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Diagnostic and therapeutic challenges in a patient with recurrent pleural effusion, heart failure and a diagnosed right atrium tumour

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ABSTRACT

Accumulation of fluid in the pleural cavity is a common symptom during heart failure exacerbation. The recurring nature of fluid accumulation during such treatment raises concern. In this case, an 84-year-old female patient with past oncological treatment, diagnosed with a right atrium tumour, manifested a rapid recurrence of pleural effusion, significantly hindering further diagnostics. Despite initial partial clinical improvement and positive trends in laboratory tests following comprehensive heart failure treatment and repeated pleural cavity punctures with drainage, we were unable to halt symptom progression. Regardless of the launched diagnostics, we did not make it in time. Thus, the level of advancement of the disease did not allow us to fulfil the diagnostic of the fluid etiology and to launch successful treatment of the eventual oncological process.

Keywords: right atrium tumour; pleural effusion; metastases; heart failure; primary heart tumour.

INTRODUCTION

We present a case of recurrent pleural effusion in a patient with heart failure and a right atrium tumour, along with a significant oncological history. Recurrent pleural effusion is often reported as a leading symptom in cancer, indicating either disseminated disease or metastasis, but also primary heart tumours such as angiosarcoma [1]. Additionally, cases of spindle cell sarcoma [2], hepatocellular carcinoma [3, 4], or leiomyosarcoma [5] have been described.

RESULTS

In May 2023, an 84-year-old woman was referred from a regional oncology centre to a cardiology clinic due to a suspected right atrium tumour identified via chest computed tomography – CT (April 2023). Upon admission, the patient was in good general condition with intermittent New York Heart Association (NYHA) class II symptoms. Her medical history included hypertension, paroxysmal atrial fibrillation, and a past right thyroid lobe removal. She had an extensive oncological history: surgery for partially keratinising G2 squamous cell carcinoma of the left hand's third finger (2022) with axillary metastases, G1 squamous cell carcinoma of the left thigh (2021), and subsequent radiotherapy (with detected lymph node metastases). During her cardiology clinic stay, echocardiography, including transoesophageal, confirmed a right atrium tumour of comparable size as noted in the CT (approx. 5 x 5 cm), and 2 Holter ECGs revealed paroxysmal atrial fibrillation and pauses over 2 seconds (Fig. 1).

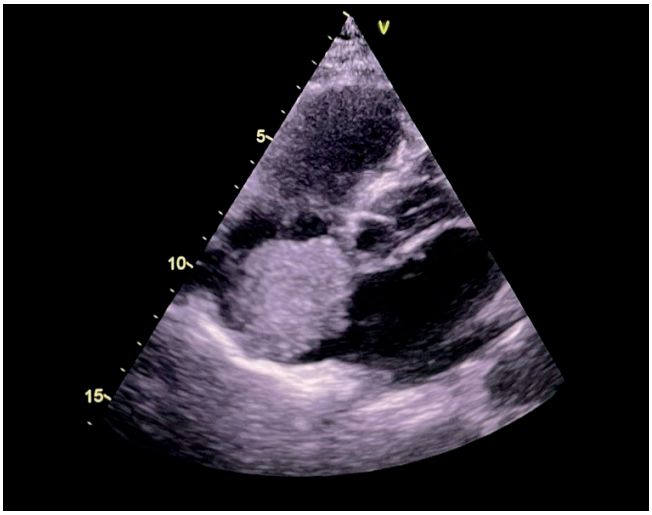

FIGURE 1. The right atrium tumour of comparable size as noted in the computed tomography (approx. 5 x 5 cm) – transthoracic echocardiography performed upon admission to the Department of Cardiology

The patient was deemed unsuitable for PM implantation because of the tumour. A full-body positron emission tomography scan on June 1, 2023, indicated NPL features of the described right atrium tumour (Fig. 2, 3), axillary lymph node metastases, and a nodule in the right lung.

Following the Heart Team consultation, the patient was disqualified from cardiac surgery due to unresolved oncological status and was urgently referred to the oncology department for further diagnostics and treatment.

