

Metastatic urothelial carcinoma to pericardium manifested by dyspnea from cardiac tamponade during systemic chemotherapy: Case report and literature review

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Abstract

A 53-year-old man presented for further evaluation due to microscopic hematuria and left lumbar pain. Computed tomography revealed a large tumour in the left renal pelvis with multiple metastases. Despite effective systemic chemotherapy, he developed dyspnea, and was diagnosed with cardiac tamponade. Pericardial involvement in an advanced malignancy is common, but symptomatic cardiac metastasis from urothelial carcinoma is rare. Of the reports of symptomatic cardiac metastasis from urothelial carcinoma, only 3 cases presented as cardiac tamponade. We report here a rare case of cardiac tamponade caused by a renal pelvic carcinoma with positive cytodiagnosis of pericardial effusion. We also summarize and discuss the symptoms, treatment, and prognosis of the pathological condition, and present a brief review of previously published reports.

Introduction

The incidence of cardiac metastasis has been reported to be 2.3% and 18.3% of autopsied cases of carcinoma.^{1,2} It has been reported that 10% of autopsied cases of urothelial carcinoma (UC) exhibited cardiac metastases.³ However, the metastases are clinically silent in most cases. To the best of our knowledge, there have only been a few reports of symptomatic cardiac metastasis from UC, and only 3 cases presented as cardiac tamponade. We report a rare case of cardiac tamponade caused by UC of the renal pelvis, and discuss the symptoms, treatment, and prognosis of the pathological condition. We also briefly review published reports.

Case report

In June 2006, a 53-year-old man visited our department for further evaluation of microscopic hematuria and left lumbar pain. Abdominal computed tomography (CT) revealed the presence of a tumour in the left renal pelvis with left

reniportal lymph node metastases, multiple lung metastases, multiple liver metastases and left pubic bone metastasis. A retrograde pyelogram revealed a filling defect in the left renal pelvis, and urine cytology collected from the left renal pelvis was morphologically similar to UC (class V). After the patient received 4 cycles of MVAC chemotherapy (methotrexate, vinblastine, adriamycin, and cisplatin), radiological findings demonstrated that MVAC therapy was not effective. He underwent 6 additional cycles of chemotherapy combined with gemcitabine and paclitaxel. The left reniportal lymph node metastases, lung metastases and liver metastases decreased in size. After the sixth cycle of gemcitabine-paclitaxel chemotherapy, the patient gradually developed chest discomfort and dyspnea. X-rays showed an enlarged cardiac silhouette and left pleural effusion. CT revealed massive pericardial effusion and left pleural effusion, which were not detected in a CT scan performed a month earlier (Fig. 1). Pericardiocentesis was performed, and 3000 mL of pericardial effusion and 100 mL of left pleural effusion were aspirated. Both of the samples were clear yellow, and cytodiagnosis of both fluids demonstrated atypical cells similar to the cells present in urine from the left renal pelvis (class V) (Fig. 2). Subsequent CT showed an 8 × 7 × 6 cm pericardial mass invading the left posterior ventricular wall. Echocardiography showed a 5-cm pericardial mass adhering to the left lateral and posterior ventricular wall, resulting in severe akinesis of the cardiac wall (Fig. 3). Pericardial effusion did not increase after the puncture, but a subsequent echocardiogram revealed the left ventricular akinetic lesion had expanded, leading to worsening of the cardiac function. He died of severe heart failure a month later.

Discussion

According to a recent review, the incidence of cardiac metastasis ranges from 2.3% to 18.3% of autopsied cases of carcinoma.¹ In a large series of 7289 autopsy examinations, the incidence of cardiac metastases diagnosed post-mortem was 9.1%, and tumours showing the highest rate were pleu-

