

Multidisciplinary Management of Rare Metastatic Thyroid Cancer with Superior Vena Cava Involvement

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Abstract

To our knowledge, there have been few reported cases of papillary thyroid carcinoma extending into the superior vena cava (SVC). We describe the case of a 47-year-old woman who came to our institution for a second opinion regarding papillary thyroid cancer that had previously been resected but now showed extensive tumor thrombus involving multiple vascular structures.

Keywords

Papillary thyroid carcinoma, Angioinvasion, SVC syndrome

Introduction

Papillary thyroid carcinoma is usually considered to have a good prognosis (1). Thyroid carcinoma sometimes has microscopic vascular invasion, but massive angioinvasion is fairly rare and is associated with high mortality rates (2). Only lately has surgical resection of the tumor in patients with macroscopic tumor thrombus successfully begun to increase survival rates (1). Until recently, surgery had been performed but unsuccessfully. In 1978, Thompson reported the first successful operation for follicular thyroid carcinoma with tumor thrombus within the SVC (3). Thyroid carcinoma, especially papillary carcinoma, rarely develops macroscopic tumor thrombus and is considered to be low risk usually (2). We present a patient who had a papillary thyroid carcinoma that had been previously resected and who was then discovered to have extensive continuous tumor thrombus into the great vessels.

Case Report

A 47-year-old woman presented to her local emergency room at an outside hospital with complaints of a lump in her thyroid gland. Computed tomography imaging of the neck revealed that she had an irregular enhancing mass, measuring about 3.8 × 3.4 cm, extending from the right lobe of the thyroid and isthmus to above the hyoid. The mass appeared to extend beyond the thyroid capsule and into the right carotid space and right internal jugular vein, deviating the trachea to the left. Ultrasound imaging confirmed a hypoechoic mass on the right lobe of the thyroid extending into the isthmus. Fine needle aspiration results were inconclusive. The patient then underwent a total thyroidectomy and

mediastinal mass excision at an outside hospital. Surgical pathology demonstrated a 6.5-cm invasive papillary thyroid carcinoma with positive resection margins. A repeat ultrasound performed at the outside hospital after the resection showed a 1.7 × 2.6 × 2.6-cm horseshoe-shaped soft tissue density lesion (previously seen on imaging) surrounding the carotid artery and right internal jugular vein, possibly extending to the SVC.

The patient then came to our institution seeking a second opinion. The head and neck surgical team examined the patient in clinic and recommended surgical resection. Upon review of her imaging results, the thoracic service was consulted regarding resection of the tumor thrombus and subsequent reconstruction of the SVC. The patient was placed on anticoagulation therapy, initially warfarin and then enoxaparin, in preparation for surgery. A cardiopulmonary bypass machine was scheduled for standby should it be needed intraoperatively.

In the operating room, standard American Society of Anesthesiologists monitors were applied. The patient was induced with propofol and intubated without any difficulty using a C-MAC video laryngoscope and a 6.0-mm EMG NIMS endotracheal tube. A post-induction arterial line in the left radial artery and a left femoral central venous catheter were placed after communication with the thoracic surgeons regarding bypass cannulation in the event it became necessary. First, the head and neck surgeon performed a right and left neck dissection. During dissection of the right neck in the area of the carotid bulk, the large tumor thrombus at the jugular vein was noted to extend to the common facial vein and superiorly into the parapharyngeal space. The superior portion of the internal jugular vein was ligated. During the left neck dissection, the disease appeared to be in the carotid vertebral area in the vertebral vein, so the vein was sacrificed. The thoracic duct was ligated as well. At this point, the thoracic surgeon performed a median sternotomy. The SVC was resected and reconstructed to the right subclavian vein using a Dacron graft. The left subclavian vein was ligated, and the tumor embolus was resected en bloc with the surrounding lymph node tissues. The surgical field was then closed.

The patient was hemodynamically stable throughout the surgery, not requiring any vasopressor infusions or the cardiopulmonary bypass machine. She was extubated when the appropriate criteria were met. Immediately after extubation, the patient complained of difficulty breathing. Upon examination, massive exsanguination was discovered with a large amount of blood found in the chest tube, so the patient was emergently re-intubated, resuscitated, and the surgical incision was reopened. The patient was found to be bleeding from the right innominate vein owing to a ligature coming undone. Digital pressure was applied to the vein, and once the patient was hemodynamically stable, a clamp was applied and the innominate vein was oversewn. The patient was given 3 units of packed red blood cells during the resuscitation effort. After surgery, the patient was sent to the ICU intubated to observe for hemodynamic instability.

In the ICU, after a cuff-leak test, the patient was extubated on the second postoperative day. She was discharged home eight days after her surgery. Her surgical pathology report showed lymph nodes positive for metastatic papillary thyroid carcinoma, so postoperative radiation therapy was recommended. Patient is currently still undergoing radiation treatment at present time.

Discussion

In this rare case of angioinvasion of a papillary thyroid carcinoma, a multidisciplinary approach to

resection and treatment led to a favorable outcome. SVC occlusion is rarely the initial presentation of thyroid carcinoma, but it can result in severe symptoms (such as chest pain, dyspnea, facial swelling, etc) collectively known as SVC syndrome, which can be fatal(3). However, our patient had not presented with any of these symptoms. In fact, the SVC occlusion was found on routine work-up imaging for her thyroid nodule.

The first successful operation for follicular thyroid cancer with extensive tumor thrombus into the SVC and right atrium was reported in 1978 by Thompson et al.(3). At that time, there was a report of 6 cases before 1940, in each of these cases, the patients died of vascular occlusion shortly after diagnosis(3). Onoda et al.(3), reviewed 19 cases of SVC involvement from differentiated thyroid carcinoma recorded since the first successful surgery in 1978. In that cohort, follicular thyroid cancers were diagnosed more frequently than were papillary thyroid carcinomas (13 cases vs. 5 cases) (3). The results of that study showed that aggressive surgery is justified for SVC involvement owing to the generally better prognosis of patients who undergo aggressive surgery; hence, that has become the treatment of choice today. In this rare case of angioinvasion of a papillary thyroid carcinoma, a multi-disciplinary approach to resection and treatment has led to a favorable outcome.

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