Case Report

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Metallic Foreign Body in Heart Mimicking Moderator Band

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A foreign body in heart is rare, but it is more frequently encountered than the past as iatrogenic causes are increasing. Clinicians should be aware that foreign body could be mistaken for normal structure of heart. In order for accurate diagnosis, multi-imaging modalities should be used for information of exact location, mobility and hemodynamic effects. A decision to intervene should be made based on potential harms harbored by foreign bodies. Endovascular retrieval should be considered as an option. However, when fatal complications occur or when foreign bodies are embedded deeply, a surgical removal should be attempted.

Key Words: Foreign body, heart

INTRODUCTION

An accidentally penetrated foreign body through body tissue could migrate to heart through bloodstream, although very rarely. In this case report, we present images of various modality capturing a metallic foreign body in right ventricle covered with epithelium, which was first misdiagnosed as a moderator band from echocardiographic findings.

CASE REPORT

A 61-year-old female visited outpatient clinic, complaining aggravating chest pain since 6 months ago. The patient was on medication for hypertension. Vital sign was 122/81 mm Hg. The pain was located at anterior chest wall, lasting several hours once started, not relieved by sublingual nitroglycerin. Her lab findings were all in normal range. Cardiac enzymes were also in normal range. Electrocardiogram was normal sinus, and chest X-ray showed normal lung parenchyme without cardiomegaly. Her body mass index was 22 kg/m^2. She was a never smoker.

Transthoracic echocardiography (TTE) showed preserved ejection fraction without regional wall motion, however, abnormal basal insertion of moderator band with hypertrophy was noted with mild tricuspid regurgitation (Fig. 1). Treadmill test was negative. For further evaluation, heart computed tomography (CT) was done. CT showed a normal coronary artery, however, abnormal high density linear

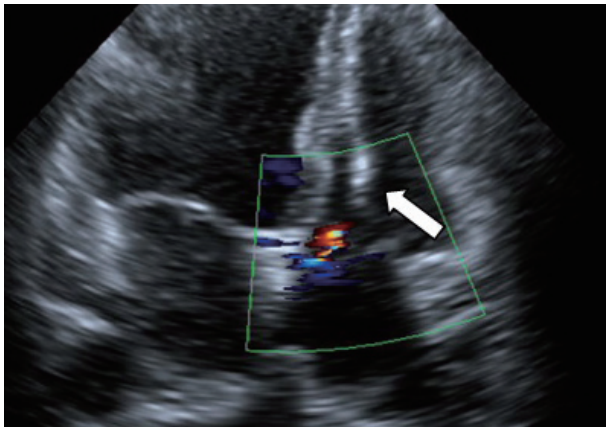

Fig. 1. Four chamber view of transthoracic echocardiography shows an echogenic linear structure of cardiac foreign body which was misdiagnosed as moderator band (white arrow).

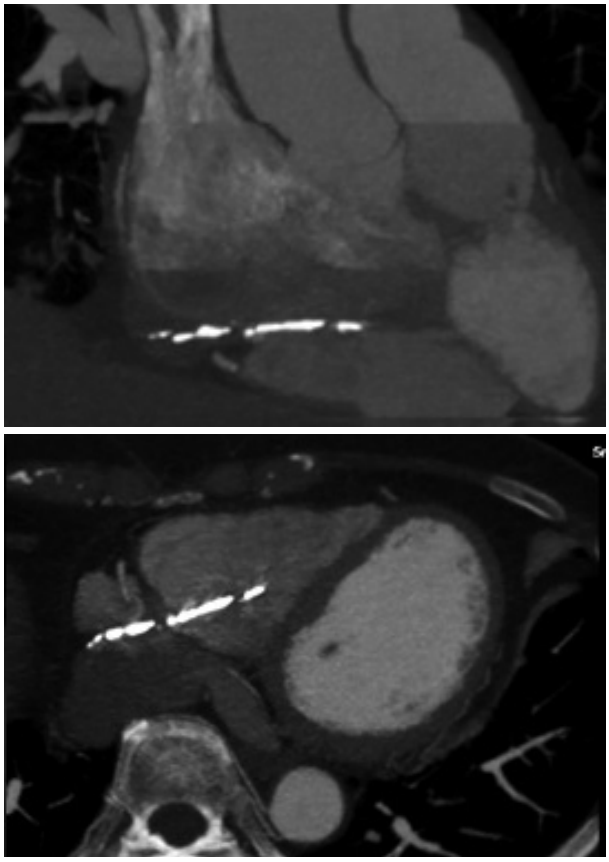

Fig. 2. Heart computed tomography revealing an abnormal high density linear structure in right ventricle.

structure in right ventricle (RV) was noted (Fig. 2). Hounsfield unit (HU) of the foreign body implicated that it was non-metallic. After comparing TTE with CT finding, it was concluded that echogenic linear structure which was previously perceived as a moderator band was foreign body in right ventricle.

