Asian Journal of Pharmacy, Nursing and Medical Sciences (ISSN: 2321 – 3639)
Volume 9 – Issue 4, August 2021

Anesthetic Consideration in Case of Large Lymphangioma in Right Atrioventricular Groove: A Case Report

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ABSTRACT---

Background*: Cardiac tumor is a rare disease but it causes various hemodynamic changes depending on location and size. Compression of the right sided heart can lead to impaired venous return and consequent systemic and coronary vascular collapse.*

Case*: A 62-year-old male who had cardiac lymphangioma on right atrio-ventricular groove. Upon entering the operating room, he was admitted to the tamponade physiology with tachycardia and hypotension. Opioid based anesthesia was performed to minimize myocardial depression, and myocardial function was continuously monitored through Transesophageal echocardiography and pulmonary artery catheter to safely wean the cardio pulmonary bypass (CPB) machine.*

Conclusion*: Anesthesiologists should be able to predict and respond appropriately to physiological hemodynamic changes according to the location and size of cardiac tumor.*

1. INTRODUCTION

Primary cardiac tumors are rare [1]. However, due to the risk of obstruction, arrhythmia and embolism, surgical resection is the treatment choice even if the tumor is benign [2]. Since various clinical manifestations can occur depending on the tumor location and size, anesthetic considerations vary by cases. Most of them cause hemodynamic changes due to the mass effect of the tumor. Compression of the right atrium can reduce the venous return and cause a decrease in cardiac output. Right ventricular compression cause the left ventricular diastolic function. And sequentially filling capacity reduction induce the decrease of left ventricular stroke volume. Predicting hemodynamic changes and responding appropriately is a challenge for anesthesiologists. We present the case of lymphangioma compress the right side heart, and will discuss the anesthetic considerations.

2. CASE REPORT

The Current report was approved by Institutional Review Board of Wonju Severance Christian Hospital, Wonju, Korea (CR321320).

A 62-year-old man with hypertension and pneumoconiosis presented to the emergency department with 15-days history of chest pain. The chest pain aggravated the day before he visited hospital and he felt dyspnea on exertion. At the time of admission, the status of hemodynamics was stable. There were no abnormal laboratory tests, and cardiac enzyme levels were also within normal range (CK-MB 1.36 ng/ml, Troponin I 2.52 pg/ml). In chest radiography, a 10.2 cm sized cardiac mass was found. The mass showed 10.1 x 7.3 x 9.3 cm sized non-enhancing homogeneous soft tissue along right atrioventricular groove in computed tomography (figure 1.).

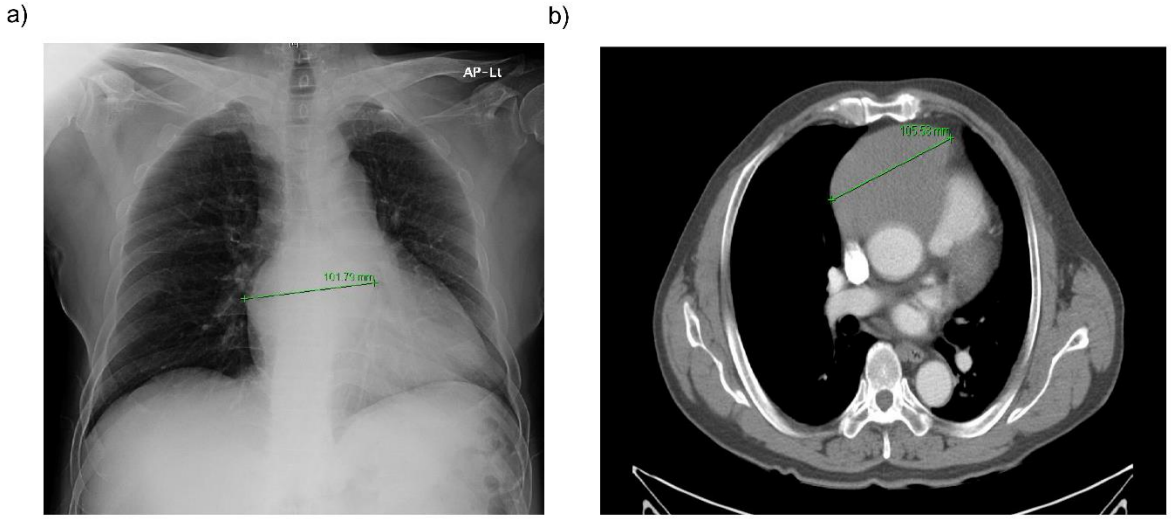

Figure 1. Cardiac mass in a) CXR, b) CT chest.

In CT angiography and cardiac MRI were performed to investigate the characteristics of the tumor, the tumor was surronding the right coronary artery and has multiple septated cyst (figure 2.).

