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Case Report

Anaesthetic challenges in a morbidly obese man for cardiac myxoma resection: A case report

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ABSTRACT

Background: Cardiac myxoma is a rare neoplasm with female preponderance. It is the commonest benign cardiac neoplasm. We report a case entailing the perioperative anaesthetic challenges in managing a young morbidly obese man with a huge left atrial myxoma, who presented to us with acute symptoms of heart failure.

Case presentation: A young morbidly obese man with a body mass index (BMI) of 43.3 kg/m^2 presented to us with acute symptoms of heart failure. An urgent transthoracic echocardiogram showed a huge pedunculated mass which arise from the left atrium, which occasionally completely occludes the mitral valve during each diastole. He underwent a resection of cardiac myxoma, which was complicated with intraoperative hypotension. Fortunately, it was successfully managed by placing the patient in Trendelenburg position for optimum blood pressure control.

Discussion: Tumours of the heart are very rare. Common histopathological findings are myxomas, followed by uncommon types of rhabdomyosarcomas and angiosarcomas. Pedunculated cardiac tumours can cause partial to complete obstructions which may lead to devastating conditions. Anaesthesia for morbidly obese patients with pedunculated cardiac myxoma are extremely challenging. Cardiac anaesthetists should be vigilant in managing these patients as they posed many life-threatening complications.

Conclusion: Cardiac myxoma are uncommon benign tumor of the heart with higher preponderances on the left atrium. Pedunculated mass can cause obstruction by limiting left ventricular filling, mimicking severe mitral stenosis. Positioning the patient Trendelenburg can transiently reduce intracardiac obstruction, improve cardiac output and venous return to the heart. Optimum patient positioning and management will lead to excellent outcomes.

1. Introduction

Cardiac myxoma is the commonest primary cardiac neoplasm which can frequently lead to fatal complications. Huge myxoma can cause intracardiac blood flow obstruction, systemic embolism and cardiopulmonary arrest. This article discusses the perioperative anaesthetic challenges during resection of cardiac myxoma in an obese young man. This work has been reported in line with the SCARE criteria [1].

2. Case presentation

A 38-year-old morbidly obese gentleman (weight = 125kg, height = 170cm, Body Mass Index (BMI) = 43.3 kg/m2), with co-morbidities of hypertension, diabetes mellitus, and obstructive sleep apnea (OSA) presented to us with progressive worsening symptoms of shortness of breath, orthopnea, palpitation and occasional chest pain for two weeks. He denied having fever, cough, loss of weight nor appetite. There was no significant family history of malignancy.

Upon examination, he was pink, alert and conscious with a respiratory rate (RR) of 25 breaths per minute. He was afebrile with blood pressure (BP) of 140/75 mmHg, regular heart rate (HR) of 70 beats/min and oxygen saturation (SpO 2) of 92–94% under room air. The lung fields were clear, and no heart murmurs were auscultated. Other clinical findings were insignificant.

His hematological and biochemical investigations were within normal values. The chest X-ray did not reveal any cardiomegaly nor perihilar haziness. His electrocardiogram (ECG) showed normal sinus rhythm. The transthoracic echocardiogram (TTE) revealed a huge

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pedunculated mass in the left atrium measuring 6.5cm × 3.5cm (Fig. 1 and Video 1) with a dilated left atrium, left ventricle, and right atrium. The mass occasionally completely occludes the mitral valve during each diastole. The ejection fraction (EF) was approximately 50%. There was presence of mild mitral and tricuspid regurgitation, and moderate pulmonary arterial hypertension (PAH) with mean pulmonary artery pressure (MPAP) of 48 mmHg. Computed tomography angiogram (CTA) of the heart confirmed an ill-defined hypodense filling defect seen at the left atrioventricular junction.

Supplementary video related to this article can be found at https://doi.org/10.1016/j.amsu.2021.102998

Our provisional diagnosis was heart failure secondary to a left atrial myxoma. Differential diagnosis includes cardiac thrombus and tumours such as rhabdmyosarcoma and angiosarcoma.

The patient was posted for an emergency sternotomy and excision of the left atrial myxoma. Upon arrival into the operating room, his baseline hemodynamics was stable. A left radial arterial and right internal jugular 5 lumen catheter was inserted under ultrasound guidance.

General anaesthesia (GA) was induced after 5 minutes of preoxygenation with intravenous (IV) fentanyl 2 mcg/kg, IV midazolam 3mg and sevoflurane at 3% concentration followed by IV rocuronium 1mg/kg. About one minute into induction of anaesthesia, he was hypotensive with a BP of 65/45 mmHg and HR of 113 beats per minute. He required boluses of IV phenylephrine 100 μg and was repositioned into Trendelenburg. His BP was corrected back to a range of 102/50–110/70 mmHg immediately. After further preoxygenation for 2 minutes and a stabilized hemodynamics in Trendelenburg position, the patient's trachea was successfully intubated using the CMAC video-laryngoscope with a size 8.0mm endotracheal tube. Trendelenburg position was maintained and vasopressor support was initiated to maintain the hemodynamic stability.

