

# Intraoperative Transesophageal Echocardiography Identifies Nonseminomatous Germ Cell Tumor Thrombus Dislodged from Superior Vena Cava into Right Ventricle

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## Abstract

Intraoperative transesophageal echocardiography is an important tool for real time imaging of pathology. We present the case of a young male with metastatic nonseminomatous germ cell tumor who presented for left neck mass excision and superior vena cava thrombectomy. Upon intraoperative transesophageal echocardiography a previously unseen mass was visualized in the right ventricle associated with the tricuspid valve. Successful tumor thrombectomy of a whiplike structure was performed utilizing cardiopulmonary bypass.

## Keywords

transesophageal echocardiography; nonseminomatous germ cell tumor; tumor thrombus; tricuspid valve

## Introduction

Testicular cancer is the most common cancer in 15-35 year old men. Germ cell tumor accounts for 95% of testicular malignancies with approximately half being nonseminomatous and the other half seminomas [1]. Those patients that have residual tumor load after chemotherapy may present for surgery in order to remove the remaining disease [2]. A young male with metastatic nonseminomatous germ cell tumor presented for left neck mass excision and superior vena cava thrombectomy. Upon intraoperative transesophageal echocardiography minimal disease was noted in the superior vena cava; however a previously unseen mass was noted in the right ventricle associated with the tricuspid valve. Successful tumor thrombectomy of a whiplike structure was performed utilizing cardiopulmonary bypass. There were no perioperative complications.

## Case Report

A 19year-old previously healthy male initially presented to clinic with a 2 month history of gynecomastia at which time a left scrotal mass and leftsupraclavicular adenopathy was identified. Ultrasound identified a 4.6cm solid mass in the left testicle. Chest, abdomen and pelvis computed tomography (CT) demonstrated extensive lymphadenopathy in the retroperitoneum. CT also showed cervical and mediastinal lymphadenopathy, bilateral pulmonary nodules, and a left supraclavicular mass measuring 3.8x6.1x4.0cm. The patient underwent a left orchiectomy which was pathologically found to

be nonseminomatous germ cell tumor (NSGCT). This was followed by 4 cycles of bleomycin, etoposide, and cisplatin therapy before returning to the operating room for postchemotherapy retroperitoneal and retrocaval lymph node dissection and mass excision. Plans to return to the operating room after recovery from abdominal surgery for the supradiaphragmatic disease were underway when on CT he was discovered to have a lesion in the superior vena cava and subclavian vein associated with the mass in the left neck (Figure 1). It was believed that the tumor had extended via the thoracic duct into the left neck and then via the thoracic duct to the subclavian vein into the superior vena cava (Figures 2 and 3). It was then decided that the cervical and intravascular disease should be addressed prior to the previously seen intrathoracic disease. Subsequent imaging demonstrated partial regression of the superior vena cava filling defect.

Standard ASA monitors including arterial line were placed and general anesthesia was induced in the operating room after which central venous access was obtained and intraoperative transesophageal echocardiography (TEE) was performed. Minimal disease was identified in the superior vena cava with TEE (Figure 4); however there was disease noted in the right ventricle associated with the tricuspid valve measuring 2.0x1.4x0.6cm (Figure 5a, 5b). Trivial tricuspid regurgitation was visualized and no patent foramen ovale was noted. Cardiopulmonary bypass was then anticipated to resect the intraventricular disease along with the intra-subclavian lesion.

Median sternotomy with extension to the left neck was performed. Phrenic and vagus nerve sparing neck dissection was performed. The subclavian vein was exposed including its junction with the jugular vein. The neck mass was removed with en bloc resection of intra-subclavian vein tumor thrombus followed by reconstruction of the subclavian vein. The patient was then placed on cardiopulmonary bypass with aortic and bicaval cannulation. Right atriotomy was performed and a whiplike structure was immediately identified entwined on a single cord of the anterior leaflet of the tricuspid valve. The single cord was excised in order to remove the tumor thrombus (Figure 6) which measured more than 5cm in length and up to 0.6cm in thickness in some areas. After successful weaning from cardiopulmonary bypass and surgical closure, TEE demonstrated a minimal increase in tricuspid regurgitation. The patient was extubated and then taken to the intensive care unit. He proceeded to have an unremarkable postoperative course and was discharged home with median sternotomy precautions in a timely fashion.