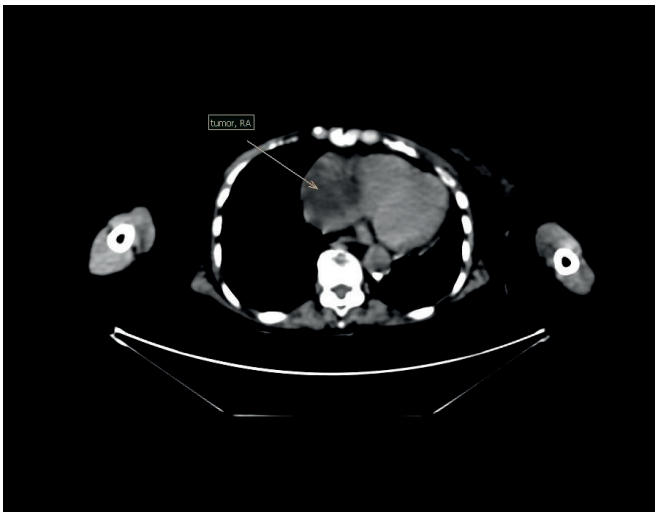

FIGURE 3. The right atrium tumour of comparable size as noted in transthoracic echocardiogram

In August 2023, a histopathological examination of a thick-needle biopsy from a left breast tumour confirmed squamous cell carcinoma infiltration/metastasis. After obtaining the chest CT follow-up results and diagnosing generalised squamous cell carcinoma, the patient was disqualified from chemotherapy but advised on potential immunotherapy if her general condition stabilised. Throughout the diagnostic process, the patient's condition gradually deteriorated, marked by worsening dyspnoea and weakness against a backdrop of hypotension and bradycardia. By late September 2023, the patient was hospitalised again in the cardiology clinic with NYHA class IV symptoms. On admission she was in moderate general condition, requiring oxygen therapy, with signs of pulmonary congestion, massive lower limb oedema, and a painful, swollen left breast.

During her clinic stay, intensive diuretic therapy, empirical antibiotics for developing pneumonia, and right pleural cavity puncture were performed. Regardless of clinical and laboratory improvements, further diagnostics were planned to explore the oncological process's nature, particularly if the right atrium tumour could be a primary heart cancer. Actions like cardiac MRI or tumour biopsy, whether primary cancer was suggested, could allow consideration of cardiac surgery to remove the tumour and initiate adequate oncological treatment. Despite clinical improvement, the pleural effusion recurred, moreover the patient constantly needed oxygen therapy. We failed in stabilising her general condition and performing tests confirming the tumour's nature, the patient continued to decompensate, precluding necessary diagnostic steps. Two more punctures, spaced 2–3 days apart, successfully evacuated copious amounts of fluid (at least 1500 ml each time). With recurrent fluid accumulation, pleural cavity drainage was installed. The evacuated fluid was bloody and cloudy, with a cytopathological examination showing a predominance of granulocytes but no cancer cells. Despite optimal heart failure pharmacological treatment, intensive diuretic therapy and antibiotics, the patient's condition progressively worsened, with renal failure signs noted. Due to the advanced cancer process, she was disqualified from intensive care unit treatment, and palliative care was implemented. The patient died a few days later after developing multi-organ failure.

