Although primary cardiac tumors are relatively rare, physicians unexpectedly encounter them in clinical practice and it is important to establish a histopathological diagnosis in order to treat them adequately; however, it is difficult to do so non-invasively. We describe a case of a primary cardiac malignant lymphoma that was easily and safely diagnosed histopathologically after a transvenous intracardiac echocardiography (ICE)-guided biopsy.

**Case Report**

A 63-year-old woman was admitted to hospital with the chief complaint of new onset chest discomfort and pretibial pitting edema. Transthoracic echocardiography revealed a large invasive tumor on the heart protruding into the right atrium and right ventricle, which obstructed the outflow tract. She underwent transvenous 9Fr, 9-MHz ultra intracardiac echocardiography (ICE) (EP Technologies, Boston Scientific Corporation, San Jose, CA, USA) guided biopsy, and a diagnosis of malignant lymphoma was established from the specimen obtained. ICE-guided cardiac tumor biopsy may be one of the most useful strategies for diagnosis of cardiac tumors.  (Circ J 2009; 73: 381 – 383)

**Key Words:** Biopsy; Cardiac tumor; Diagnosis; Intracardiac echocardiography; Malignant lymphoma

A 63-year-old woman was admitted to hospital with the chief complaint of new onset chest discomfort and pretibial pitting edema. On physical examination, dilated jugular veins and pretibial pitting edema were noted. Auscultation revealed a cardiac ejection systolic murmur and normal vesicular lung sounds. Chest X-ray revealed cardiomegaly (cardiothoracic ratio = 64%), and the electrocardiogram demonstrated right-axis deviation, right bundle branch block, low voltage in the limb leads, and poor R wave progression in the precordial leads. Transthoracic echocardiography (TTE) revealed a large invasive cardiac tumor protruding into the right atrium (RA) and right ventricle (RV), obstructing the outflow tract (RVOT) (Figs 1A, B). There was also moderate pericardial effusion without any hemodynamic significance. Contrast computed tomography (CT) also showed the large cardiac tumor measuring 76×37 mm in diameter and stretching from the RA to the RV and pulmonary artery (Fig 2). Pericardial effusion, as
well as mediastinal and mesenteric lymphadenopathy, were revealed. Because the cytology examination from the pericardial effusion was negative, a percutaneous cardiac tumor biopsy was performed in order to establish a histopathological diagnosis. Right atriography also revealed the cardiac tumor protruding into the RA and RV (Fig 3A). A 6Fr cardiac biopsy catheter (Technowood Biopsy Forceps, Tonokura Ika Kogyo Co Ltd, Tokyo, Japan) and 9Fr, 9-MHz Ultra ICE catheter (EP Technologies, Boston Scientific Corporation, San Jose, CA, USA) were percutaneously inserted into the RA via the right jugular vein and right femoral vein, respectively (Fig 3B). Because ICE images enabled detailed examination of the intracardiac structures, as well as an accurate surveillance of the positioning of the biopsy catheter (Fig 4), cardiac tumor specimens were easily and safely taken into the RA via the right jugular vein and right femoral vein, respectively (Fig 3B). 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such as echocardiography, CT, and magnetic resonance imaging can provide much important information regarding the size, shape, composition, attachment, and surface characteristics of tumors,⁴,⁵ which are important considerations for surgical excision, but surgery is not an effective treatment for the great majority of malignant cardiac tumors, because of the large mass of cardiac tissue involved, as in the present case, and because all cardiac tumors have the potential for causing life-threatening complications,⁶ including embolization. Thus, it is critically important to establish a histopathological diagnosis for instigation of appropriate treatment as soon as possible.

Previous reports demonstrate that a transvenous biopsy under TTE or transesophageal echocardiographic (TEE) guidance⁴,⁷,⁸ is a useful diagnostic approach. Although TTE is the most noninvasive and convenient technique, TEE can provide superior imaging to TTE, especially of posteriorly located structures.⁹ However, TEE sometimes causes the patient pain if performed without anesthesia, and for that reason it may usually require local pharyngeal anesthesia and sometimes general sedation. Moreover, the operator of the TTE or TEE is at risk of exposure to radiation during the procedure.

ICE is a new technique based on the use of an ultrasonic diagnostic catheter that can be introduced through the femoral vein and provides a 2-dimensional view.¹⁰ Image acquisition is usually from within the RA or RV. Thus, ICE enables complete examination of the inter-atrial and -ventricular structures, as well as an accurate surveillance of the positioning of intracardiac devices such as a biopsy catheter. A major advantage of ICE is its potential to provide superior information to TEE,¹⁰,¹¹ as well as avoiding general sedation and exposure of the echocardiographer to radiation. Therefore, ICE may be one of the most useful diagnostic strategies and should be considered when trying to diagnose the histopathology of cardiac tumors. At present, however, the main limiting factor is its high cost, which is related to the single-use catheters.