The use of TEPWs is effective during and after cardiac surgery to provide backup cardiac function, particularly for patients with bradycardia or low output syndrome. However, complications related with TEPWs are sometimes reported. Although rare, cardiac tamponade and bleeding after the removal of TEPWs are known, serious complications. Therefore, to avoid such events we cut and removed the needle at the cardiac end of the TEPW and left the wire in the skin, etc, and the consequences of such migrations. Surgeons should also attach TEPWs to the atrium or ventricle in such a manner that they can be easily and safely retracted. Moreover, at the time the surgical incision is closed, the suturing needs to be carefully performed to avoid binding the TEPW and making its removal difficult.

References


Partial Resection of Cystic Tumor of Atrioventricular Node

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We treated a 57-year-old female patient with an atrial tumor that was widely attached to the atrial septum. The tumor was diagnosed as a cystic tumor of the atrioventricular node (CTAVN). This type of tumor is rare, and its ante-mortem diagnosis is difficult because it is usually asymptomatic. This tumor may cause sudden death; thus surgical resection is recommended. We performed partial resection instead of total resection to avoid pacemaker implantation.

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Cystic tumor of the atrioventricular node (CTAVN) is a rare congenital cardiac tumor that is typically located at the base of the atrial septum [1]. Most previous reports on CTAVN described postmortem diagnosis because this tumor may be a cause of sudden death. CTAVN invades the atrioventricular (AV) conduction or proximal His
bundle and destroys them, resulting in complete AV block or ventricular fibrillation. In a few cases, antemortem diagnosis of CTAVN and successful removal were achieved. Whether the tumor should be completely resected remains controversial. This case report describes the performance of partial resection of a CTAVN to avoid postoperative pacemaker implantation.

A 57-year-old female patient was referred to our institution for investigation of a right atrial tumor detected by a general practitioner during preoperative examination of congenital extralobar pulmonary sequestration. She had no overt symptoms. Electrocardiography showed first-degree AV block (PQ interval, 0.39 seconds), and echocardiography showed a low-echoic tumor with a diameter of 40 mm in the right atrium (Fig 1A). The tumor had no signal in color Doppler mode and was widely attached to the atrial septum. Chest computed tomography demonstrated a low-density area in the right atrium (Fig 1B). The tumor was of high density on T1- and T2-weighted magnetic resonance images (Fig 1C). It was clearly different from myxoma and other cardiac tumors. Based on these findings, the preoperative diagnosis was believed to be CTAVN.

The patient underwent surgical tumor resection. Cardiopulmonary bypass was established after placing an arterial cannula in the ascending aorta with direct bicaval cannulation. The ascending aorta was clamped, and the right atrium was then opened with the patient in cardioplegic arrest. The tumor was located in the right atrium and widely attached to the atrial septum (Fig 2A). The tumor was opened, revealing 1 large cavity filled with viscous fluid (a cyst). We suctioned out the viscous fluid and washed the cavity. The cyst wall was thin, and the bottom of the cyst formed the larger part of the atrial septum, which was located 3 mm from the fossa ovalis and 7 mm from the septal annulus of the tricuspid valve. The cyst was believed to be macroscopically benign. We decided to perform partial resection to avoid complete AV block caused by total resection. We carefully estimated the border between the atrial and cyst walls by examining the cyst from both inside and outside. Only the cyst wall projecting into the right atrium was resected. Her postoperative course was uneventful, and she was doing well at her 1-year outpatient follow-up after visits every 2 months with no evidence of tumor recurrence.

Histologic examination revealed that the cyst wall was composed of fibrous connective tissue covered by cuboidal epithelium (Fig 2B). Immunohistochemical staining showed that the cyst was diffusely positive for cytokeratin (Fig 2C), focally positive for CA19-9, and negative for carcinoembryonic antigen, calretinin, mesothelin, CD31, and von Willebrand’s factor. Furthermore, the proportion of Ki-67–positive cells for estimating the capability of the tumor to proliferate was quite low (<1%) (Fig 2D). These immunohistochemical results suggest that the cyst was derived from the epithelium. The histologic findings confirmed the preoperative and intraoperative diagnosis.

Comment

CTAVN is a rare congenital cardiac tumor that is typically located at the base of the atrial septum [1]. Various terms have been used to describe the tumor, such as angioendothelioma, endodermal heterotopia, and mesothelioma of the AV node [2]. The terms CTAVN or tumor of the AV nodal region have more recently been used because of the benign and histologically cystic nature of the tumor [3–8]. The use of various terms might be related to the fact that in previous reports, such

Fig 1. (A) Echocardiogram. (B) Enhanced computed tomography. (C) T2-weighted magnetic resonance image. Tumor (T) was located at base of atrial septum. (LA = left atrium; LV = left ventricle; RA = right atrium; RV = right ventricle.)
tumors could not be identified as the same tumor because of histopathologic variations and the complexity of the histogenesis. Recent histochemical, ultrastructural, and immunohistochemical studies have supported the postulated endodermal origin.

About 70 cases have been previously reported, but most of them involved postmortem diagnosis. According to these previous reports, the tumor size varies from 0.5 to 30.0 mm. The most frequent cause of death is arrhythmia, such as with complete AV block or ventricular fibrillation [1]. Microscopically, the tumor cells are seen to invade the AV conduction or proximal His bundle, destroying them. Most tumors have many cysts inside them, creating a so-called honeycomb structure. Each cyst is filled with necrotic cells, debris, proteinaceous fluid, and calcification but contains no bacteria. The cyst in our patient was 40 mm in diameter and contained only 1 large cavity. This large cyst was filled with caseous fluid comprising necrotic cells, debris, and proteinaceous fluid, as in previously reported cases. The tumor size is not associated with lethal arrhythmia or sudden death because lethal arrhythmia is dependent on tumor cell invasion into (and the destruction of) the AV conduction or His bundle.

