

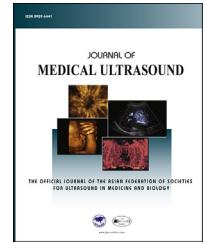


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CASE REPORT

Metastatic Testicular Cancer to Left Atrium via the Left Inferior Pulmonary Vein: A Case Report



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KEYWORDS

intracardiac tumor,
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Abstract Testicular cancer is one of the most common cancers diagnosed in young men. Frequent sites of metastasis include the retroperitoneum, lungs, liver, brain, and bone. Intracardiac metastasis has also been described. An 18-year-old boy with a history of mixed testicular germ cell tumor presented to our institution for surgical resection of his metastatic disease. Intraoperative transesophageal echocardiography during his surgery confirmed a tumor thrombus into the left atrium coming from the left pulmonary vein. We report a case of metastatic testicular cancer with rare tumor extension from the left inferior pulmonary vein into the left atrium. Perioperative transesophageal echocardiography was necessary to aid intraoperative diagnosis and confirmation of the intracardiac tumor, providing data to guide surgical strategy.

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Conflicts of interest: The authors have no conflicts of interest to disclose.

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Introduction

Testicular cancer is one of the most common cancers diagnosed in young men. Frequent sites of metastasis include the retroperitoneum, lungs, liver, brain, and bone [1]. A previous case report also describes intracardiac metastasis with left atrial involvement via the right pulmonary vein [2]; however, in our patient, the metastasis arose from the left pulmonary vein.

Case Report

An 18-year-old boy with a history of mixed testicular germ cell tumor (GCT) status post right orchiectomy presented for surgical resection of metastatic disease. The metastases were found during his work-up for respiratory distress. Computed tomography (CT) showed a large superior mediastinal mass. He was initially treated with chemotherapy, and a subsequent transesophageal echocardiography (TEE) revealed a highly mobile mass measuring 2.4×1.1 cm attached to the tip of the left pulmonary vein. No thrombus in the left atrial appendage was seen. CT confirmed a filling defect along the left pulmonary vein and left atrium (LA).

Standard ASA monitors were applied, general anesthesia was induced, the airway was secured, and central venous and arterial access were obtained without complication. Intraoperative TEE performed by the anesthesia team showed a homogeneous hyperechoic mass in the left pulmonary vein extending about 2 cm into the LA. Resection of the pulmonary vein mass via left anterior thoracotomy was unsuccessful, and median sternotomy was performed with bicaval and aortic cannulation in anticipation for cardiopulmonary bypass. Atriotomy was performed along the left inferior pulmonary vein. The left inferior pulmonary vein was excluded as well as a portion of the left atrial free wall to completely remove the intracardiac tumor. Left pneumonectomy was performed for metastatic disease after unsuccessful attempts to preserve the left upper lobe (Figure 1).

Discussion

We report a case of metastatic testicular cancer with rare tumor extension from the left inferior pulmonary vein into the LA. Surgical resection of left lung and intracardiac tumor (aided by intraoperative TEE) as well as cardiopulmonary bypass was performed. Perioperative TEE provides continuous monitoring of the cardiac function and anatomy. The use of TEE in this case was necessary to aid intraoperative diagnosis and confirmation of the

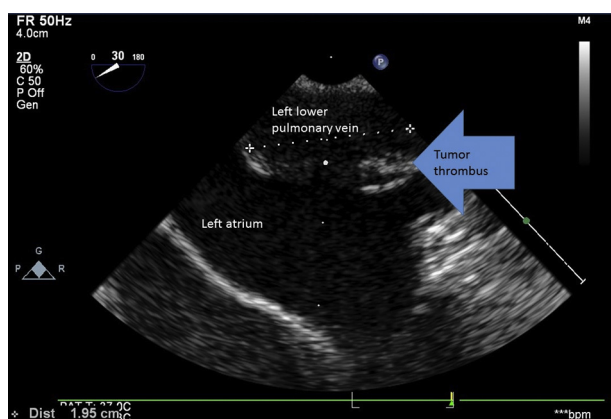


Figure 1 Intraoperative transesophageal echocardiography image obtained prior to tumor thrombus removal. Mid-esophageal view of the left atrium and left lower pulmonary vein at a scan angle of 30° . In this view, the tumor thrombus present within the left lower pulmonary vein can be visualized.