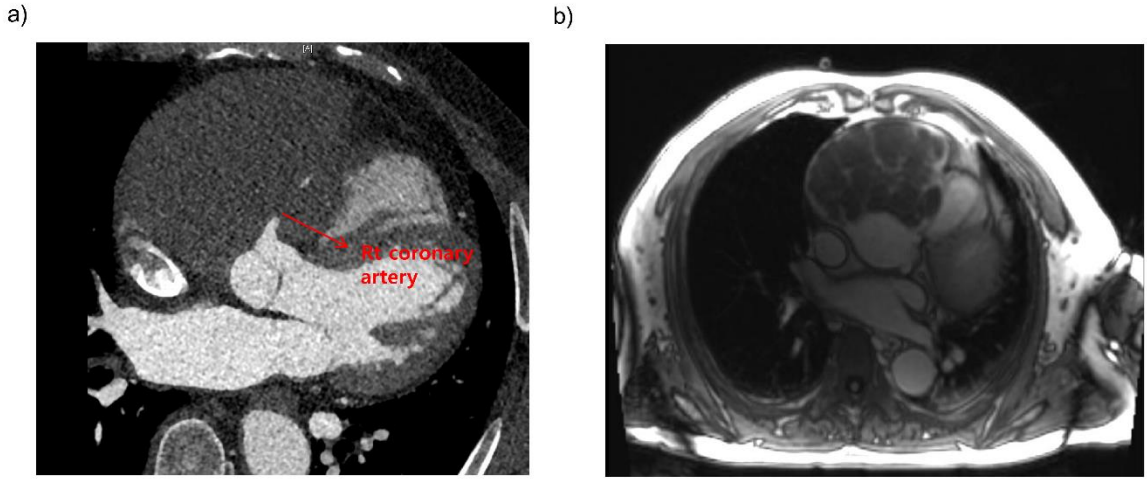

Figure 2. cardiac mass a) CT angiography showed mass encasing the right coronary artery. b) cardiac MR showed multiple cyst with septation.

The mass size was huge and compress the right ventricle, the left ventricular systolic function was limited due to interdependence of both ventricles like tamponade physiology. Considering risk of the right ventricular rupture or the right coronary artery occlusion, the clinician decided to remove the mass. When entering the operating room, the initial blood pressure was 91/56/68 mmHg and the heart rate was 123 beats/min. There was no vasopressor or inotropic using. Invasive blood pressure monitoring was initiated before the induction. Preparing for the hemodynamic perturbation, induction of anesthesia was performed with 0.05 mg/kg of midazolam and 100 microgram of sufentanil to minimize myocardial depression. We inserted the MAC catheter (Teleflex®, U.S.) and Swan-Ganz pulmonary artery catheter (Edwards Lifesciences®, U.S.). Initial pulmonary artery pressure was 39/18/25 mmHg and central venous pressure was 19 mmHg. The right ventricular cardiac output and index were 4.0 L/min and 2.1 L/min/m^2. Trans-esophageal echocardiography was inserted for assessing the remnant tumor after resection and ventricular function. In intraoperative echocardiography, the cystic mass compress the right ventricle (Figure 3.) and reduced LV systolic function is observed. Using a cardio pulmonary bypass machine (CPB), the mass was removed and remnant mass was assessed by TEE (Figure 3.). The mass positioned free wall of the right ventricular myocardium. Pathologic analysis was performed during surgery and it was confirmed as a benign cystic region, lymphangioma. On TEE view, the compression effect of mass was reduced (Figure 3.), so we decide to quit surgery.

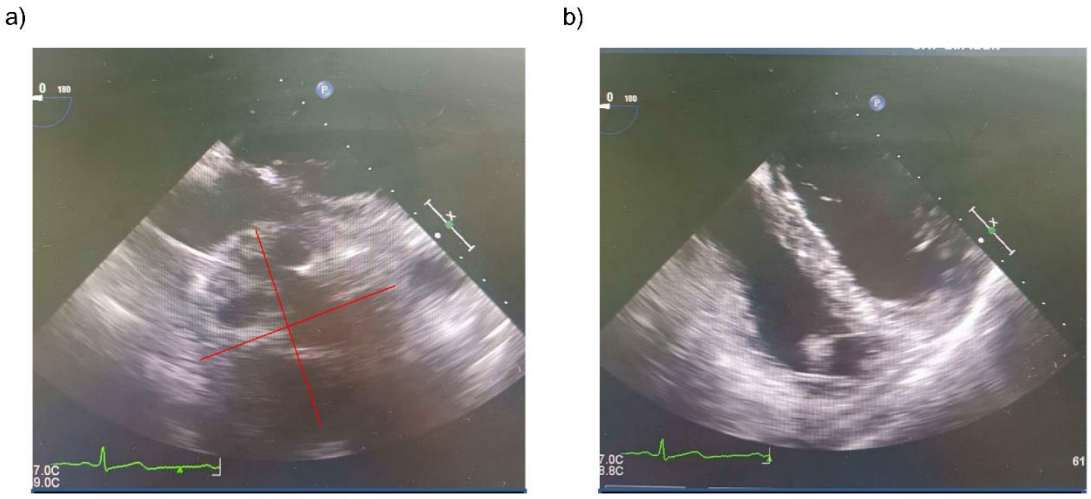

Figure 3. intraoperative TEE esophageal 4 chamber view; a) pre resection b) post resection

