

Unusual presentation of more common disease/injury

Right ventricular inflow tract obstruction secondary to metastatic cutaneous squamous cell carcinoma

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Summary

We report the case of an immunocompetent 83-year-old man with metastatic neoplastic infiltration of the heart from primary squamous cell carcinoma (SCC) of the skin. Death was from cardiopulmonary collapse due to left ventricular failure with features of right ventricular inflow tract obstruction. Metastatic tumours involving the heart rarely originate from cutaneous SCC though have been reported in the literature in both immunocompetent and postrenal-transplant recipient patients. Most involve the pericardium and only rarely the endocardium or the myocardium. While the prognosis is generally poor, palliative radiotherapy may provide significant symptom relief. Cardiac metastases should be considered in patients with advanced cancer, especially when they show cardiac symptoms and signs.

BACKGROUND

We consider this case to be an important one, due to rarity of cutaneous squamous cell carcinoma (SCC) metastasising primarily to the myocardium. Our case represents the only case of metastatic cutaneous SCC affecting the right ventricular inflow tract reported that we know of. Furthermore, this occurred in an immunocompetent individual, with metastatic spread sparing the other organs.

It also serves as a lesson that not all clinical heart failure is due to cardiomyopathy.

CASE PRESENTATION

An 83-year-old man presented with abdominal distension, presyncopal episodes, worsening dyspnoea, severe malaise with loss of activities of daily living over a several-week period. On examination he had marked peripheral cyanosis, signs of congestive cardiac failure including raised Jugular venous pressure, bilateral pitting oedema, pleural effusions and ascites. He had a raised respiratory rate with oxygen saturations of 70% and a systolic blood pressure of 80/40 mm Hg. There was no history of known coronary artery disease though he did have previous history of multiple non-melanoma skin carcinomas. Significantly, there was a SCC of the left cheek metastatic to the left parotid gland 3 years prior to presentation. This had required superficial parotidectomy and Level I–III neck dissection. Histologically, the tumour had infiltrated the intraparotid lymph node with extra-nodal perineural invasion, margins were clear and he was treated with radiotherapy to the left parotid gland and neck over several months.

Within the previous 18 months he had recurrence of disease in the left cheek with perineural invasion that was managed with wide local excision, forehead flap reconstruction and brachytherapy. Further, radiotherapy was considered but not undertaken due to risk of damage to normal tissues.

Multiple other SCC's and basal cell carcinomas were previously excised from sites including right deltoid, left elbow, right upper shin, right anterior ankle and above the left knee.

He was not on any regular medications apart from salbutamol and paracetamol as required.

INVESTIGATIONS

Investigations at presentation revealed a raised Troponin I level of 1.1 µg/l (<0.04), and elevated liver enzymes: alanine aminotransferase (ALT) 172 u/l (<45), alkaline phosphatase (ALP) 157 µmol/l (<4), aspartate aminotransferase (AST) 222 u/l (<35), bilirubin 38 µmol/l (<20), C-reactive protein 68 (<5), normal full blood count. A chest radiograph (figure 1) showed cardiomegaly and pleural effusions.

Echocardiogram and CT scan (figure 2) revealed a large mass relating to the lateral wall of the right atrium, between the right atrium and right ventricle (arrowed), causing compression from its infero-lateral aspect and causing significant narrowing of the tricuspid valve. There was also another mass inferiorly in the apical region extending into the septum. Features were thought consistent with metastatic deposits. There were no filling defects suggestive of pulmonary embolus and no significant pericardial effusion. Appearances within the abdomen and pelvis (figure 3), specifically ascites (arrowed), were thought related to likely elevation of right heart pressure.

Autopsy findings

There was extensive involvement of the heart by metastatic squamous cell carcinoma (figure 4) with large discrete deposits in the right atrium and left ventricle (arrowed). The largest tumour deposit measured 55×35×20 mm and extending from pericardial surface through the full thickness of the right atrial wall to involve and narrow the tricuspid valve orifice. The pericardium was extensively involved and foci of vascular,



Figure 1 Chest Radiograph: Chest radiograph on presentation

perineural and lymphatic invasion were seen. Tumour had completely occluded a small pericardial artery adjacent to the left anterior descending artery. Tumour infiltrated the aorta, inferior vena cava and diaphragm.

Otherwise there was no further evidence of metastatic SCC in either the chest or abdominal cavity. Given these findings we postulate that spread to the myocardium was likely caval from venous drainage of the head and neck.

OUTCOME AND FOLLOW-UP

The patient was initially started on antibiotics for possible pneumonia, but was soon palliated after discussion with family. He died a few days after admission without resuscitation efforts. Consent was obtained for a full autopsy.



Figure 2 CT scan of the thorax showing bilateral pleural effusion and heavy tumour infiltration of right atrium.