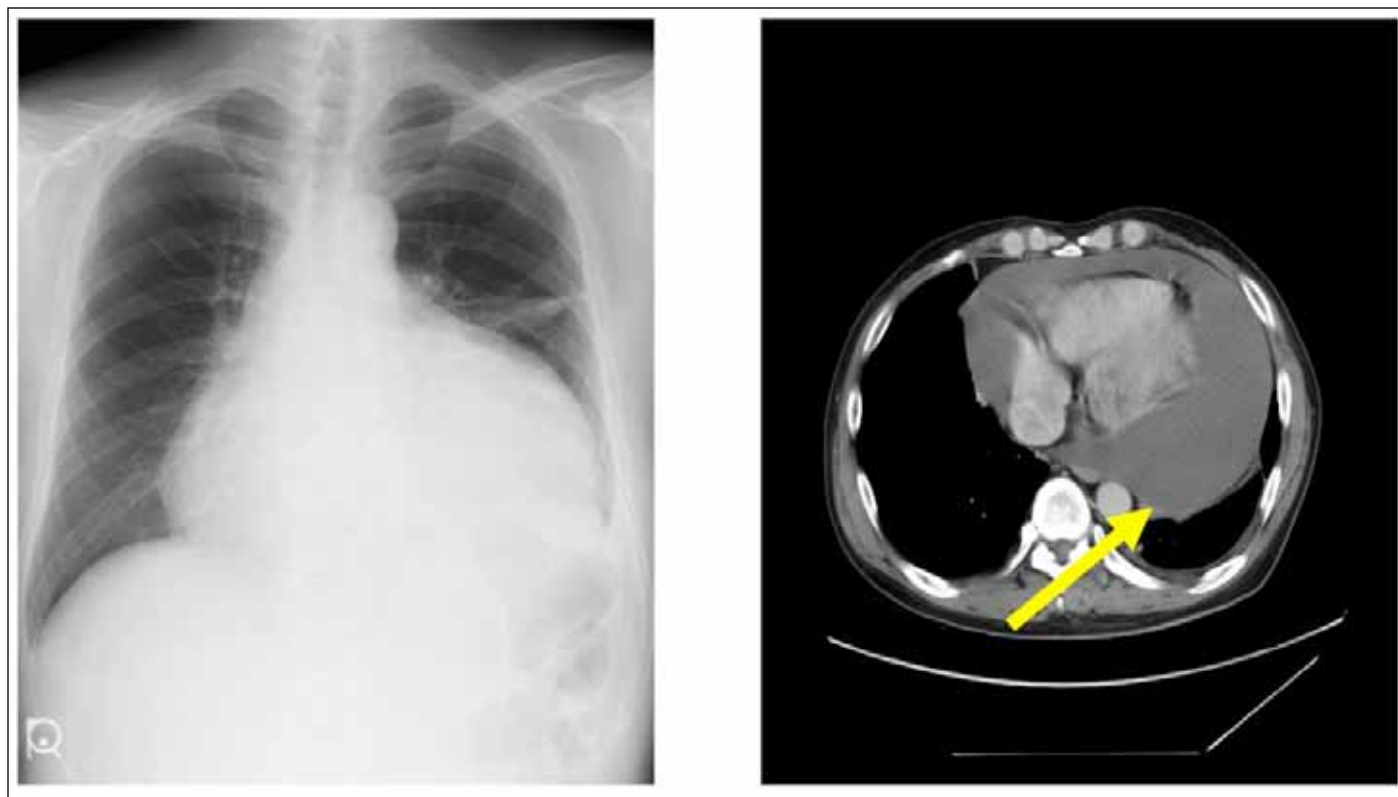


Fig. 1. X-ray and computed tomography showing massive pericardial effusion and left pleural effusion.

ral mesothelioma (48.4%), melanoma (27.8%), lung adenocarcinoma (21%), undifferentiated carcinomas (19.5%), lung squamous cell carcinoma (18.2%) and breast carcinoma (15.5%).² In the case of UC, 10% of autopsied cases show cardiac metastases.⁴ Pericardial effusions were found in 25.4% of those with cardiac involvement. However, cases presented as clinically significant cardiac tamponade are rare. Including the present case, 14 cases of symptomatic cardiac metastases from UC have been reported so far: 7 bladder cancers and 7 renal pelvic cancers.⁴⁻¹⁶ (Table-1). There have been 3 reported cases of cardiac tamponade from urothelial carcinoma.^{4,5,7} In all the cases, symptoms included dyspnea, fatigue, orthopnea and chest pain. Plain chest radiography revealed an enlarged cardiac silhouette or “water bottle” heart. Echocardiography was useful to evaluate pericardial effusions in both cases. Differentiation of the etiology of effusions was performed via pericardiocentesis, which also provides safe and rapid relief of the low-output symptoms of cardiac tamponade. Although bloody pericardial effusion suggests malignancy in 75% of cases,³ the cytodiagnosis of pericardial effusion was negative in the former 2 cases. In the other case, the cytodiagnosis suggested malignancy.^{4,5,7}

In our case, symptoms were similar to previously reported cases. Plain chest radiography showed a “water bottle” heart, and echocardiography was useful to evaluate pericar-

dial effusion. Pericardiocentesis relieved the patient from the symptoms of cardiac tamponade. Although the pericardial effusion was clear, the cytodiagnosis was positive.

