

Right atrial myxosarcoma in a dog

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ABSTRACT

A case of right atrial myxosarcoma is described in a Staffordshire bull terrier with a history of weight loss, exercise intolerance and collapse. The diagnosis of an intracavitary cardiac tumour was made on echocardiography. The dog was euthanased. Secondary spread to the lungs and lymph nodes was present. Myxoma is one of the rare intracavitary cardiac tumours and this case is believed to be the 1st report of its more malignant form in the dog.

Key words: atrial, canine, cardiac, myxosarcoma, tumour.

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INTRODUCTION

Primary and metastatic cardiac tumours are not common in the dog¹¹. In humans, cardiac tumours are also infrequent and myxoma, with a predilection for the left atrium, is most commonly reported^{4,14}. Right atrial myxosarcoma is a rare occurrence in humans, and as in this case, initially often goes undiagnosed⁴. Right atrial myxoma in humans presents with right-sided cardiac failure and may be accompanied by pulmonary embolism⁴. In most human patients with cardiac myxomas, the systemic effects, including fever and weight loss, are the most evident^{5,14}. These tumours are often excised in man² with no recurrence and good long-term survival⁴. Intracavitary cardiac tumour excision has also been described in the dog¹⁸, and 2-dimensional echocardiography provides valuable information for planning surgical intervention.

Cardiac tumours may be classified as intracavitary, intramural, epicardial or originating at the base of the heart around the large blood vessels¹³. Each of these categories may interfere with cardiac function in different ways¹³, resulting in non-specific signs that include lethargy, weight loss, anorexia, syncope, arrhythmia, conduction disturbances, murmurs, pericardial effusion,

right heart failure and respiratory effects^{13,15}. In the dog, the most common cardiac tumours are heart base tumours^{13,16} and haemangiosarcomas¹⁶ of the right atrium. Other intracavitary neoplasms are rare and include ectopic thyroid carcinoma^{3,18}, chondrosarcoma^{5,12}, fibrosarcoma^{1,17}, undifferentiated sarcoma¹⁵, rhabdomyosarcoma⁸ and myxoma^{3,7,10,13}. Canine myxomas arise from myxoid tissue comprising embryonal endocardium and are located in the right atrium¹³, with 1 case described in the right ventricle causing outflow obstruction³. Myxosarcoma with metastasis as reported in this case, has, to the best of our knowledge, not been described before in the dog.

Diagnosis of intracardiac tumours has been extremely difficult owing to vague clinical signs and non-specific change in the cardiac silhouette on thoracic radiographs. Selective and non-selective angiography has been the imaging method of choice until recently, when it was replaced by 2-dimensional echocardiography, allowing visualisation of masses in real time.

CASE HISTORY

An 8-year-old male Staffordshire bull terrier, weighing 17.4 kg, was presented with a persistent, dry, non-productive cough. Crackles were heard on auscultation and the dog had a temperature of 40 °C. Injections of co-trimoxazole (Trivetin, Hoechst Ag-Vet) for suspected tracheobronchitis were given for 2 days, after which the patient was given co-trimoxazole tablets (Purbac, Lennon Limited) for 10 days. Theophylline (Alcophyllin, Premier Pharmaceutical

Company), as a bronchodilator, was given twice a day.

The dog was returned a month later with a pendulous abdomen. The pulse was weak and temperature and respiratory rate were normal. Heart rate was 150 beats per minute and heart and lung sounds were muffled. Amoxicillin (Clamoxyl, Pfizer Laboratories) as well as oral digoxin (Lanoxin, Wellcome Limited) and furosemide (Puresis, Lennon Limited) for suspected congestive heart failure were prescribed to be administered twice a day for 10 days. The dog deteriorated over the next week and was returned, at which time he was found to be alert with normal posture and respiratory rate. Marked loss of body mass was evident, accompanied by severe abdominal distention with a ballotable fluid wave. The liver was enlarged on palpation. A harsh, dry, non-productive cough elicited by tracheal palpation was indicative of tracheal irritation. Oral mucosal capillary refill time was slow (>5 sec) and a mild jugular pulse was present. The femoral pulse was weak but regular. On auscultation, a marked grade IV systolic murmur, loudest over the right 5th intercostal space, was audible. The murmur radiated dorsally and to the left. No abnormal lung sounds were audible. When agitated, the dog suffered attacks of syncope, each lasting approximately 4 min. A single lateral thoracic radiograph showed no abnormalities. Haematological and biochemical tests showed mild normocytic, normochromic anaemia and mild leucocytosis, slightly raised alanine amino-transferase and normal urea and creatinine.

