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Cardiac Metastasis of Cervical Cancer: A Case Report and Review of The Literature

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ABSTRACT

Background: Cervical cancer cardiac metastasis is a rare disease with a poor prognosis. It has been reported that the disease often is more detected at autopsy and has no standardized treatment options.

Case presentation: Here, we report a patient with cardiac metastasis from cervical cancer who initially suffered nonspecific symptoms, such as chest tightness.

Conclusion: A review of cases of cardiac metastasis from cervical cancer in over a decade was performed. Pretreatment data were provided for such matters, which may be helpful for diagnosis and treatment in the future.

INTRODUCTION

Cardiac neoplastic disease is a rare disease with an incidence of 1.23% based on autopsy findings [Grigsby 2008]. Secondary or metastatic heart tumors are more common than primary cardiac tumors [Al-Mamgani 2008]. Because of atypical symptoms, cardiac metastatic tumors are difficult to find in surviving patients [Bussani 2007]. Here, we present an extremely rare case of metastatic intracardiac mass from the cervix. At the same time, the literature on cardiac metastasis of cervical cancer was reviewed.

CASE PRESENTATION

A 35-year-old female was admitted to our hospital with palpitations, chest tightness, and fatigue after activity. Electrocardiogram was only suggestive of sinus tachycardia and ST-segment changes. Echocardiography after hospitalization revealed a significant space-occupying lesion in the right heart. (Figure 1)

Because the patient's echocardiography result did not accord with the characteristics of a primary cardiac tumor, we continued to pursue the patient's general condition and past medical history. She developed squamous cell carcinoma (SCC) of the uterine cervix two years ago, which International Federation of Gynecology and Obstetrics (FIGO) staging was IIIC1. Once diagnosed, the patient underwent a total hysterectomy, postoperative chemotherapy with docetaxel and cisplatin (TP) Regimen, and formal radiation therapy. Nevertheless, cancer metastasized to the supraclavicular and thoracic paraspinal nodes two years later. The patient received radiotherapy on the left upper lymph node at that time, and afterward, she received targeted therapy with apatinib. We speculated that the chest tightness of the patient and the space-occupying lesion of the right heart might be associated with the patient's previous cervical cancer. Therefore, we performed pulmonary artery computed tomographic angiography (CTA) and positron-emitting tomography/computed tomography (PET/CT) for her. The pulmonary artery CTA clearly showed an occupying lesion in the right ventricle and main pulmonary artery. (Figure 2) Additionally, PET/CT demonstrated a mass shadow with low density in the cavity of the RV and main pulmonary artery, and the 2-F-18-fluoro-2-deoxy-D-glucose (FDG) metabolism was heterogeneously increased. (Figure 3) Meanwhile, nothing abnormal was found in the vaginal stump.

Based on the patient's clinical symptoms and imaging manifestations, after a multidisciplinary discussion, we thought that the patient's right ventricular mass might be metastasized from the previous cervical cancer. Considering the surgical tolerance and the patient's own will, we finally reached an agreement that corresponding chemotherapy would be the most appropriate treatment. Since then, the patient was discharged and received chemotherapy.

DISCUSSION AND CONCLUSION

Although secondary or metastatic cardiac tumors are more common than primary cardiac tumors, cardiac metastatic tumors are rarely diagnosed in surviving patients due to more than 90% of them being clinically silent [Bussani 2007]. With the advancement of diagnostic tools, chemotherapy regimens, and perioperative nursing levels, the survival rate of cancer patients has been dramatically improved [Karwinski 1989]. Liver, bone, brain, lung, and supraclavicular lymph nodes are well known as common metastatic sites for cervical cancer [Brenner 1982], whereas metastasis to the heart is quite rare. However, many studies have shown that the incidence rate of metastatic heart tumors is increasing [Lockwood 1980].