Treatment options for malignant pericardial effusions include pericardiocentesis, pericardial window and systemic chemotherapy.⁴ Pericardiocentesis does not improve survival and has a high recurrence rate,¹⁷ but it is useful for relieving patients from the low-output symptoms of cardiac tamponade. Surgical pericardial windows or possibly balloon pericardiotomy should be used for recurrences.¹⁷ In the present case, pericardiocentesis was effective, but persisting reno-cardiac failure prevented us from performing additional systemic chemotherapy.

An echocardiogram was useful for diagnosis in almost every case previously reported. On the other hand, X-rays and CT were useful for diagnosis in more than half of the cases, but could not exclude the presence of cardiac disease (Table 1). In our case, X-rays, CT and echocardiograms were positive studies and useful for diagnosis.

The prognosis of patients with symptomatic cardiac metastases from UC is extremely poor. Although UC might respond to systemic chemotherapy, this does not appear to be practical because symptomatic cardiac metastases do not allow adequate time for cure.

In 2 cases, the patient received chemotherapy and survived for 6 months and 1 year, respectively.^{4,7} In 3 cases,

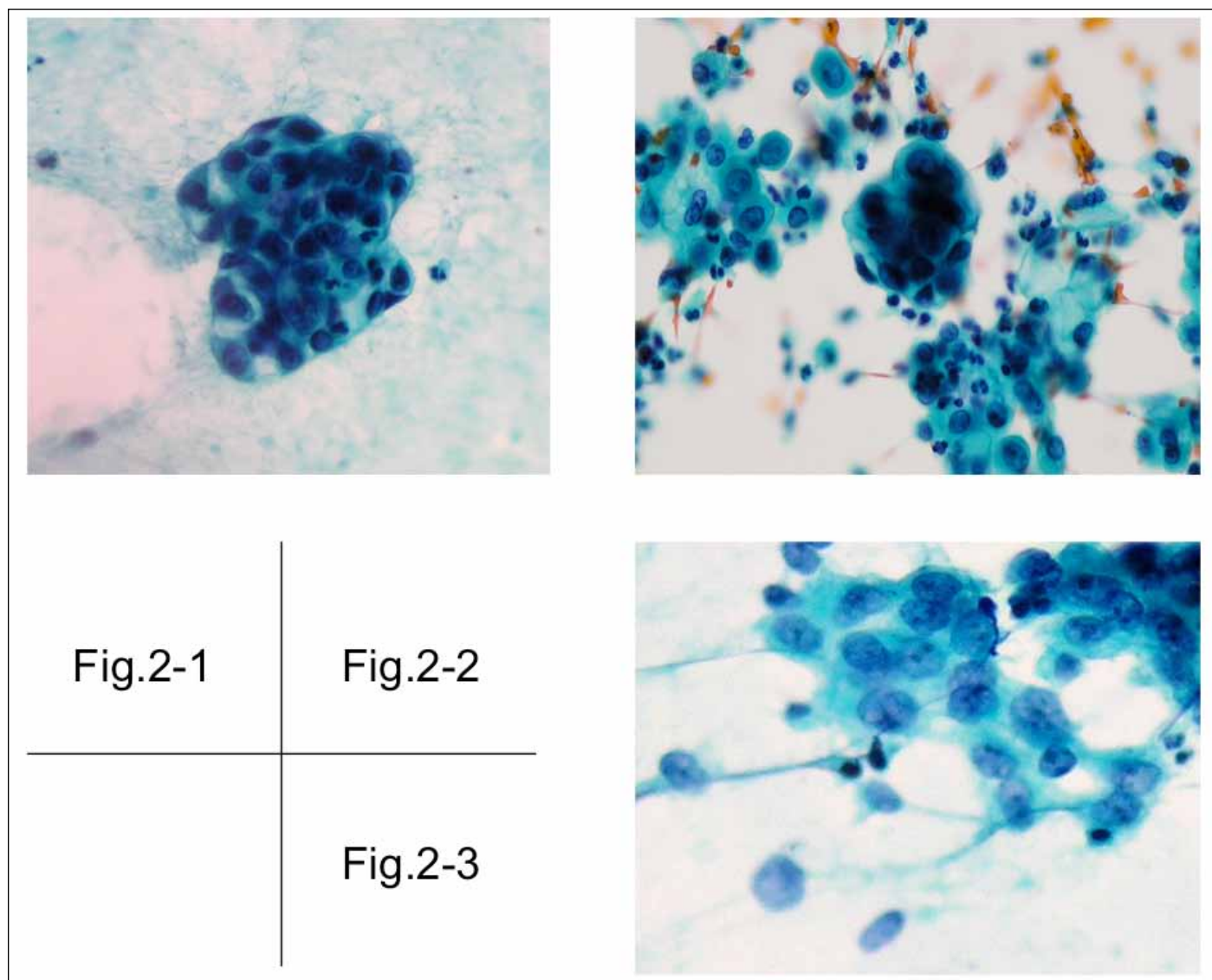