## Discussion

Tumor thrombosis is not uncommon with NSGCT. It is a complication that may cause catastrophic events and must be managed with caution. Tumor thrombosis to the superior vena cava previously was described associated with NSGCT [3,4]. Successful management of tumor thrombosis has been demonstrated with tumor thrombectomy [5]. The use of intraoperative TEE in this patient with subclavian and superior vena cava thrombosis was paramount in changing the planned surgical course. We suspect that the tumor thrombus previously identified in the superior vena cava broke free and ultimately tangled itself on one of the chords of the tricuspid valve. The anatomy of the tricuspid valve with its complex chordal structure possibly served as a trap and prevented further migration to the pulmonary vasculature. If the thrombus had not entwined itself around the chord, it could have potentially led to a catastrophic pulmonary embolus. This case showcases the complexity of tumor thrombus associated with NSGCT, highlights the complexity of the chordal complex of the tricuspid

valves, and demonstrates the importance of intraoperative TEE for confirmation and real time imaging of pathology intraoperatively.

## Figures



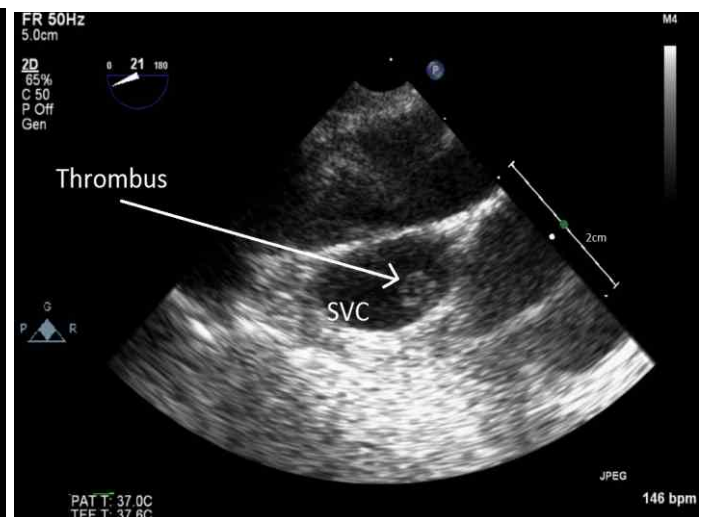
**Figure 1.** Left neck mass



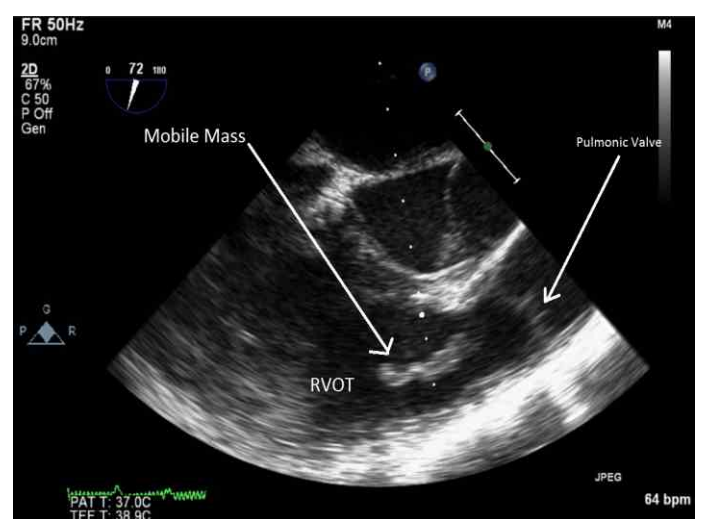
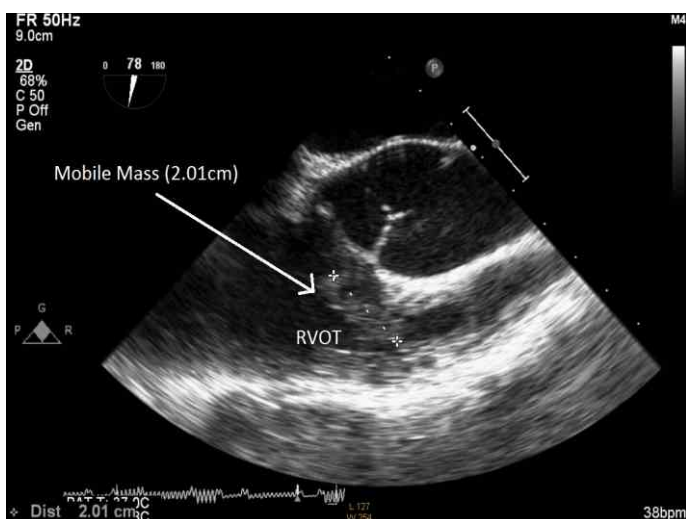
**Figure 2.** Filling defect noted in superior vena cava



**Figure 3.** Filling defect in superior vena cava, seen in coronal view



**Figure 4.** Minimal disease noted in superior vena cava



**Figure 5 (a,b).** Mobile mass in right ventricular outflow tract



**Figure 6.** Tumor thrombus

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