A marked right axis deviation was present on ECG evaluation with a mean electrical axis of +150. A right and left bundle branch block pattern and non-specific T-wave changes were evident. Signs of ST displacement indicated possible myocardial hypoxia. There were no signs of arrhythmia or ectopic beats during the 3-minute tracing.

Ultrasonographic evaluation (SIM 7000 Challenge, Esoate, Italy) of the abdomen and heart was performed. The liver was normoechoic and diffusely enlarged with distended hepatic veins, oedematous gall

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bladder wall and a moderate amount of free anechoic abdominal fluid suggestive of a transudate. These changes were characteristic for right heart failure or post-hepatic venous obstruction. The prostate was enlarged (58 × 38 × 60 mm), slightly hyperechoic and contained several poorly marginated anechoic structures, the largest being 10 × 12 mm. These changes were regarded as typical for prostatic hyperplasia with secondary cavitory disease.

Two-dimensional echocardiography revealed a thickened septum, up to 25 mm wide (Figs 1, 2) and a mass, with echogenicity similar to that of myocardium, filling most of the right ventricular inflow region, and obliterating the tricuspid valve region. The mass had several hyperechoic specks suggestive of fibrous tissue and invaded the right atrium, which was grossly distended. In addition, the right atrium contained an echogenic mass, 16 × 10 mm, attached to the interatrial septal wall and floating freely in the atrium. Turbulent high-velocity blood flow secondary to right ventricular inflow obstruction was documented on Doppler examination. The internal dimensions of the left ventricle were slightly smaller than normal. A right ventricular neoplasm invading the septum and right atrium with secondary obstruction of right ventricular filling was diagnosed and the dog was euthanased due to the grave prognosis.

Post mortem examination revealed an abdomen filled with approximately 2 l of serosanguinous fluid and enlarged abdominal lymph nodes, prostate and liver. Histopathological examination of the prostate revealed cystic hyperplasia with interstitial fibrosis and lymphocytic infiltration. Cyanotic induration of the liver was present with disseminated 'fat cysts' and prominent dilatation of the Glisson's capsule lymphatics. Mild nephrosis was present.

The thorax contained about 100 ml of serosanguinous fluid. Several 2–3 cm diameter nodules were present in the lungs and the mediastinal lymph nodes were enlarged. The right atrium was grossly distended and contained a glistening pale broad-based multilobular mass (Fig. 3), 40 mm in diameter and originating from the interatrial septum. The mass invaded the interventricular septum and bulged into the tricuspid valve region, extending to the level of the papillary muscles (Fig. 4), leaving a valvular opening of approximately 3 mm diameter. The septum was grossly thickened to the level of the origin of the papillary muscle. The left and right

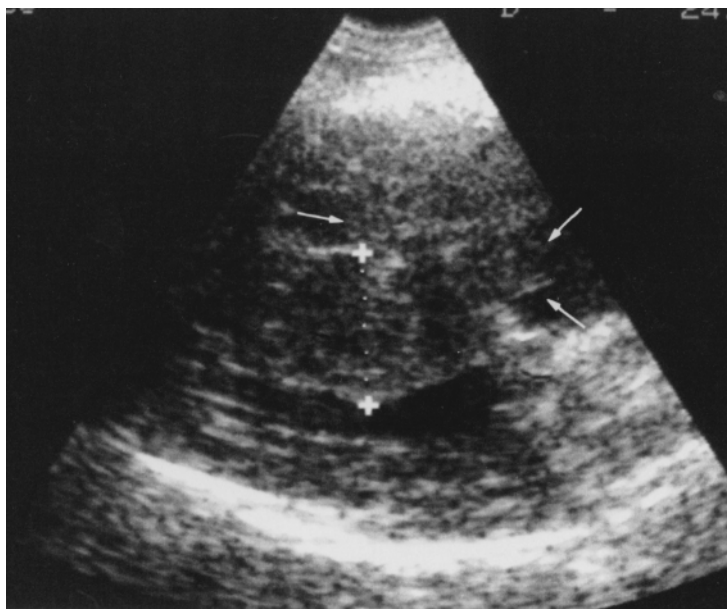


Fig. 1: Right parasternal long axis 2-dimensional echocardiogram with 25 mm thick interventricular septum between + and + bulging into the left ventricle. Arrows delineate the echogenic mass obliterating the tricuspid valve region.