Fig. 2. Both pericardial effusion and left pleural effusion were clear yellow, and cytodiagnosis from both fluids demonstrated atypical cells similar to the cells present in urine from the left renal pelvis. 2-1: Cytodiagnosis of the pericardial effusion; 2-2: Cytodiagnosis of the left pleural effusion; 2-3: Cytodiagnosis of urine from the left renal pelvis.

the tumour in the heart was removed,^{6,13,16} but the operation was effective in only 1 case.¹⁶ However, in the other cases, the patients died soon after the operation. We, therefore, suggest that although the prognosis of symptomatic cardiac metastasis of UC is extremely poor, early diagnosis and treatment can help in the management of this life-threatening pathological condition, and an echocardiogram can be useful for early detection.

Conclusion

The present case is a rare case of cardiac tamponade from renal pelvic carcinoma with positive cytodiagnosis of pericardial effusion. The prognosis of symptomatic cardiac

metastasis from a UC is extremely poor. Therefore, the treatment methods must be chosen carefully, and pericardiocentesis, which provides safe and rapid relief of the low-output symptoms of cardiac tamponade, can be an appropriate treatment option. Also, cytodiagnosis of pericardial effusion may help in the diagnosis, regardless of the appearance of the effusion.

Competing interests: None declared.

This paper has been peer-reviewed.

