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Journal of Cardiology & Clinical Research

Case Report

Massive Pulmonary Embolism after Hip Surgery with a Mobile, Snake-Like Right Atrial Thrombus Successfully Treated with Open Heart Surgery

Jahangir A. Khan*, Juha E. Hautalahti, and Jari O. Laurikka

Department of Cardio-Thoracic Surgery, Heart Hospital, Tampere University Hospital, Finland

***Corresponding author**

Jahangir A. Khan, Department of Cardio-Thoracic Surgery, Heart Hospital, Tampere University Hospital, PO BOX 2000, Tampere, Finland, Tel: +358331165037; Fax: +358331165756; Email *jahangir.khan@sydansairaala.fi*

Submitted: 27 June 2017

Accepted: 20 July 2017

Published: 22 July 2017

Keywords

- Thrombosis
- Pulmonary embolism
- Cardiac surgery
- Embolectomy

Abstract

Surgical embolectomy for pulmonary embolism and intracardiac thrombus is a rare but occasionally required procedure that should be considered when anticoagulation and/or thrombolytic therapy is contraindicated or failed. We describe a patient with massive pulmonary embolism and a large, mobile, snake-like thrombus in the right atrium, as well as a patent foramen ovale, treated successfully by surgery.

ABBREVIATIONS

PFO: Patent Foramen Ovale

INTRODUCTION

Massive pulmonary embolism is a potentially lethal condition. Besides supportive care, conventional treatment consists of systemic anticoagulation, thrombolytic therapy and, in selected cases, surgery or percutaneous catheter-based procedures. Surgical embolectomy should be considered when thrombolysis is contraindicated or failed [1].

CASE PRESENTATION

A 70-year old man was referred to our hospital the 1st of November 2016 because of malaise, hypotension, tachycardia, and a collapse. He had been operated on for a left-sided hip fracture four days earlier and had received routine low-molecular-weight heparin prophylaxis postoperatively. The patient was previously diagnosed with polysytemia vera and had five months earlier undergone an abdominoperineal resection for a grade II distal rectal carcinoma with no known metastases.

In the emergency department, the patient was awake and oriented, with initial blood pressure of 92/53mmHg and a pulse rate of 110. The pulse oximetry showed 97% oxygen saturation with 9L oxygen flow and the ECG revealed a new right bundle branch block. Arterial blood gas analysis showed a pH of 7.42, pO_2 of 12.2kPa, pCO_2 of 4.5kPa, and a base excess of -3.5mmol/L. Physical examination and chest x-ray were inconclusive. Chest computed tomography revealed massive bilateral pulmonary embolism involving each pulmonary segment with a saddle embolus in the bifurcation of the pulmonary artery while cardiac ultrasound examination showed enlarged right-sided cardiac chambers and a large, snake-like mobile thrombus in the right atrium (Figure 1). A deep venous thrombus was also detected in the left leg at the popliteal level. Anticoagulation therapy was considered insufficient and thrombolytic therapy contraindicated due to recent surgery and the mobile atrial thrombus. Surgical embolectomy was chosen as the treatment course after multidisciplinary discussion.

The operation consisted of median sternotomy, normothermic perfusion with bicaval cannulation, aortic cross-clamping and cardioplegic arrest, embolectomy from the right atrium, pulmonary trunk, and both pulmonary arteries, as well as closure of the patent foramen ovale (PFO) discovered during the operation. The thrombus was partially dislocated subphrenically by the inferior vein cannula but was flushed into the operational field by loosening the caval snare. It was suspected but could not thus be confirmed that the thrombus had been trapped in the sizeable PFO. The incision in the pulmonary trunk was continued into the left pulmonary artery and the right pulmonary artery

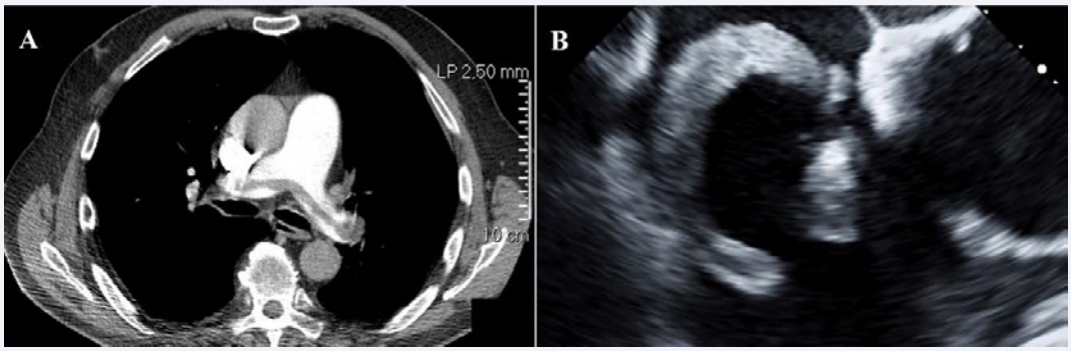

Figure 1 A) Chest computed tomography showing a saddle embolus in the bifurcation of the pulmonary artery. B) A large, mobile, and snake-like thrombus in the right atrium in echocardiography.

