Right atrial myxoma: case report and anaesthetic considerations

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Primary cardiac tumours occur rarely. Myxoma is the most common of these tumours and 25 per cent of myxoma occur in the right atrium. We present a patient with a right atrial myxoma and hypoxaemia who suffered sudden hypotension upon induction of anaesthesia.

Primary cardiac tumours occur rarely with a reported incidence of 0.03 to 0.05 per cent.[1] Cardiac myxoma is the most common of these primary tumours. Review of the literature reveals little concerning the anaesthetic management of patients with cardiac myxoma.[2,3] We present a patient with a right atrial myxoma, hypoxaemia, and an episode of severe hypotension during induction of anaesthesia as well as treatment. This is followed by a discussion of the anaesthetic considerations for the patient presenting with right atrial myxoma.

Case report

The patient, a 67-year-old 63 kg male, was transferred to our institution because of progressive dyspnoea and severe hypoxaemia. These symptoms were noted four months earlier when he presented with a complaint of shortness of breath, diagnosed as bronchitis, and treated with aminophylline with no benefit. Past medical history revealed insulin-dependent diabetes mellitus. Laboratory reports included a haemoglobin of 170 $g \cdot L^{-1}$, haematocrit of 50.4 per cent, and arterial blood gas values (ABG) breathing 100 per cent O_2 via face mask of pH 7.46, PO_2 45 mmHg, PCO_2 21 mmHg, and O_2 saturation of 87 per cent. Initially a pulmonary embolus was considered but was not confirmed by a ventilation/perfusion scan.

A right atrial mass was diagnosed by echocardiography. It appeared to arise from the intraatrial septum, and to obstruct triscuspid valve inflow. Its size was estimated to be 4 × 6 cm. Colour flow doppler revealed no evidence of intracardiac shunt. The electrocardiogram showed sinus tachycardia, right axis deviation, incomplete right bundle branch block, and a suggestion of right atrial enlargement. The patient was scheduled for immediate excision of his right atrial mass.

During the interview the patient was in respiratory distress with a rate of 36 breaths $\cdot min^{-1}$ while wearing a humidified 100 per cent O_2 face mask. He denied any change of his symptoms related to body position. Physical examination revealed clear lung sounds without wheezes or rales. Distended neck veins were present and the liver was palpated five centimeters below the right costal margin. There was no ascites or peripheral oedema. Auscultation of the heart revealed 2/6 systolic and diastolic murmurs and multiple extra sounds.

The patient was brought to the operating room, administered 100 per cent O_2 via face mask while monitors were applied. Pulse oximetry (Nellcor) revealed an oxygen saturation of 87 per cent. The blood pressure was 125/60 by noninvasive oscillometric cuff (Dinamap), and heart rate 110 beats $\cdot min^{-1}$. A radial arterial catheter, a central venous catheter inserted in the left antecubital fossa (CVP Infuset, Sorenson Research), and a 14G peripheral catheter were all inserted percutaneously using one percent lidocaine local anaesthesia. The CVP mean pressure was 22 mmHg.

Induction of anaesthesia with fentanyl was preceded by 0.5 mg of vecuronium. After a dose of 12 $\mu g \cdot kg^{-1}$ fentanyl the patient's blood pressure decreased progressively until it was not obtainable. The ECG trace revealed normal sinus rhythm at 105 beats $\cdot min^{-1}$. Ventilation was maintained via mask, chest compression started and 10 μg epinephrine was given IV through the central line. Blood pressure was 150/100 mmHg by arterial line approximately 45 seconds after chest compression was started. Vecuronium 6.5 mg IV facilitated tracheal intubation. Blood gas analysis following intubation re-

Key words
ANAESTHESIA: cardiovascular; HEART: atrial myxoma; SURGERY: cardiovascular.

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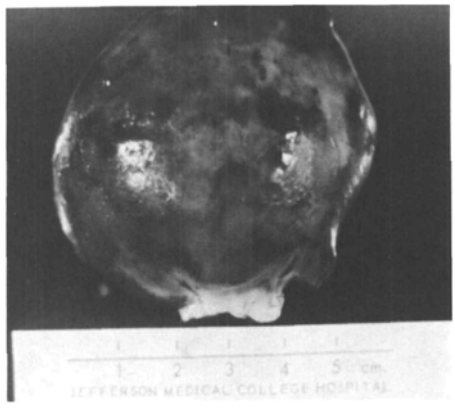

FIGURE Myxoma excised from right atrium.

vealed a pH of 7.41, PO_2 67 mmHg, PCO_2 32 mmHg, and 94 per cent saturation.