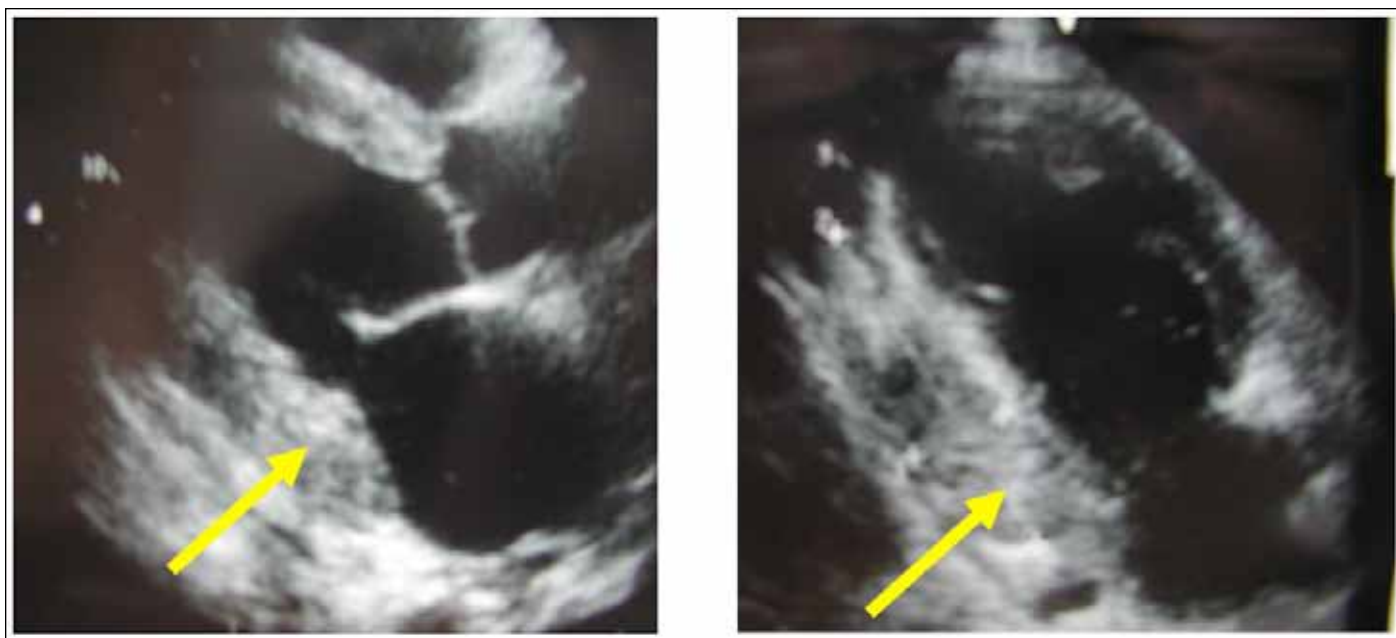


Fig. 3. Echocardiography showed a 5-cm pericardial mass adhering to the left lateral and posterior ventricular wall

Table 1. Reported cases of symptomatic cardiac metastasis from urothelial carcinoma

Reporter	Age/sex	Metastatic lesion	Primary lesion	Tamponade	Cytology	Diagnosis	Treatment	Prognosis
Fabozzi ⁴	66M	Pericardium	Bladder	Bloody 700 cc	Anaplastic cells	XP, echo	Pericardial window Chemotherapy	DOD (6 months)
Islam ⁵	39M	Left ventricular	Renal pelvis	Bloody 200 cc	Negative	XP, echo	Pericardiocentesis	Not described
Spiliotopoulos ⁷	66M	Right atrial	Bladder	Bloody 2000 ml	s/o malignancy	Echo/CT MRI	Chemotherapy	Alive One year
Kemp ⁶	53M	Right ventricular	Bladder	×	-	Echo	Sternotomy	DOD (shortly after)
Patel ⁸	45M	Right ventricular	Renal pelvis	×	-	CT Echo (3 cm)	Supportive care	DOD (shortly after)
Lin ⁹	83M	Right ventricular	Bladder	×	-	Echo CT (5x4 cm)	Denied treatment	DOD (shortly after)
Murakami ¹⁰	66M	Right ventricular	Renal pelvis	×	-	Echo (0.8 cm) CT	None	DOD (shortly after)
Kadono ¹¹	57M	Right ventricular	Renal pelvis	×	-	Echo	None	DOD (shortly after)
Clemente ¹²	53M	Right ventricular	Bladder	×	-	Echo	None	DOD (shortly after)
Sobczyk ¹³	75M	Left ventricular	Renal pelvis	×	-	Echo (4.5 cm)	Operation	DOD (one month)
Malde ¹⁴	77F	Left ventricular	Bladder	×	-	-	None	DOD (shortly after)
Mountzious ¹⁵	67M	Right atrial	Bladder	Not mentioned	Epithelial cells	Echo/CT MRI (4.6 cm)	Chemotherapy	DOD (one year)
Shields ¹⁶	58F	Right Ventricular	Renal pelvis	x	-	Echo/CT MRI	Operation Adjuvant chemo	Alive Nine weeks
Our case	53M	Left ventricular	Renal pelvis	Clear, 3000 cc	Class v	Echo (8 cm) CT (5 cm) XP	Pericardiocentesis	DOD (one month)

M: male; F: female; DOD: dead of disease; XP: x-ray photographs; CT: computed tomography; MRI: magnetic resonance imaging.