Antemortem diagnosis of CTAVN is quite rare because it rarely causes any symptoms. Only 10 cases to date involved antemortem diagnosis and successful operations [1–8]. Nine of these 10 patients had abnormal electrocardiographic findings, such as first-degree AV block or complete AV block. Interestingly, all 10 patients were women (21–66 years), and 4 of them had a congenital disease, such as atrial septal defect or ventricular septal defect. Likewise, our patient had first-degree AV block and congenital extralobar pulmonary sequestration. Eight of the 10 patients underwent complete resection and atrial septum plasty and needed pacemaker implantation. The other 2 underwent partial tumor resection. In brief, the tumor was incised and deroofed from the atrial surface, and a pacemaker was not needed, as in our patient. Whether the tumor should be completely resected from the base of the atrial septum remains controversial. There are no reports on recurrence of CTAVN. In fact, 1 patient who underwent partial resection showed no recurrence 10 years after operation. Even if complete tumor resection is macroscopically performed, close follow-up is needed because tumor cells may remain.

In conclusion, to achieve antemortem diagnosis, special mention should be paid to patients with electrocardiographic evidence of heart block, even if they are asymptomatic. Additionally, echocardiography, computed tomography, and magnetic resonance imaging should be performed with a focus on the AV node. If a tumor is detected, surgical intervention should be scheduled to partially or totally remove it. After resection, close follow-up is needed to detect subsequent AV node dysfunction.

References
Surgical Dilemmas: Diagnosis and Treatment of Atrial Plasmacytoma

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Treating heart masses demands a well-planned diagnostic strategy. As with any disease in medicine, the confirmation of a diagnosis leads to a tailored, more efficacious treatment. We present the case of a 72-year-old man presenting with a right atrial mass on echocardiography and diagnosis of plasmacytoma after transvenous endomyocardial biopsy.

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Heart tumors, especially plasmacytomas, are particularly rare entities. The treatment of any heart mass demands a strategic diagnostic strategy for optimal patient outcomes. We discuss our past experiences and diagnostic algorithm to right heart masses.

A 72-year-old male with past medical history that included multiple myeloma status post radiation, chemotherapy, tumor debulking, and laminectomy, prostate cancer status post-transurethral resection of the prostate, cerebrovascular accident, and sick sinus syndrome status post pacemaker implantation, presented to an outside hospital with a 4 to 6 week history of dyspnea on exertion and nonproductive cough. The patient admitted to having a recent syncopal episode in which he woke up on the bathroom floor. He denied any prodromal symptoms or angina.

Echocardiogram performed at an outside hospital revealed septal hypokinesis, mild to moderate aortic regurgitation, moderate pericardial effusion, a large occcluding right atrial mass with moderate right ventricular inflow tract obstruction, and a left ventricular ejection fraction (LVEF) of 0.40 to 0.45. Myocardial perfusion study revealed no ischemia, and left and right heart catheterization demonstrated nonobstructive coronary artery disease with pulmonary capillary wedge pressure of 18 mm Hg, increased right atrial pressures, and decreased right ventricular pressures.

The patient was referred to our hospital for further treatment. Echocardiography and cardiac magnetic resonance imaging (CMR) at this time revealed a LVEF of 0.29, moderate pericardial effusion, and a 10 × 6 cm mass attached to the posterior lateral wall of the right atrium, obliterating most of its size (Fig 1). There was partial tricuspid inflow and inferior vena cava obstruction without superior vena cava obstruction. The patient underwent transvenous endomyocardial biopsy of the mass and pathology revealed plasmacytoma.

Comment

We have a relatively extensive experience with surgical resection of cardiac tumors; however, we have encountered less than 5 cardiac plasmacytomas in our practice. Regardless, our diagnostic and surgical approach is dictated by tumor location and type. In this case, the location of the mass in the right atrium allowed for relatively easy biopsy access through a transvenous endomyocardial approach. Once pathology confirmed that the large, obstructive mass was indeed a plasmacytoma, we were able to devise radiation and not surgery, as the best therapeutic regimen for the patient.

This patient with a large right atrial mass was referred to us because of our cardiac tumor program and experience with resecting cardiac sarcomas. In patients with a right atrial mass, we first look at previous imaging to see if the mass “appears” benign. For example, a small and smooth mass with a pedicle, appearing as if it could be “scooped out,” suggests myxoma. If this were the case, we would surgically resect the mass without undergoing preoperative biopsy. For larger masses and those that are questionable, differentiation of tumor from clot is important. This is especially vital when dealing with masses of the right atrium, as clots here are not uncommon. We then employ delayed enhancement CMR to provide gadolinium contrast enhancement patterns of increased capillary perfusion to help study the extent of vascularity of a mass. Typically, tumors have increased perfusion with better contrast enhancement than thrombi. Both recent and chronic thrombi typically demonstrate increased signal intensity on T1-weighted imaging, but do not demonstrate gadolinium contrast enhancement [1].

Once the possibility of clot is ruled out, we biopsy these tumors to see if we are dealing with sarcoma or not. This is done to rule out nonsarcoma malignancies such as lymphoma (or plasmacytoma in this case), which usually entail a nonsurgical approach such as chemotherapy or radiation. If the biopsy reveals a diagnosis of sarcoma, we give neoadjuvant chemotherapy with the hopes of achieving an R0 resection in the near future. Currently in our experience, only approximately 30% of right heart sarcoma resections are R0. We have shown that an R0 resection in right heart sarcoma patients significantly improves survival [2]. It is our hope that by giving neoadjuvant chemotherapy we can shrink right heart sarcomas and improve the R0 resection percentage, and this is currently being evaluated in our study.