In the present study, a case of cervical cancer with cardiac metastasis diagnosed before patient death was reported. We

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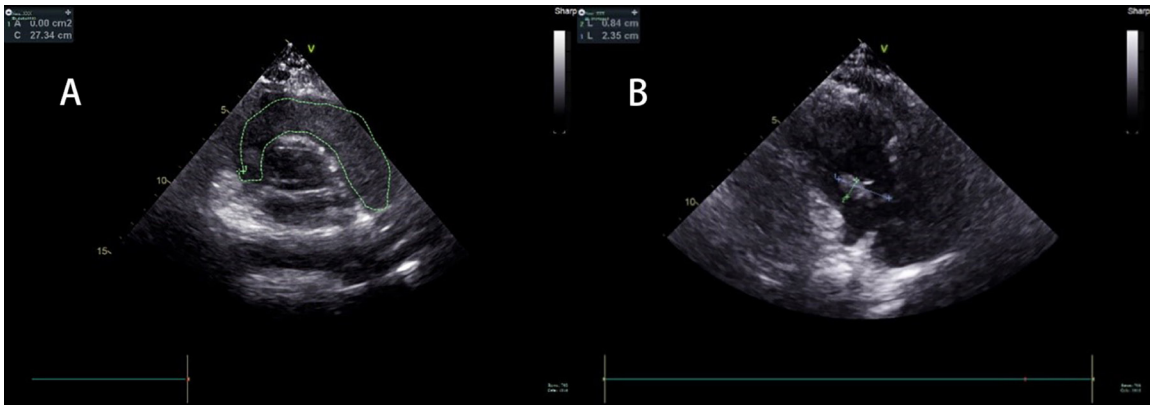

Figure 1. (A) RV accessible hypoechoic mass, size about 12 * 2.5cm, pedicle located near RV side of tricuspid annulus, width about 1.2cm, lesion extending in the direction of the main pulmonary artery. (B) Echogenicity was observed, measuring 2.4 * 0.9CM on the right atrial surface of the posterior tricuspid valve, which was similar in texture to the right ventricular lesion.

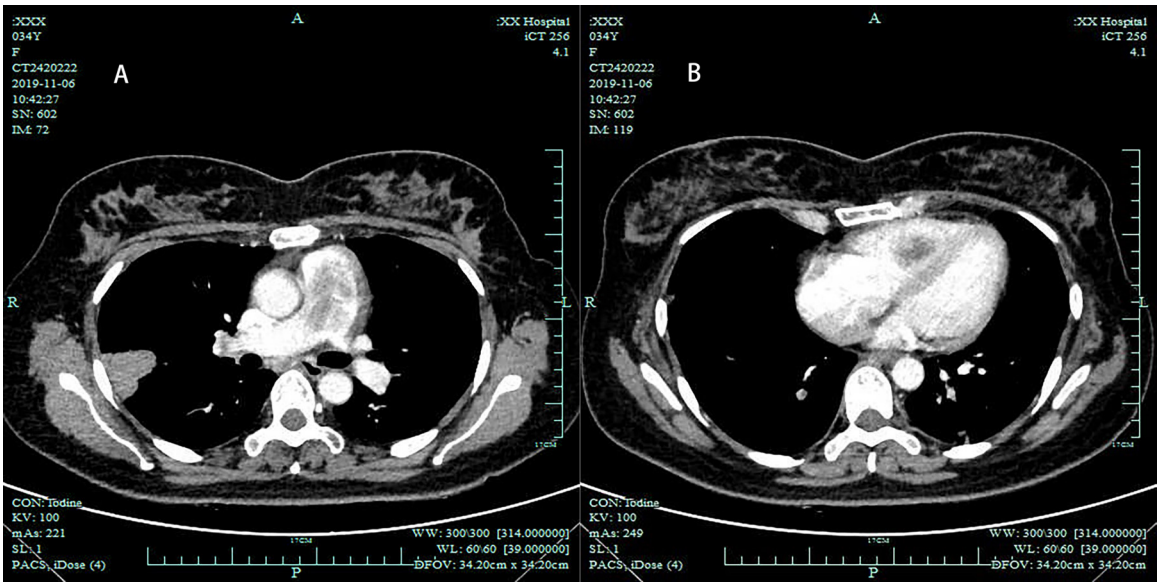

Figure 2. (A) there were multiple filling defects in the main pulmonary artery trunk, right axillary artery, and arterial branches of both lower lobes. (B) A patchy hypoenhancement shadow was seen in the RV.

searched the relevant literature between 2011 and 2021 on PubMed. So far, only 14 cases of cervical cancer with cardiac metastasis have been reported.

Analyzing the cases reported in the literature above, we found that cardiac metastasis from cervical cancer did not present with specific clinical symptoms. They often present with chest tightness or swelling of the lower extremities and other clinical symptoms resembling heart failure. In these 14 case reports, the mean age of these patients was 43.5, and 71.4% of the primary tumors were squamous cell carcinomas. Most patients were found to have cardiac metastasis by echocardiogram; this prompted us that transthoracic echocardiography during follow up is warranted for these patients.