GA was continued with sevoflurane and a fraction of inspired oxygen (FiO2) of 40–50%. Pre-bypass, his hemodynamics were maintained at a range of 15% from the baseline preoperative values with low dose intravenous infusion of noradrenaline and adrenaline. Remifentanil infusion was initiated and maintained at a range of 0.2–0.4 μg/kg/min as analgesia. Midline sternotomy and cardiopulmonary bypass (CPB) were done in a standard manner. Left intra-atrial mass measuring 6.5cm × 3.5cm was excised and sent for histopathological examinations (HPE) (Fig. 2). The total duration of bypass and cross-clamp time were 103 minutes and 73 minutes, respectively.

Our patient was weaned off from CPB without any difficulties. He was admitted into the cardiac intensive care unit (CICU) and was extubated 6 hours later. Repeated post-operative TTE showed good cardiac and valvular functions, with normalization of pulmonary pressure. Physiotherapy and ambulation were commenced on the next day and he was discharged to home 5 days later.

He was reviewed in the clinic three weeks later with good functional and physical status. He did not have any heart failure symptoms and was able to do activities of daily living by himself. The HPE specimen showed tissues which were composed of plump spindled and stellate cells in abundance of myxoid stroma. They were arranged in cords and were infiltrated with eosinophilic cytoplasm and inflammatory cells. This confirmed the diagnosis of cardiac myxoma. As it is a benign pathology, the patient did not undergo any chemoradiotherapy.

3. Discussion

The incidence of cardiac myxoma is extremely rare at 0.5 to 1 case per million population in a year [2]. It is twice more common in females with the mean age of occurrence of about 60 years old [3]. Cardiac myxoma predominantly originate in the atrium while only 5% occur in the ventricles. Approximately 75% of it occur in the left atrium while 25% occurs in the right atrium or ventricles [4]. Cardiac myxomas are usually benign in nature. Approximately 25% of cardiac tumor is malignant in nature, which includes angiosarcoma and rhabdomyosarcoma [5,6]. About 10% of these patients develop cardiac metastases, but these are rarely manifested clinically [7]. Most of the patients developed cerebral metastases, of which a surgical removal of tumor with post-operative chemoradiotherapy showed good prognosis.

Our patient developed hypotension upon induction of anaesthesia. This was possibly due to the pedunculated mass obstructing the mitral valve, causing a reduction in left ventricular filling and cardiac output (Video 1). This condition is described as mimicking mitral stenosis. Obstructive symptoms may be precipitated by changing of body positions and rigorous activities due to motion of the tumor within the cardiac chambers.

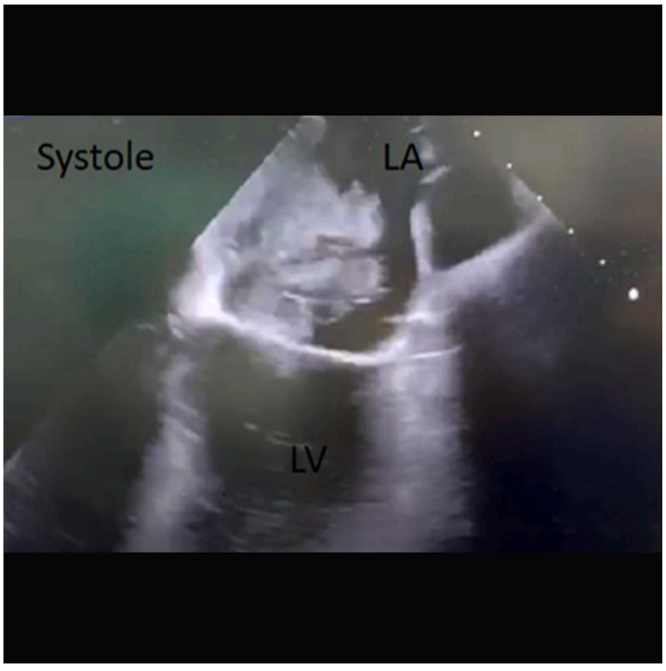

Fig. 1. TEE demonstrating a huge, regular mass (6.0cm × 3.5cm) across the left atrioventricular junction, during systole.