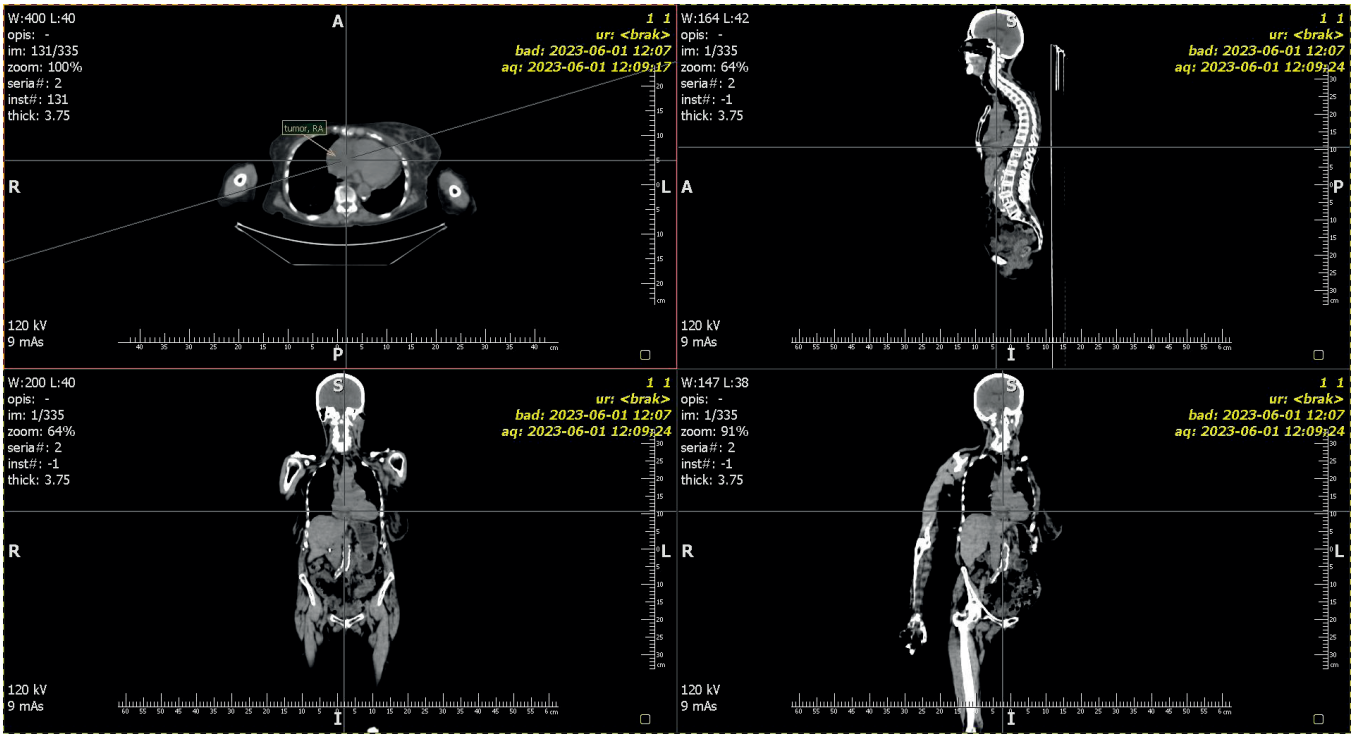

FIGURE 2. The right atrium tumour of comparable size as noted in transthoracic echocardiogram

DISCUSSION

Recurrent pleural effusion can result from various cancers, including primary heart cancer and disseminated disease or metastases: poorly differentiated angiosarcoma, leiomyosarcoma [5], hepatocellular carcinoma [3, 4], spindle cell sarcoma [2], epithelioid haemangioendothelioma [6], myxoma [7, 8], mediastinal tumours [9] and others [10, 11]. Notably, these cases appeared to have negative [2, 7] results of removed fluid, either positive [12]. A common feature in all these cases was the recurrent fluid accumulation [7, 11, 12, 13, 14, 15] and poor prognosis [10, 14]. Besides that, we should consider that benign tumours may also present with pleural effusion [16]. Considering the above, including the rare mention of secondary metastatic cardiac tumours in literature [8, 17], we suggest the recurrent pleural effusion could have been due to a primary heart tumour, which could contribute to the effusion recurrence. This case emphasizes the necessity for thorough diagnostics as soon as a tumour is found. In this situation, regardless of launching the proper treatment and starting the diagnostic process dedicated to figuring out the nature of the tumour, rapid heart failure decompensation did not allow us to succeed. If clinical stability had been achieved, prompt tumour biopsy or cardiac MRI [11] could have allowed consideration of urgent cardiac surgery. This way, confirming whether the atrial tumour was a primary heart cancer could have allowed to launch of radical management, preventing disease progression and patient death.

CONCLUSION

In conclusion, for any patient, including those with a diagnosed atrial tumour, finding the tumour's etiology is crucial. Although the nature of the atrial tumour in this case remains unknown, experience and the data obtained during this patient's hospitalisation suggest the atrial tumour could have been a primary heart cancer, leading to hemodynamic decompensation, exacerbating heart failure symptoms, and ultimately causing acute kidney injury and patient death. Prompt diagnostics to define the nature of a cardiac tumour upon its detection can be an effective tool for advancing cardiology-oncology knowledge. Such an approach may also be essential in managing patients with disseminated cancer, preventing multiorgan decompensation.

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