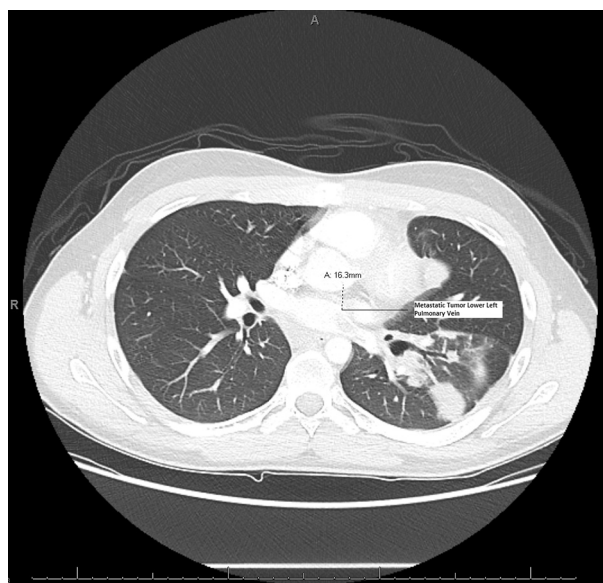


Figure 2 Preoperative computed tomography scan showing the lower left pulmonary vein with the tumor metastasis.

intracardiac tumor, providing data to guide surgical strategy. It also guided anesthetic management based on the real-time continuous monitoring of physiology. In light of the recent success of cisplatin-based chemotherapeutic agents, prognosis is favorable when tumor burden including thrombi are removed [3] (Figure 2).

The pulmonary vein views are often challenging to obtain in TEE. Using Mathew's textbook on TEE for review, there are four pulmonary veins. Each left and right pulmonary vein has an upper and lower pulmonary vein. Common anatomical variances can also be seen.

The left upper pulmonary vein (LUPV) is best visualized in the mid-esophageal four-chamber view and mid-esophageal two-chamber view. The easiest technique for obtaining an image includes obtaining the mid-esophageal four-chamber view and withdrawing the probe slightly and then turning the probe counter clockwise until the LUPV is visualized at the superior and lateral portion of the LA. Another way of obtaining a view of the LUPV includes the obtaining the two-chamber view and withdrawing the probe



Figure 3 Metastatic tumor removed intraoperatively from the pulmonary vein.

slightly and then turning the probe counter clockwise to visualize the LUPV. The left atrial appendage lies just inferior to the LUPV and serves as a valuable landmark. In addition, these views can be utilized to visualize thrombi and tumors arising from these structures, as illustrated in our case.

The left lower pulmonary vein can usually be obtained from the two-chamber view starting with the LUPV and slightly advancing the probe 1–2 cm.

The right upper pulmonary vein (RUPV) is best visualized in the mid-esophageal four-chamber and a modified mid-esophageal bicaval view. In the mid-esophageal four-chamber view, the RUPV can be visualized by turning the probe to the far right at the level of the LUPV. The RUPV can be seen entering the LA at the superior aspect in an anterior to posterior direction. The RUPV can be visualized in another plane by obtaining the mid-esophageal bicaval view at 90° turning the probe to the right. This will bring the RUPV into view with the orifice of the RUPV at the inferior portion of the LA.

The right lower pulmonary vein (RLPV) can be visualized with the same RUPV view in the mid-esophageal four-chamber view. Turning the probe slightly further to the right and advancing 1–2 cm will help visualize the RLPV.

Alternately, the longitudinal plane can be electronically rotated to 45–60° and the probe rotated to the right where the RLPV and RUPV can be seen entering the LA [4].

This is a case where being qualified to perform TEE in the operating room guided management of tumor resection of a metastatic GCT (Figure 3).

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