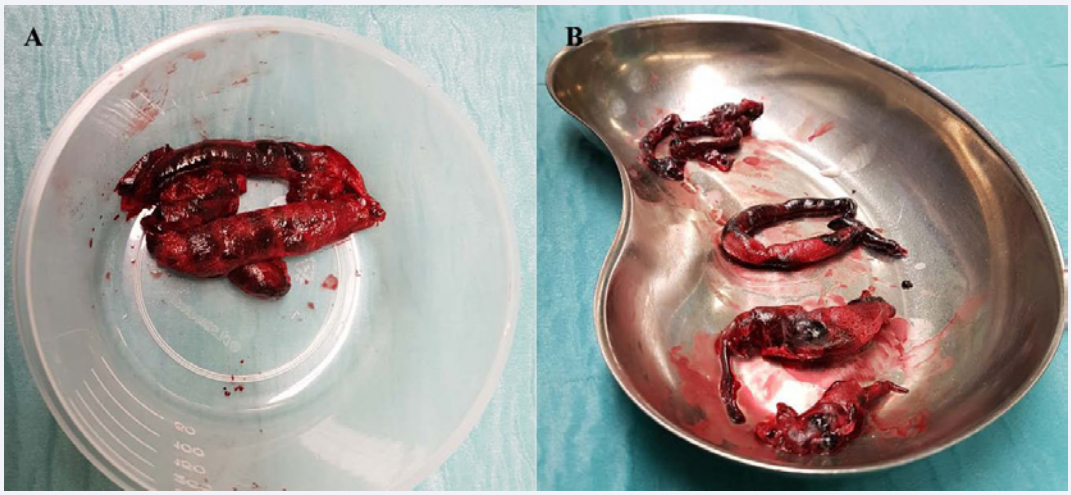

Figure 2 A) Thrombus retrieved from the right atrium. B) Emboli retrieved from the main pulmonary artery (middle), left pulmonary artery (bottom), and right pulmonary artery (top).

was opened separately between the aorta and the superior vena cava. The thrombus (Figure 2) was retracted using suction, forceps, fogarty catheters, and gentle lung manipulation.

The postoperative course was uneventful. The patient was referred for tertiary care nine days after surgery and has recovered as usual thereafter. Follow-up chest computed tomography two months later showed no complications or abnormalities.

DISCUSSION

Postoperative thrombo-embolic complications are a significant cause of morbidity. In high-risk patients - as the present case - additional prophylactic measures, such as higher-dose heparin prescription and/or the use of compressive stockings, should be considered. In addition to the risk of dislodgement into the pulmonary circulation, a right atrial thrombus may cause paradoxical embolism when presenting together with a PFO. A snake-like, highly mobile thrombus may suggest partial entrapment within the PFO. In this setting, anticoagulation and/or thrombolysis therapy carries an exceedingly high risk of embolization which, especially if associated with massive pulmonary embolism, may prove fatal. Furthermore, thrombolytic therapy may cause intra-cranial hemorrhage when administered with concomitant silent cerebral emboli and the risk for paradoxical embolus increases with elevated right-sided pressures associated with pulmonary embolism. Surgical embolectomy is a relatively easy procedure allowing thrombectomy from cardiac chambers and pulmonary arteries as well as simultaneous closure of a PFO if present.

Embolectomy from the pulmonary arteries may be performed under perfusion without arresting the heart [2]. However, if thrombus is present in the right atrium and opening of the right atrium is contemplated, especially when a PFO is present/suspected, we suggest aortic cross-clamping and arresting the heart to avoid systemic embolization. This allows better control and yields the possibility of entering the left atrium if a part of the thrombus needs to be recovered.

Both fibrinolytic therapy and percutaneous treatment have been described in a similar setting [3,4]. The authors argue that though success with these techniques is possible, the risk of catastrophic complications is obvious and that when no contraindication for surgery exists, these patients should be operated on or at least treated in a center with surgical backup.

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Cite this article

Khan JA, Hautalahti JE, Laurikka JO (2017) Massive Pulmonary Embolism after Hip Surgery with a Mobile, Snake-Like Right Atrial Thrombus Successfully Treated with Open Heart Surgery. J Cardiol Clin Res 5(5): 1113.