Figure 3 CT radiograph of abdomen showing signs of right heart failure with metastatic sparing of the liver.

DISCUSSION

Malignant cardiac tumours are rare. Secondary cardiac neoplasms, particularly lymphoma, oesophageal, lung, breast cancers and melanoma are the most common.¹ Cardiac metastases from a malignant neoplasm were first described by Bonet in 1700 though the first ante mortem diagnosis was not made until 1924.² A recent meta analysis of autopsy between 1975 and 2007 found an incidence of 7.1% of cardiac metastasis among cancer patients; with evidence suggesting an increase incidence of cardiac metastasis since the 1970s, postulated due to increase longevity among cancer patients.³

Retrograde spread to the heart via mediastinal lymphatic channels is the most common route of extension, though non-cardiac tumours may also disseminate to the heart by haematogenous pathways, local spread or a trans-venous extension.⁴

True embolic metastases to the myocardium can occur via the coronary arteries, or much less commonly, by implantation of cancer fragments carried in the vena cavae into the right cardiac chamber.⁵ Cardiac metastases almost always occur in the setting of widespread primary

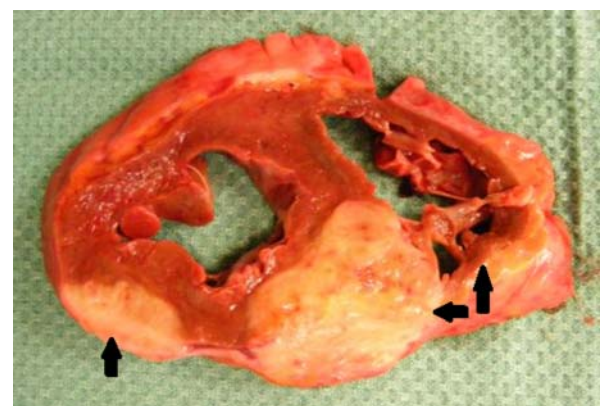


Figure 4 Transverse section of heart showing two deposits of metastatic squamous cell carcinoma, in the anterior (extending into interventricular septum) and lateral left ventricle.

disease, and most often either primary or metastatic disease exists elsewhere in the thoracic cavity.

The clinical signs and symptoms of cardiac metastases are non-specific and include fatigue, superior vena cava syndrome, congestive heart failure, cardiac arrhythmia, pericardial effusion, obstructed right ventricular inflow or outflow, and transient ischaemic attack.⁶ A pericardial effusion, often haemorrhagic, is often the first manifestation of a cardiac metastasis.⁷ Tumour involvement and its consequences, such as tamponade, congestive cardiac failure (CCF), coronary artery invasion, sinoatrial node invasion are the cause of death in one-third of patients with cardiac metastases.⁶

Overall the prognosis of patients with cardiac metastasis remains dismal with a 5 years survival of 7% reported in the literature. Surgical resection is saved for highly selective cases though there is a role for palliative radiotherapy to relieve troublesome symptoms, to produce local control and to stabilise haemodynamic disturbance.³

Nonmelanoma skin cancer is the most common cancer affecting white-skinned individuals and the incidence is increasing worldwide.⁸

The estimated annual incidence rate of SCC, the second most common type of skin cancer, in Australia (2002 survey) was 387 per 100 000 persons,⁹ though the incidence is 20-fold greater in patients with solid organ transplantation. Size (>2 cm), depth of invasion (>4 mm), perineural involvement, location near the parotid gland, locally recurrent disease and immunosuppression increases the incidence of both regional and distant metastases.¹⁰

The majority of metastases occur in the regional lymph nodes, followed by the lungs, liver, brain, skin or bone.¹¹

Squamous cell carcinoma has a potentially aggressive and fatal nature in organ transplant recipients¹² widely believed due to the effects of long-term immunosuppression.

Mackenzie described a case of myocardial metastatic SCC in a renal transplant patient in whom cause of death was pulmonary thromboembolism.¹³ Boukhalil reported metastatic cutaneous SCC to the heart but confined to the pericardium, and not confirmed by histology or autopsy.¹⁴

Gurvitch *et al*¹⁵ described metastatic cutaneous SCC causing right ventricular outflow tract obstruction and death in a renal-transplant patient.

Competing interests None.

Patient consent Obtained.

Correction notice This article has been corrected since it was published online on the 20 August 2012. Figures 1, 2 and 4 were positioned incorrectly.

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Learning points

- There is a potentially aggressive and fatal nature of cutaneous squamous cell carcinoma even in immunocompetent individuals.
- Cardiomyopathy is not the only cause of a presentation of cardiogenic shock.
- Cardiac metastasis should be considered in patients presenting with cardiac symptoms especially when there is a history of advanced cancer.
- When cardiac metastasis are discovered the prognosis is usually extremely guarded.

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