

# Superior vena cava syndrome due to metastasis from urothelial cancer: A case report and literature review

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## Abstract

Superior vena cava (SVC) syndrome is caused by compression or obstruction of the SVC. We report here in a case of SVC syndrome due to lymph node metastasis from urothelial cancer to the mediastinum and lung. The origin of metastasis was determined by computed tomography (CT)-guided biopsy of metastases. After radiotherapy to the mediastinum with glucocorticoid failed, anticancer pharmacotherapy including paclitaxel, gemcitabine, and cisplatin proved effective and SVC syndrome resolved. But patient died from cerebral bleeding from newer brain metastases 10 months later.

**Key Words:** Metastatic urothelial cancer, Superior vena cava syndrome, urothelial cancer

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## INTRODUCTION

Superior vena cava (SVC) syndrome is an uncommon situation for urologists. Compression or obstruction of the SVC may result from many reasons like masses in the anterior or middle mediastinum, thrombosis in the vein, infectious causes or iatrogenic causes, etc.<sup>[1]</sup> More than 90% of cases involve malignant conditions, including non-small-cell lung cancer (50%), small-cell lung cancer (22%), lymphoma (12%), and metastatic cancer (9%).<sup>[1]</sup> Breast cancer is the most frequent origin for metastatic cases.<sup>[1]</sup> Cases of SVC syndrome due to metastasis of urogenital cancer are rare.<sup>[2]</sup> We report the case of a 59-year-old man with SVC syndrome due to lymph node metastases from urothelial carcinoma (UC) 3 years after left nephroureterectomy.

## CASE REPORT

A 59-year-old man presented with dyspnea, face and neck edema, strangled feeling, cough and fatigue in April 2008. Symptoms rapidly advanced over the course of 1 week. He was known case of UC for which he underwent transurethral resection for bladder tumor (TURBT) (the size was 7 cm, left wall, UC, G2 > G1, pTa) in April 2005. In addition, 2 weeks later left nephroureterectomy had been performed for the left ureter and renal-pelvis cancer. The entire mucosa of the ureter and renal-pelvis were replaced by papillary tumor [Figure 1] and histological examination showed UC, G2>>G3, pT2, ly0, and v0. Because of high grade invasive cancer, two courses of adjuvant chemotherapy had been administered using methotrexate, vinblastine, doxorubicin hydrochloride, and cisplatin (MVAC therapy). In February 2006, multiple bladder tumors (9 papillary tumors, size was 5 to 15 mm) had recurred and TURBT was performed (UC, G2, pTa). No metastatic lesions were found until the second admission. After TURBT the patient came the hospital twice for the convenience of the patients, and he was not followed for 1 year and presented again with SVC symptoms. The face, neck, and right upper limb were edematous and varicosis of the right

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jugular vein was apparent. Computer tomography (CT) scan revealed multiple lung masses involving a 5 cm tumor in the right upper lung field and multiple lymph nodes in the mediastinum [Figure 2]. Massive nodes constricted the upper part of the SVC and merging section of bilateral brachiocephalic veins. Bone scintigraphy revealed a hot spot in the forehead bone. Glucocorticoid (bethamethasone 16 mg/day) was administered and radiotherapy was started on the second day of admission. Twenty days later CT-guided biopsy was performed and metastasis of UC was diagnosed histopathologically [Figure 3]. A total 40 Gy of radiation proved ineffective and edema of the face and upper limbs continued. A modified intravenous anti-cancer chemotherapy was initiated with paclitaxel at 60 mg/m<sup>2</sup> on days 1 and 8, gemcitabine at 1000 mg/m<sup>2</sup> on days 1 and 8, and cisplatin 70 mg/m<sup>2</sup> on day 2.<sup>[3]</sup> Facial edema and dyspnea temporarily worsened with fluid infusion, but symptoms improved and the size of tumors decreased after one course of this chemotherapy. After three courses of the chemotherapy, most lung metastases had vanished and the main lung tumor had decreased to a diameter of 2 cm. Lymph nodes became reduced in size, but compression of the SVC remained. However, collateral circulations around the compression of the SVC and the dorsal chest wall developed, improving SVC syndrome. About ten months later patient died due to cerebral bleeding around the forehead metastasis.

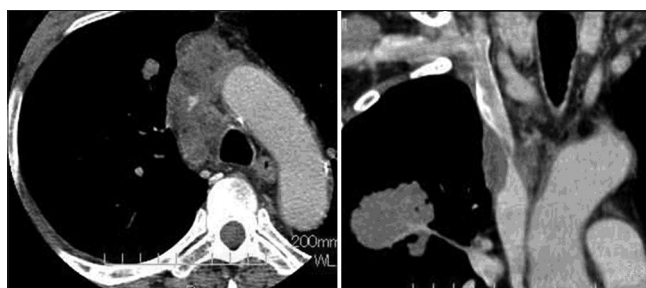
## DISCUSSION

Management for SVC syndrome associated with malignant condition involves both treatment of the cancer and relief of the obstructive symptoms. Prognosis for patients with this condition is poor and median life expectancy is approximately 6 months.<sup>[1]</sup> Of course, survival among these patients varies and some patients achieve cure of both SVC syndrome and cancer.