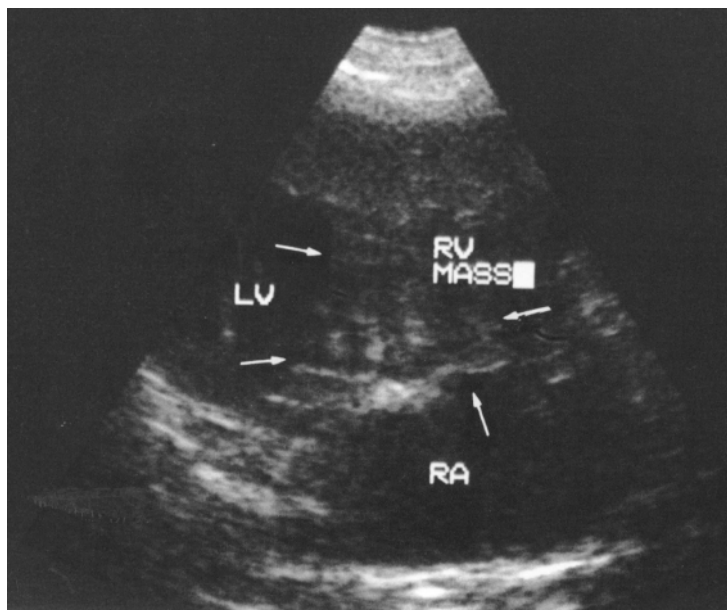


Fig. 2: Left apical 4-chamber 2-dimensional echocardiogram. Note the grossly enlarged right atrium (RA) with no left atrium visible. Arrows delineate the thickened interventricular septum and part of the mass.

ventricular free walls appeared normal.

Histopathological examination of the heart, lungs and mediastinal lymph nodes revealed neoplastic masses of similar appearance that were regarded as myxosarcomas. They were composed of stellate to spindle-shaped cells scattered throughout the masses. The larger masses had multiple extensive central areas of necrosis with an outer rim of viable neoplastic tissue. The smaller metastatic foci

in the lungs were more cellular than the larger masses and composed of plump rounded cells with distinct borders.

DISCUSSION

The clinical, radiographic and ECG findings were all non-specific. The single thoracic radiograph showed no evidence of cardiomegaly or pulmonary metastasis, emphasising the need for multiple views to diagnose lung pathology. Echocardiography and abdominal ultrasonography

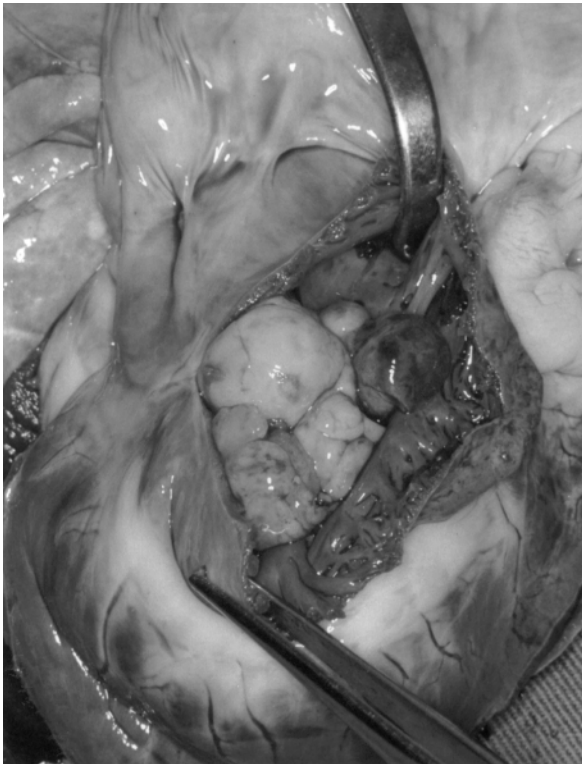


Fig. 3: View of opened right atrium with multilobular mass obscuring the tricuspid valve. Right ventricle and cardiac apex at bottom of photograph.



Fig. 4: View of opened right ventricle. Cardiac apex at bottom of photograph and the right ventricular free wall (RVW) is reflected towards the cardiac base at the top of the photograph. The multilobular mass extends through the tricuspid valve (short arrows) and reaches the base of the papillary muscles (long arrows).

allowed for the accurate and rapid diagnosis of a cardiac tumour and its secondary effects. Although the exact origin of the mass could not be determined, this did not affect the outcome. Two-dimensional echocardiography is a non-invasive, safe technique that has greatly improved *ante mortem* cardiac evaluation.

Myxosarcomas are common in rabbits and poultry⁹. Myxomas have been described in the dog, but myxosarcomas are extremely rare in this species. The extensive necrosis, invasiveness and metastasis of this tumour all indicate its highly malignant nature despite the relatively bland appearance of the neoplastic cells on histopathology. We believe this to be the first documented case of primary right atrial myxosarcoma with pulmonary metastasis in the dog.

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