Oxygen saturation remained between 94 and 96 per cent until the initiation of cardiopulmonary bypass. Right atrial incision revealed a 7 × 5 cm purplish mass which was attached by a stalk to the foramen ovale. The foramen ovale appeared to be closed and the mass was encapsulated and smooth suggesting that it had not fragmented and embolized (Figure).

Cardiopulmonary bypass was terminated without the aid of pressors or inotropes. After bypass whilst breathing 100 per cent O_2 the PO_2 was 460 mmHg with 99 per cent saturation, PCO_2 was 31 mmHg, and pH was 7.45. Final pathology of the mass disclosed a myxoma. The patient had an uneventful recovery and was discharged on the seventh postoperative day.

Discussion

Myxoma is the most common primary cardiac tumour. In 75 per cent of patients it occurs in the left atrium, 25 per cent in the right atrium, and occasionally in the ventricle.[4] Clinical features in collected series and case reports of right atrial myxoma reveal that dyspnoea is the most common symptom occurring in 25 of 28 patients.[5–10] Hypoxaemia, demonstrated by low arterial oxygen saturation ranged from 46 to 97 per cent.[5,11,12] In one patient oxygen saturation varied with changes in body position[11] and another had dyspnoea and cyanosis when bending forward.[5] When cardiac index was reported it ranged from 1 to 1.9 $L \cdot min \cdot m^{-2}$ in six patients.[5,6,13]

Hypoxaemia in these patients can be secondary to low cardiac output related to obstruction at the tricuspid valve, right to left cardiac shunt presumably through a patent foramen ovale,[11] and/or pulmonary emboli from tumour fragmentation. Dyspnoea might result from an increase in pulmonary dead space (West's Zone 1) from reduced pulmonary blood flow and a subsequent increase in the work of breathing.

Our patient's hypoxaemia was due to low cardiac output secondary to obstruction of right ventricular filling. A right to left shunt was not demonstrated preoperatively or intraoperatively. Tumour embolization seems unlikely in light of a normal $\dot{V}/\dot{Q}$ scan and the operative finding of a smooth encapsulated tumour mass. Hypotension upon induction of anaesthesia was in all probability secondary to the mass obstructing right ventricular filling. Another mechanism of hypotension in this patient might include a decrease in systemic vascular resistance in the presence of a fixed cardiac output, i.e., fixed flow around the myxoma. Venodilatation can decrease right atrial pressure allowing the atrium to collapse and exacerbate mechanical obstruction of the tricuspid valve by the myxoma. Chest compression might have displaced the myxoma mechanically allowing right ventricular filling. The administration of epinephrine could have contributed to the resuscitation by increasing systemic vascular resistance.

Anaesthetic considerations in patients with right atrial myxoma include hypoxaemia, low cardiac output, possible right to left shunt, and potential pulmonary emboli. These patients' symptomatology can be exacerbated by changes in body position. With tumour embolization and the existence of right to left shunts, pulmonary artery catheterization may be contraindicated although a case report exists where a cardiac angiography catheter was passed around the myxoma without incident.[7] We elected to insert a central venous catheter. To avoid entry of the right atrium, the antecubital vein was utilized and the catheter was not advanced to the full distance to assess central pressure and deliver medications centrally. With the possibility of right to left shunts and paradoxical embolization, care must be taken to avoid air bubbles in any of the intravenous tubing.

In summary, we present a patient with a right atrial myxoma exhibiting hypoxaemia and an episode of hypotension on induction of anaesthesia. Recommendations for anaesthetic management would include supplemental oxygen therapy, and careful positioning for induction of anaesthesia, since patient position can affect oxygenation.[5,11] No information exists for an anaesthetic agent of choice for these patients. However, agents which decrease systemic vascular resistance and/or cause venous dilitation should be used cautiously.

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Résumé

Les tumeurs cardiaques primaires surviennent rarement et leur incidence rapportée est de 0.03 à 0.05 pour cent.[1] Le myxome cardiaque est une des formes les plus communes de ces tumeurs primaires. Une revue de la littérature révèle l'absence de préoccupation pour la conduite anesthésique chez ces patients.[2,3] On présente un patient avec un myxome de l'oreillette droite, une hypoxémie et une épisode d'hypotension sévère lors de l'induction et on discute du traitement institué pour corriger cet épisode. On discute aussi des considérations anesthésiques chez les patients avec un myxome de l'oreillette droite.