3. DISCUSSION

Primary cardiac tumor sometimes asymptomatic, but usually show one of the following four symptoms [3], obstruction of intracardiac blood flow, arrhythmia or pericardial effusion with tamponade, embolization and/or systemic symptoms. Hemodynamic effects are greatly affected by the location and size of the mass [1]. Therefore, rather than malignancy or cell type, anesthesiologists consider the tumor location and size preferentially. In this case, the tumor had a mass effect on the atrioventricular groove, right ventricular free wall and peri aortic annulus. Increased CVP may represent a decrease in venous return [4]. Reduction of the systemic venous-right atrial pressure gradient leads to decrease in cardiac output. Inability to maintain the coronary and systemic perfusion cause the cardiovascular collapse [5]. Compression of the right coronary artery may cause a decrease of systolic function on inferior wall or myocardial infarction [6]. In addition, the occurrence of the arrhythmia can potentiate the reduction of cardiac output by limiting ventricular filling [7,8]. Autonomic nervous system reflexes as compensatory mechanism should not be limited. Therefore, the anesthetic goal of induction are as follows, preserving myocardial contractility, maintaining coronary perfusion pressure, maintaining venous return and cardiac filling pressure and preventing decrease of heart rate or arrhythmia.

Mechanical ventilation also affects circulating system. Increased intrathoracic pressure limit the venous return [9]. The mass effect of the RV can be potentiated, cautious monitor of CVP and right ventricular end-diastolic volume to assess the venous return and RV diastolic function. Also consider the increase of pulmonary vascular resistance and right ventricular workload. So using pulmonary artery catheter, as gold standard of measuring cardiac output, has many advantage. Even if the tumor is in cardiac chamber, catheterization is discouraged due to embolism risk. PAC provides the right ventricular ejection fraction and end-diastolic volume by the thermodilutional technique. And it also provide information of left ventricular cardiac output through the continuously venous oxygen saturation [10].

Intraoperative TEE monitoring provide us information about effective circulating volume, ventricular function and remnant tumor after resection. In addition, unintentionally shunt flow should be checked after resection, and removal of air in the cardiac chamber also should be checked during CPB machine weaning by TEE. After CPB machine weaning, evaluation of bleeding and ventricular function abnormality due to hematoma also be evaluated using TEE.

In conclusion, cardiac tumors have various hemodynamic effects depending on location and size. It will be essential to provide a safe anesthetic milleu to predict hemodynamic effects and monitor appropriately to these changes in consideration of the image findings.

4. REFERENCES

1. Ekmektzoglou KA, Samelis GF, Xanthos T. Heart and tumors: location, metastasis, clinical manifestations, diagnostic approaches and therapeutic considerations. J Cardiovasc Med (Hagerstown) 2008; 9: 769-77.
2. Hoffmeier A, Sindermann JR, Scheld HH, Martens S. Cardiac tumors--diagnosis and surgical treatment. Dtsch Arztebl Int 2014; 111: 205-11.
3. Vander Salm TJ. Unusual primary tumors of the heart. Semin Thorac Cardiovasc Surg 2000; 12: 89-100.
4. Magder S. Understanding central venous pressure: not a preload index? Curr Opin Crit Care 2015; 21: 369-75.
5. Appleton C, Gillam L, Koulogiannis K. Cardiac Tamponade. Cardiol Clin 2017; 35: 525-37.
6. Baumann F, Obeid S, Gilhofer T, Siegrist P, von Spiczak J, Lüscher TF, et al. Right coronary artery motion analysis: a novel method to measure right ventricular systolic function by selective coronary angiography. Int J Cardiovasc Imaging 2019; 35: 1557-61.
7. Al-Omari MA, Finstuen J, Appleton CP, Barnes ME, Tsang TS. Echocardiographic assessment of left ventricular diastolic function and filling pressure in atrial fibrillation. Am J Cardiol 2008; 101: 1759-65.

8. Lima JA, Weiss JL, Guzman PA, Weisfeldt ML, Reid PR, Traill TA. Incomplete filling and incoordinate contraction as mechanisms of hypotension during ventricular tachycardia in man. Circulation 1983; 68: 928-38.
9. Mahmood SS, Pinsky MR. Heart-lung interactions during mechanical ventilation: the basics. Ann Transl Med 2018; 6: 349.
10. Chatterjee K. The Swan-Ganz catheters: past, present, and future. A viewpoint. Circulation 2009; 119: 147-52.