While in terms of the time of onset, 1 or 2 years after completing the initial treatment was the time point when most patients are diagnosed cardiac metastasis. When the echocardiogram could not clearly show a heart mass, a PET/CT would be advocated in the further examination. It could help clinicians choose a more reasonable treatment option in cases where the biopsy of cardiac masses was not available. When faced with cardiac metastasis, palliative chemotherapy was the most common choice because of the poor prognosis of advanced cervical cancer. In the retrieved literature, the prognosis was unsatisfactory after diagnosing cardiac metastases in patients. Even receiving an aggressive treatment cannot largely prolong the life span of patients. Since the low incidence of the disease and its poor prognosis, the treatment strategies for cardiac metastasis of cervical cancer have still not been standardized [Kim 2008].

In our case, the patient visited the hospital because of chest tightness. The CTA suggested that the patient might have a pulmonary embolism. Mechanical obstruction of the

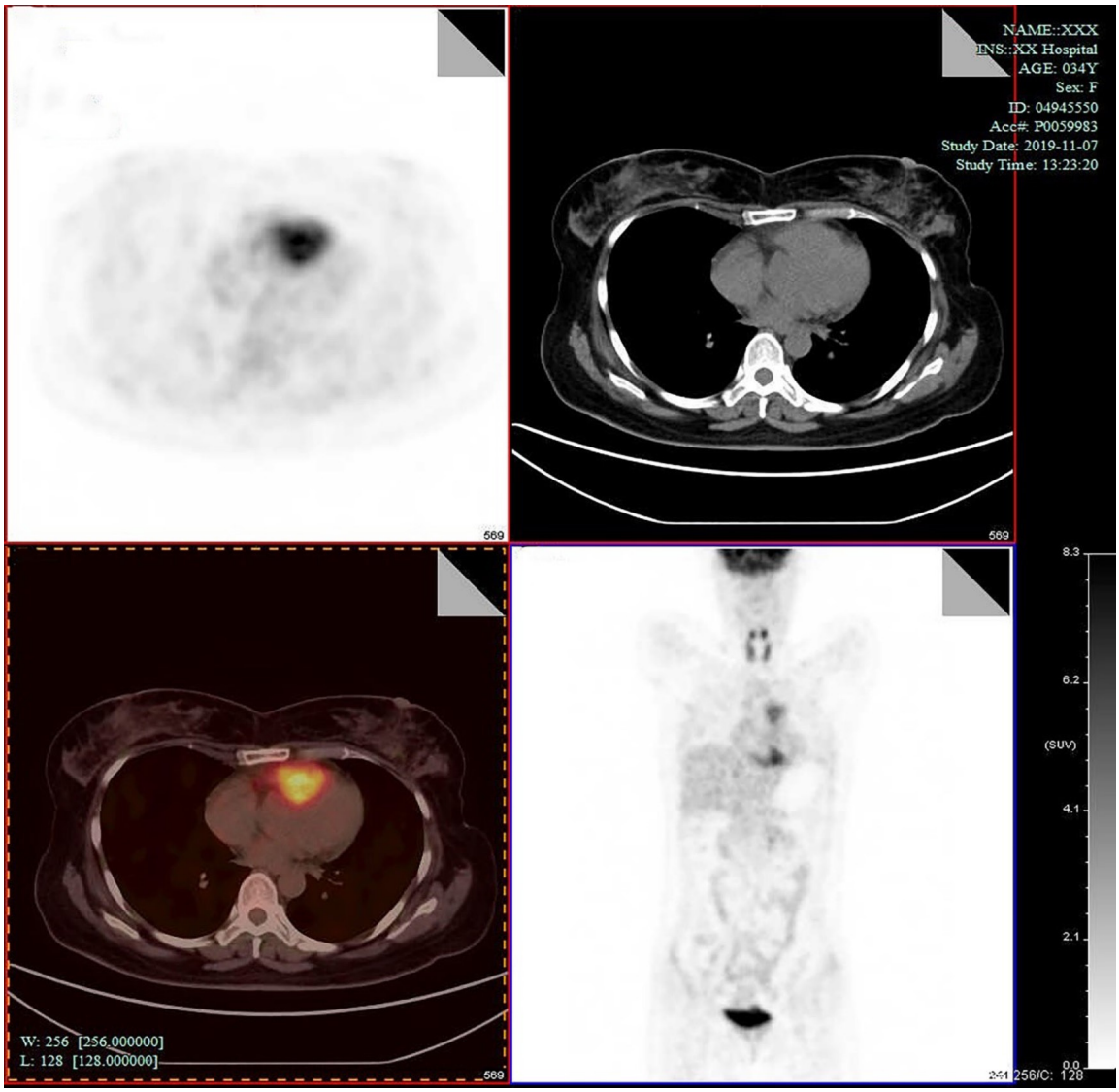

Figure 3. A mass-like soft tissue density shadow was seen in the cavity of the RV and main pulmonary artery, and the FDG metabolism was heterogeneously increased. FDG metabolism was mildly elevated in multiple enlarged lymph nodes in the left diaphragmatic foot, posterior descending aorta, and left the clavicular region.

right ventricular outflow tract is life-threatening. Therefore, to avoid the adverse outcome of acute embolism caused by a tumor, simple resection of tumors in the right ventricle and pulmonary artery is regarded as a palliative treatment. After a multidisciplinary discussion, it was considered that radical cancer surgery could not provide a high benefit to the patient, so chemotherapy was recommended. Although related surgical modalities are palliative treatment, many scholars still believe that surgeries can alleviate patients' symptoms and thus improve their quality of life [Borsaru 2007]. But the poor prognosis indicates that palliative surgery may not depend solely on the symptoms of the condition [Okamoto 2015]. However, palliative surgery can save lives for patients with the high possibility of embolization or obvious hemodynamic changes.

