning should be performed to achieve accurate diagnostic results. Patients should also be told to fast for 2 hours after the examination.

Thus it can be seen that TEE inspection before radiofrequency ablation can significantly improve the detection rate of left atrial and left atrial auricular thrombosis, and make necessary preparations for the next radiofrequency ablation for patients with atrial fibrillation, ensuring the safety of surgery and preventing surgical risks. What's more, it is also believed that TEE can even prepare the left atrial appendage occlusion for patients with AF who have formed thrombosis in the left atrial appendage. In addition, it is worth noting that the existence of small atrial septal defects that cannot be detected by TTE during the TEE examination of patients with atrial fibrillation. In addition, it is worth paying attention to that spontaneous contrast may sometimes occur in patients with atrial fibrillation accompanied by significant mitral stenosis^[7]. In the TEE examination, the following points need to be paid particular attention to: During the examination, the probe should be fully rotated by 180 to prevent the missed diagnosis of small volume thrombosis. Distinguish the difference

between the left atrial appendage thrombosis and the pectinate muscle carefully. The presence of hypoechoic plaques is a manifestation of thrombosis. The opening of the atrial appendage is the main area for thrombosis, which is mostly attached to the inner wall of the atrial appendage; The pectinate muscle has a strong echo, and the deep part of the atrial appendage is its main gathering area. During the TEE examination, the pectinate muscle showed 2 to 4 thick line-like echoes arranged in parallel at the scanning section of 110°-135°, but the thrombosis is still a mass, then the two can be identified.

Therefore, the use of TEE has significantly improved the detection rate of left atrial and left atrial appendage thrombosis in patients with AF, and has become an important examination method before the implementation of radiofrequency ablation. which is of great significance in its diagnosis and treatment and has a high application value.

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