Through history taking, the patient confessed that she annually visited an acupuncture clinic for 10 years due to chronic musculoskeletal pain at back and shoulder. She did not have any previous history of major operation, hospital admissions, or penetrating injury. It seemed most likely that a needle entered blood stream during acupuncture.

Cardiac venography was done in an attempt to remove the foreign body in RV with snare catheter, however, was unsuccessful as it was deeply embedded. Surgical removal of foreign body was scheduled. Median sternotomy was performed and right atrial incision was made. A calcified rod-like structure of about 4 cm in length, covered with endothelium, was found after opening from tricuspid annulus to the right ventricle. It was completely covered with epithelial peels, which resulted in lower HU on CT. Metallic core was removed from the heart (Fig. 3). She was discharged from hospital 5 days after surgery, symptom-free.

DISCUSSION

This is a rare case of a retained needle in a heart from acupuncture, subsequently causing atypical chest pain. Beside an acupuncture needle, sewing needle, bullets, missiles, pencils, or splinters were reported as intracardiac foreign bodies.[1] Schechter and Gilbert reviewed 157 cases of needles in hearts and reported that most common route of foreign body entering to heart was by either a penetrating injury or by ingestion.[2,3] Migration of an inserted foreign body from distant body part to heart via the venous routes is frequently reported. Symbas, et al.[4] concluded that right ventricle (37.5%) was the most frequently involved part, compared to left ventricle (28.4%), pericardium (12.5%), right atrium (9%), and left atrium (3.4%) after reviewing 222 cases of retained missiles in heart. The heart is more vulnerable to serious injuries when the foreign body is extracardiac than when it is intracardiac.[5] There was a reported case of cardiac injury of partly embedded needles in left ventricle from repeated laceration secondary to the needle motion with each heartbeat, which also caused pneumothorax.[5] Most of reported cases of intra-cardiac needles have been shown to cause cardiac tamponade, have dysfunction, recurrent arterial embolism, or chronic constrictive pericarditis, while a few cases remained asymptomatic owing to completely embedded needle in myocardium.[6]

Establishing the exact position of the foreign body is essential. TTE is reported to offer information regarding the size, location, and mobility with almost 100% sensitivity.[7] However, in our case, TTE could not exactly localize a re-