Unfortunately, this patient did not have a follow-up in our hospital, nor did we have access to related follow-up data. The patient's current state was supposed to be considered when choosing treatment measures. As a result, the metastatic cardiac tumor can affect hemodynamics and develop metastatic lesions anywhere else; the surgical resection combined with concurrent chemoradiation is not indicated for every single patient.

In summary, the case we reported and the review of relevant literature show that most cervical cancer metastases are occult, suggesting that cardiac metastases should be included in the differential diagnosis of related patients. Echocardiography is a convenient and effective screening method. The prognosis of cardiac metastasis of cervical cancer is poor. Given the above, the surgical benefits and indications of chemotherapy in individual cases should be carefully evaluated.

Table 1. Literature review of cardiac metastasis from cervical cancer cases

Age (years)	Stage	Type	Primary Tx	Time to CM (months)	Recurrence diagnosis modality	Recurrence Tx	Time to death from CM (months)	Refs
78	IIIB	SCC	RT	15	Echocardiogram and MRI scan	Untreated	1	Tsuchida 2016
39	IIA	SCC	Op, CCRT	23	CT scan	RT	7	Togo 2013
48	IIA	SCC	Op, CCRT	46	Echocardiogram	Op, CCRT	>5	Takeda 2014
33	IIB	SCC	Op, CCRT	24	Echocardiogram	CTx	NA	Schawkat 2014
47	IIIB	SCC	CCRT	12	Echocardiogram	Untreated	11	Sasidharan 2016
27	IIIB	SCC	Op, CCRT	15	CT scan	Untreated	0.7	Okamoto 2015
43	NA	Adeno	NA	11	Echocardiogram	Op	NA	Keskin 2016
52	IVB	SCC	Untreated	0	Echocardiogram	Op, CTx	>12	Kasai 2020
35	IIB	NA	CTx	8	Echocardiogram	CTx	NA	Kapoor 2016
44	IVB	SCC	Untreated	0	Echocardiogram	Op, CTx	15	Han 2017
60	IIB	Adeno	CTx	6	Echocardiogram	Op	Postoperative death	Hajsadeghi 2021
32	IIA	SCC	Op, CCRT	15	Echocardiogram	Op, CTx	13	Byun 2013
22	IVB	SCC	Op	12	Echocardiogram	Op, CCRT	>6	Al-Ebrahim 2013
49	NA	NA	Untreated	0	Echocardiogram	Op	0.2	Kalvakuri 2016

NA, not available; SCC, squamous cell carcinoma; adeno, adenocarcinoma; Op, operation; RT, radiation therapy; CCRT, concurrent chemoradiotherapy; CTx, chemotherapy; CM, cardiac metastasis

Perhaps earlier diagnosis means more therapeutic options and longer survival time.

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