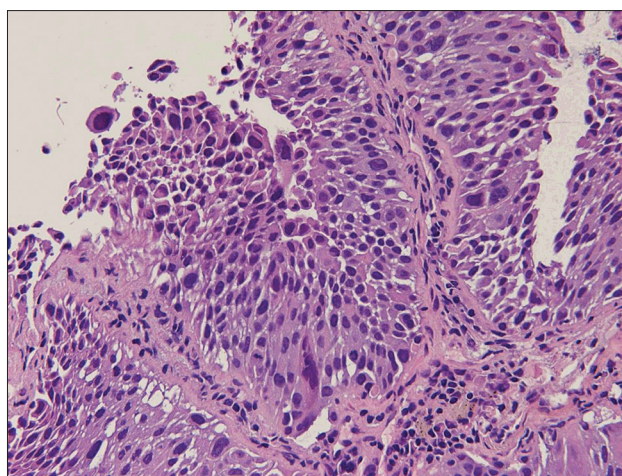
In the present case, urgent treatment was tried to decrease hydrostatic pressure and edema on the neck, face and upper limbs. The glucocorticoid and radiotherapy were ineffective and symptoms deteriorated because the patient had to have fluid infusion due to inability to eat following side effects of radiation such as candida esophagitis and pharyngitis. As the patient had received MVAC therapy, another therapy with paclitaxel, gemcitabine and cisplatin was selected. The transfusion was run from the veins of the inferior limbs and loop diuretics were used.<sup>[2]</sup> Finally, CT revealed that volume of the main mass in the right lung had decreased 90% and other coin lesions had vanished. Lymph nodes in the mediastinum were reduced in size, but no bloodstream flow could be seen in the superior SVC to the right jugular or right subclavian vein. Various collateral vessels developed



**Figure 1:** Abdominal enhanced computerized tomography scan revealing tumors in the left renal pelvis and ureter



**Figure 2:** Chest CT revealing multiple tumors in the lung fields and enlargement of lymph nodes at the right side of the lung hilum and trachea, anterior mediastinum and bilateral supraclavicular fossae. Massive lymph nodes in the right mediastinum constricted the upper part of the superior vena cava and merging section of bilateral brachiocephalic veins



**Figure 3:** Irregularly sized transitional cells with nuclear pleomorphism forming a papillary structure

from the right dorsal-chest wall to the SVC through the azygos vein, decreasing the symptoms of SVC syndrome. In retrospect, endovascular stenting may have relieved SVC syndrome,<sup>[1,4,5]</sup> but was not attempted. The reason is

because in urothelial carcinoma patients, chemotherapy and radiation are effective although not immediately, and in one prospective<sup>[6]</sup> study symptoms resolved completely in only 17% of cases by stenting. But in this case radiation did not relieve SVC syndrome, endovascular stenting might be good choice. The cases of 11 published reports involving SVC syndrome associated with urogenital malignancies are shown in Table 1. The origins were prostate cancer<sup>[7-10]</sup> ( $n = 4$ ), renal cancer<sup>[5,11,12]</sup> ( $n = 3$ ), urothelial cancer<sup>[13,14]</sup> ( $n = 2$ ), testis cancer<sup>[15]</sup> ( $n = 1$ ), and Wilm's tumor<sup>[16]</sup> ( $n = 1$ ). In five cases, SVC syndrome was the initial symptom and metastatic origins were found later. Only three patients survived, including two cases of prostate cancer and one case with Wilm's tumor. SVC syndrome due to metastasis of urothelial cancer was seen in two cases: One with atrial metastasis<sup>[14]</sup> without details of the clinical course; and the other with metastatic lymph nodes from the bladder cancer.<sup>[13]</sup> In the latter case, details of the clinical course showed that SVC syndrome occurred on 14 weeks after the total cystectomy and urethrotomy and patients received with radiation and anti-cancer chemotherapy with cisplatin, cyclophosphamide, and methotrexate. However, the patients died by respiratory failure 4 months after admission. These cases are slightly older and reports of SVC syndrome from urothelial cancer are currently very rare. The present case was the first report that anti-cancer therapy with paclitaxel, gemcitabine, and cisplatin appears temporally useful in

relieving the symptoms of SVC syndrome and allowing time for the development of collateral vessels.

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**Table 1: Review of cases of superior vena cava syndrome associated with urogenital malignancies**

Author	Sex	Age	Treatment for SVC syndrome	Origin of cancer
Lanteri <sup>[13]</sup>	M	56	Chemotherapy	Bladder cancer
Greyson <sup>[14]</sup>	M	57	No description	Urothelial cancer
Montalbán <sup>[7]</sup>	M	75	Hormonal therapy	Prostate cancer
Low <sup>[15]</sup>	M	14	Chemotherapy	Testis cancer
Old <sup>[8]</sup>	M	68	Radiation therapy	Prostate cancer
McGarry <sup>[9]</sup>	M	48	Radiation and hormonal therapy	Prostate cancer
Fong <sup>[16]</sup>	F	14	Chemotherapy and radiation therapy	Wilms tumor
Strugnelli <sup>[11]</sup>	F	66	Radiation therapy	Renal cancer
Davison <sup>[5]</sup>	M	55	Stenting	Renal cancer
Sakura <sup>[12]</sup>	F	65	Radiation therapy	Renal cancer
Takeda <sup>[10]</sup>	M	60	Hormonal therapy	Prostate cancer

SVC: Superior vena cava

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