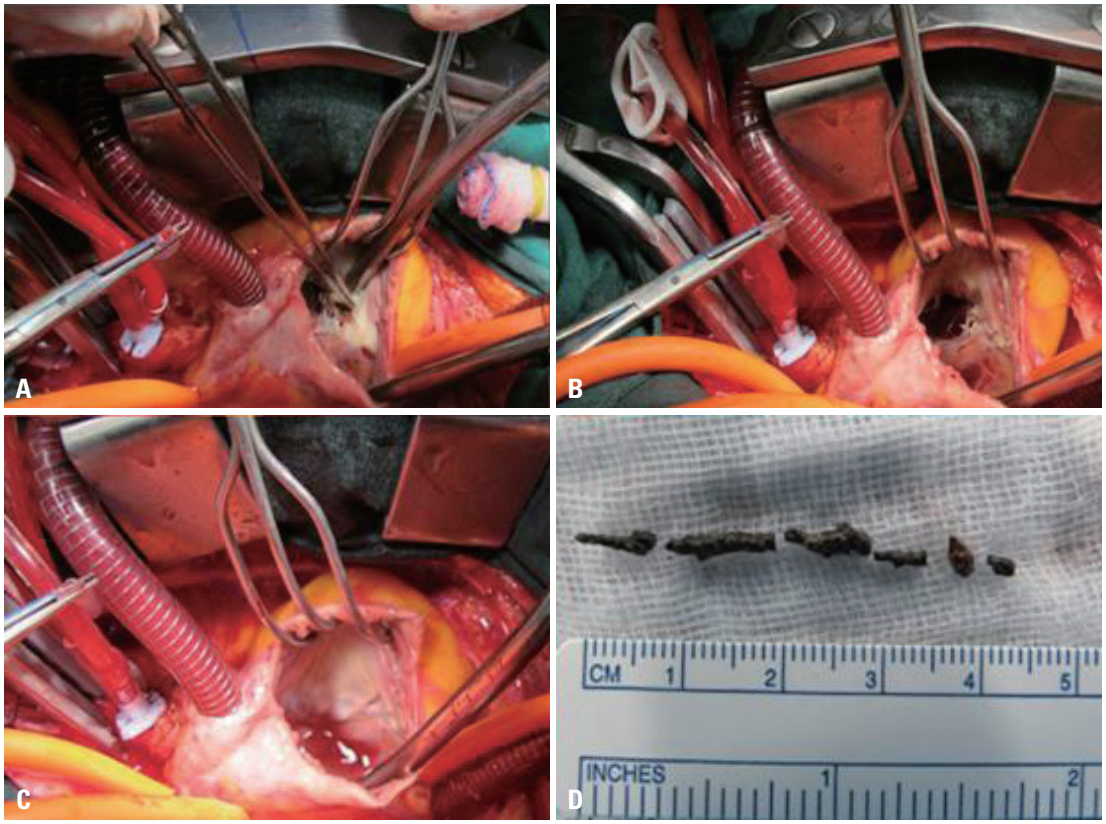

Fig. 3. (A and B) Right atrial incision was made. (C) After inspection, a rod-like structure covered with epithelium was opened from tricuspid annulus to the right ventricle. (D) Metallic core about 4.5 cm was removed.

tained needle, mainly because the needle was completely covered with epithelial peels. CT scan has been shown to have higher sensitivity, and specificity in diagnosing cardiac foreign bodies.[1] In this case, HU from CT implicated a non-metallic foreign body due to epithelial peels that covering foreign body. A physician should take into consideration that epithelial peels covered a metallic foreign body may interfere with HU of CT. Lundy, et al.[8] proposed multiple imaging tools for exact localization of cardiac foreign bodies including transesophageal echocardiography, cardiac fluoroscopy, and intraoperative echocardiography, once a decision is made to intervene.

The treatment of intra-cardiac foreign body is controversial owing to limited numbers of cases.[1] There was a reported cases of a needle embolism from intravenous drug abuse into the right ventricle was treated conservatively without further intervention.[9] However, fatal complications were reported such as cardiac perforation, tamponade, infective endocarditis, systemic embolism, or arrhythmia.[4,10] Foreign bodies accompanied by intracardiac shunt, significant valvular abnormalities or arrhythmia also infer a strong indication for intervention.[1,8] A controversy arises when encountered with an asymptomatic patient. Perrotta, et al.[11] suggested that asymptomatic old foreign bodies in heart may be well managed conservatively, as removing old foreign body attached to myocardium may lead to serious complication. They implied that timing of diagnosis since the injury is important for a decision to intervene. Baker, et al.[12] also suggested that a clinical decision to intervention must be based on the possibilities for potential harms. However, most of authors in earlier case reports recommend an early removal of foreign bodies because they eventually could migrate.

Endovascular removal of intracardiac foreign body with a snare catheter was first attempted in our case before the surgery. Percutaneous retrievals should be considered before surgery since it prevents potential complications related with open heart surgery.[13,14] In this case, percutaneous retrieval was unsuccessful as it was migrated for long enough to be all covered by epithelium. Carroll, et al.[13] suggested that, if a foreign body is discovered acutely and does not appear to be adherent, a snare catheter retrieval of foreign body is usually very successful. Calvagna, et al.[15] insisted that attempts to retrieve foreign bodies should be carried out as soon as possible because this will increase the chances of successful removal. Since foreign bodies eventually become adherent to cardiac walls, delayed retrieval lowers chances

of successful retrival as there is no free portion of foreign bodies, by which snare catheters need to grasp.

In conclusion, cardiac foreign body is difficult to diagnosis unless it was inserted intentionally. Therefore, a thorough history taking is important. Also, clinicians should be aware that multi-modality imaging should be used for accurate diagnosis and further plan for removal of cardiac foreign body. When diagnosed, a foreign body can be removed through surgery or endovascular retrieval depending on location, duration, and characteristics of foreign body.

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