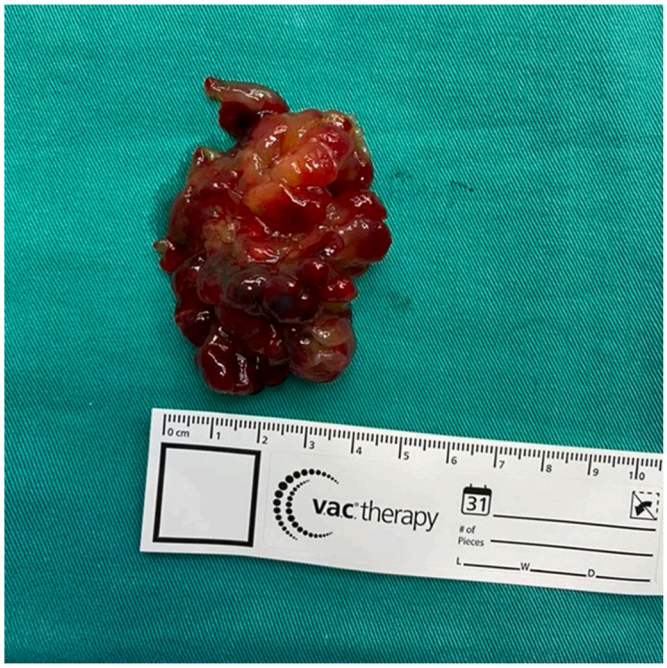

Fig. 2. Left atrial myxoma specimen measure 3.5cm × 6.5cm after resection.

Most of the myxomas are single lesion, and only a few cases present with two or more tumours in the same or different cardiac chambers. Structurally, there are two types of myxoma: one with round, non-mobile surface, and another pedunculated type with irregular shape, mobile surface. . The latter type has the higher incidence of embolism, and this is the commonest type to prolapse through the atrioventricular valve to cause obstruction (Video 1), as what had happened to our patient during induction of anaesthesia [8].

Syncope, palpitations, and exertional chest pain are more commonly seen in left sided tumours, as reflected in our patient. About 12–20% of the cases are usually asymptomatic and lesions were found coincidentally during review [7]. Echocardiogram is essential in establishing the diagnosis of cardiac myxoma. It approximates the size, location, and origin of the myxoma. In this regard, TEE is superior to a TTE. N-terminal pro b-type brain natriuretic peptide (NT-proBNP) is useful to distinguish the origin of shortness of breath and orthopnea symptoms. Elevated level of NT-proBNP will point towards cardiac origin rather than respiratory. However, it was not done in our centre due to lack of resources.

Although majority of cardiac myxoma is benign, it can lead to fatal catastrophic complications such as intracardiac blood flow obstruction, pulmonary hypertension, hypoxemia, congestive heart failure, systemic embolism, infection, malignant transformation, and sudden death. Once a diagnosis of a cardiac myxoma is established, tumor resection is immediately planned for curative and prophylaxis purposes. Pinede et al. in the year 2001 demonstrated only four deaths in a series of 112 patients with cardiac myxoma who were operated, over a median follow-up of 3 years [9,10]. Tumor recurrences after 4 years of resection is uncommon. Recurrence is usually attributed to incomplete excision of the tumor, growth from a second focus, or intracardiac implantation from the primary tumor.

The principles of anaesthesia for such patients include maintaining normal HR, BP, and cardiac output (CO). The preload, contractility, and systemic vascular resistances (SVR) should be maintained within normal ranges. In obese patients with PAH, it is vital to avoid factors that can cause increased pulmonary vascular resistance (PVR) such as hypotension, hypoxemia, acidemia, and hypercarbia. While Trendelenburg position helped by relieving the valvular obstruction, it also contributed to the redistribution of pooled venous blood from the lower limbs back to the heart by increasing preload and CO [11–13].

In summary, anaesthesia for obese patients with huge cardiac myxoma poses significant challenges. We suggest avoiding drugs that have myocardial depression effect and recommend the usage of etomidate or ketamine during induction of anaesthesia in any future similar cases of large myxoma. Anesthetists may consider positioning the patient in Trendelenburg to improve venous return and CO during tracheal intubation, bearing in mind the consequences.

4. Conclusion

Cardiac myxomas are rare benign tumours of the heart which has higher preponderances on the left atrium. It has variable clinical presentations, depending on the size and location within the cardiac chambers. TTE is handy to detect cardiac pathologies, including myxoma, in patients presenting with signs of heart failure. Surgical resection of cardiac myxoma remains the mainstay of treatment with excellent prognosis. Anaesthesia for obese patients with cardiac myxoma poses significant perioperative challenges. Intraoperative Trendelenburg position may relieve the intracardiac obstruction, increasing venous return, preload and CO of the heart.

4.1. Patient's perspective

I am very happy and grateful to the cardiothoracic surgeons and anaesthetists for saving my life. I admit that being morbidly obese with several health issues, are not easy for the team to manage and optimize me throughout the surgery. Fortunately, with the wisdom bestowed by God, the teams were able to perform the resection successfully.

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Ethical approval

This case report does not need any ethical approvals.

Consent

Informed and written consents were obtained from the patient and parents involved.

Author contribution

Dr Chen Chua, Dr Teck Fui Wong and Dr Chee Yee Ang were the clinicians involved in the management of the patient. They are the co-authors for this manuscript as well with Dr Boon Tat Yeap.

Registration of research studies

NOT RELATED.
1. Name of the registry:
2. Unique Identifying number or registration ID:
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

Guarantor

BOON TAT YEAP.

Declaration of competing interest

There is no conflict of interest in our manuscript.

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Appendix A. Supplementary data

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