References

- Gupta R, Paner GP, Amin MB. Neoplasms of the upper urinary tract: a review with focus on urothelial carcinoma of the pelvicalyceal system and aspects related to its diagnosis and reporting. *Adv Anat Pathol* 2008;15:127-39. <http://dx.doi.org/10.1097/PAP.0b013e31817145a9>
- Bussani R, De-Giorgio F, Abbate A, et al. Cardiac metastases. *J Clin Pathol* 2007;60:27-34. <http://dx.doi.org/10.1136/jcp.2005.035105>
- Klatt EC, Heitz DR. Cardiac metastases. *Cancer* 1990;65:1456-9. [http://dx.doi.org/10.1002/1097-0142\(19900315\)65:6<1456::AID-CNCR2820650634>3.0.CO;2-5](http://dx.doi.org/10.1002/1097-0142(19900315)65:6<1456::AID-CNCR2820650634>3.0.CO;2-5)
- Fabozzi SJ, Newton JR Jr, Moriarty RP, et al. Malignant pericardial effusion as initial solitary site of metastasis from transitional cell carcinoma of the bladder. *Urology* 1995;45:320-2. [http://dx.doi.org/10.1016/0090-4295\(95\)80025-5](http://dx.doi.org/10.1016/0090-4295(95)80025-5)
- Islam N, Ahmedani MY. Renal carcinoma presenting as cardiac tamponade: a case report and review of literature. *Int J Cardiol* 1998;64:207-11. [http://dx.doi.org/10.1016/S0167-5273\(98\)00015-1](http://dx.doi.org/10.1016/S0167-5273(98)00015-1)
- Kemp W, Rothberg M, Saporito JJ, et al. Transitional cell carcinoma and right ventricular obstruction. *J Urol* 1997;158:1522-3. [http://dx.doi.org/10.1016/S0022-5347\(01\)64260-5](http://dx.doi.org/10.1016/S0022-5347(01)64260-5)
- Spiliotopoulos K, Argiriou M, Argyrakos T, et al. Solitary metastasis of urothelial carcinoma of the urinary bladder to the heart: an unusual clinical manifestation. *J Thorac Cardiovasc Surg* 2008;136:1377-8.
- Patel AK, Moorthy AV, Yap VU, et al. Cardiac metastasis from transitional cell carcinoma: a subtle echocardiographic entity. *J Clin Ultrasound* 1980;8:49-51. <http://dx.doi.org/10.1002/jcu.1870080111>
- Lin WC, Telen MJ. Cardiac metastasis from a transitional cell carcinoma: a case report. *Med Oncol* 2000;17:147-50. <http://dx.doi.org/10.1007/BF02796211>
- Murakami T, Komiya A, Mikata K, et al. Cardiac metastasis of renal pelvic cancer. *Int J Urol* 2007;14:240-1. <http://dx.doi.org/10.1111/j.1442-2042.2007.01512.x>
- Kadono Y, Yamamoto H, Tajika E. Cardiac metastasis from a transitional cell carcinoma diagnosed by two-dimensional echocardiography. *Int J Urol* 2006;13:454-6. <http://dx.doi.org/10.1111/j.1442-2042.2006.01323.x>
- Clemente LM, Patier JL, Lopez-Suanzes MJ, et al. Cardiac metastases from a transitional cell carcinoma: an unusual clinical manifestation. *Br J Urol* 1997;80:831-2. <http://dx.doi.org/10.1046/j.1464-410X.1997.00394.x>
- Sobczyk D, Nosal M, Myc J, et al. Cardiac metastasis due to pulmonary metastasis from a transitional cell carcinoma. *Eur J Echocardiogr* 2008;9:113-5.
- Malde DJ, Gall Z, George N. Ventricular rupture secondary to cardiac metastasis of transitional cell carcinoma of the bladder. *Scand J Urol Nephrol* 2006;40:170-1. <http://dx.doi.org/10.1080/00365590510040372>
- Mountzios G, Baniyas A, Dalianis A, et al. Endocardial metastases as the only site of relapse in a patient with bladder carcinoma: a case report and review of the literature. *Int J Cardiol* 2010;140:e4-7. <http://dx.doi.org/10.1016/j.ijcard.2008.11.012>
- Shields AM, Pomplun S, Deshpande R, et al. Right ventricular metastasis of transitional cell carcinoma of the renal pelvis: successful single stage surgical treatment. *Interact Cardiovasc Thorac Surg* 2011;12:297-300. <http://dx.doi.org/10.1510/icvts.2010.256230>
- Vaitkus PT, Herrmann HC, LeWinter MM. Treatment of malignant pericardial effusion. *JAMA* 1994;272:59-64. <http://dx.doi.org/10.1001/jama.1994.03520010071035>

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