

Clinic analysis of myocardium perforation misdiagnosed as ventricular electrode microdislocation after implanted the dual chamber pacemaker

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Abstract: One of the most common complications of dual chamber pacemaker implanted in patients with cardiac arrhythmia is micro dislocation. In this case, using color doppler echocardiography and X-ray examination, we made the defined diagnosis of myocardium perforation caused by pacemaker electrode. So, we should consider not only the common reason, also need to exclude the rare cause such as myocardium perforation with local encapsulated when we meet the pacemaker dysfunction.

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Introduction:

Pacemaker dysfunction is very common complication after pacemaker implanted. There are two reasons, one is dislocation, including micro dislocation and obvious dislocation, another is pacemaker threshold increased due to endocardium edema and hyperemia where electrode fixed. Pacemaker dysfunction caused by myocardium perforation is very uncommon reason and there are rare related reports. Recently we met a case in clinic and report as follows.

Case presentation:

Male, 89 years old, the holter monitoring found the patient have a long pause of 3.5 seconds. The patient was considered as pathological sinoatrial node syndrome and implanted dual chamber pacemaker after the heart consultation. During the operation, all of the test parameter was good. Two months later, the patient felt dizziness once more, and with the hypotension of 60/40mmHg. The external programmer showed that the parameter of the atrial electrode was normal, but the impedance of ventricular electrode was significantly higher, which reached to 3000Ω. What is more, the surface electrocardiogram indicated there was no ventricular pacemaker pulse. After given the X-ray examination, the clinical doctor diagnosed the patient as electrode micro dislocation[figure 1]. In view

of the old patient, it was unfavorable to give the surgery immediately and went ahead of the observation. So the patient was given the pacemaker of AAI mode with the initial frequency of 70ppm. After the treatment, the patient's blood pressure stabilized at 125/80 mmHg. In may 2012, when the patient had the routine examination in our hospital, the UCG showed the pacemaker wire echo in the right atrium and the right ventricle. The pacemaker in the right ventricular was found located in the apex epicardial of the external wall of the right ventricle, which linked with the wire of the chamber pacemaker well [figure2]. Liquidity dark space ranging about 34mm×7mm with well sound transmission was seen in local pericardial cavity[figure 3]. The clinical doctor considered that the patient was the myocardium perforation caused by the pacemaker electrode instead of the micro dislocation.

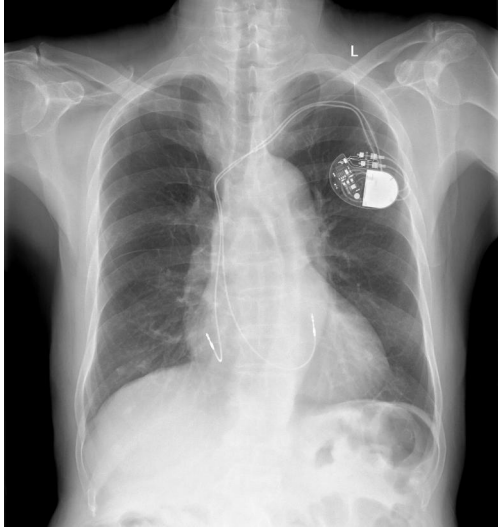


Figure 1. X-ray chest film shows pacemaker electrode in normal position

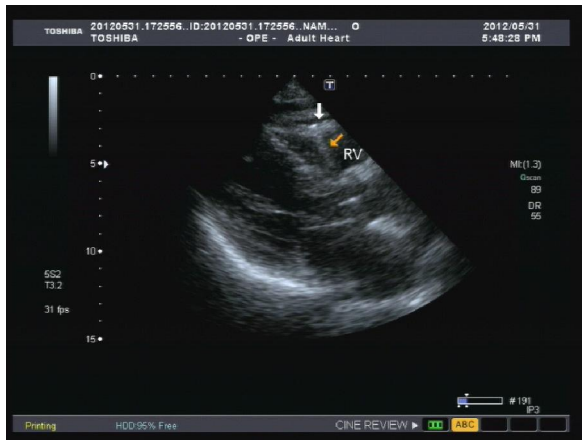


Figure 2. pacemaker electrode fixed in epicardium of right ventricle anterior wall



Figure 3. a small amount of effusion in the pericardial cavity around the pacemaker electrode.

Discussion:

The pacemaker dysfunction is one of the common complications after the pacemaker implantation. The researchers have found that, the main method to solve the pacemaker perceived barriers caused by the myocardium potential interference which result by the single electrode perception is change the single electrode into bipolar^[1]. So in recent years, the bipolar electrode pacemaker is mainly used. The pacemaker common fault can be represented as pacemaker failure caused by the pacemaker threshold value increased^[2]. Improper electrode position, poor contact between electrode and endocardium can result in the increasing of threshold value which can cause the pacemaker failure^[3]. For this, there including two factors: firstly, the bipolar electrode is rougher and hard than the single, especially in the head. For a lot of elderly patients physiological myocardial atrophy, trabecular flat and relaxation, the bipolar electrode are hard to firmly fixed which can cause ventricular electrode micro dislocation or obvious dislocation^[4]. Secondly, old patients often associated with senile valve degenerative changes, especially accompany with the tricuspid regurgitation, the impact force from the ventricular to atrial will be too high. This can become the potential risk factors of the atrial electrode dislocation. There is also another reason which is called pacemaker closed value. After implanted the electrode for 3-7 days, due to the edema and hypermia of endocardium where the electrode fixed, the early pacemaker value will be increased. Then the perception and pacemaker function will be poor. This should be identified with electrode dislocation. If the examination make sure no pacemaker dislocation indications the output of the pacemaker or perceived sensitivity can be improved, or a small amount of cortisol hormone therapy is effectively^[5].

The pacemaker function of this patient is normal in the early time, then the pacemaker threshold increases. Then the clinical doctor consider as electrode micro dislocation because of chest radiography showed pacemaker electrode located in the normal position and the electrode micro dislocation is the very common reason for pacemaker threshold value rise. Moreover the electrode position variation is different obviously after the myocardial perforation. It is easy to mistake for electrode dislocation rather than myocardial perforation without careful observing the patient's X-ray film showing normal electrode position. There are some reasons for the author thought not to support this conclusion through the review of ultrasonic cardiogram. First of all, electrode micro dislocation or obvious dislocation performed as the pacemaker threshold value increasing, but this case had non ventricular pacemaker signal in vitro

programme monitoring which indicate that the electrode was not located in normal myocardium. Secondly, ultrasonic cardiogram showed the electrode located in epicardial place, a small amount of effusion echo can be seen in the pericardial cavity around the electrode, which indicated the perforation possibility. Perhaps the local myocardial hyperplasia after the electrode perforation making the electrode position fixed relatively, so the patients had no obvious symptoms of chest pain.

It is actually wrong to think for electrode micro dislocation when pacemaker dysfunction^[6]. This case showed that myocardium perforation caused by pacemaker electrode is also one of the reasons for the failure of the pacemaker, which can be diagnosed through ultrasonic cardiogram and X-ray chest film. Myocardial perforation has also been reported, but is rare. Patients often have obvious chest pain, and the X-ray film may indicate the electrode position change obviously after perforation. This case is so rare that when faced with a pacemaker dysfunction, we should consider not only the common reason, also need to exclude the possibility of myocardium perforation accompanying with local encapsulated caused by pacemaker electrode. Color doppler echocardiography can be used as a best examination method for the diagnosis because of noninvasive, economy, and can

be repeated. When combining with chest radiography, the diagnostic value will be improved.

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