

Uncommon Entrapment of Swan-Ganz Catheter in the Main Pulmonary Trunk in Valvular Heart Surgery

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Abstract

The Swan-Ganz pulmonary artery catheter (PAC) in cardiac surgery patients is used for monitoring haemodynamic status of the critically ill patients including cardiac output, mixed venous oxygen saturation and pulmonary artery (PA) pressure. The complications associated with catheter insertion include tachyarrhythmias, heart block, pulmonary artery rupture, catheter curling/knotting and pulmonary artery catheter entrapment.

We report an unusual case where PAC was inadvertently entrapped in pulmonary artery vent stitch. Re-exploration, institution of CPB, and repair of pulmonary artery vent site were required to retrieve the pulmonary catheter.

Keywords: Swan-ganz catheter, PA catheter entrapment, Cardiac surgery, Pulmonary artery vent.

CASE REPORT

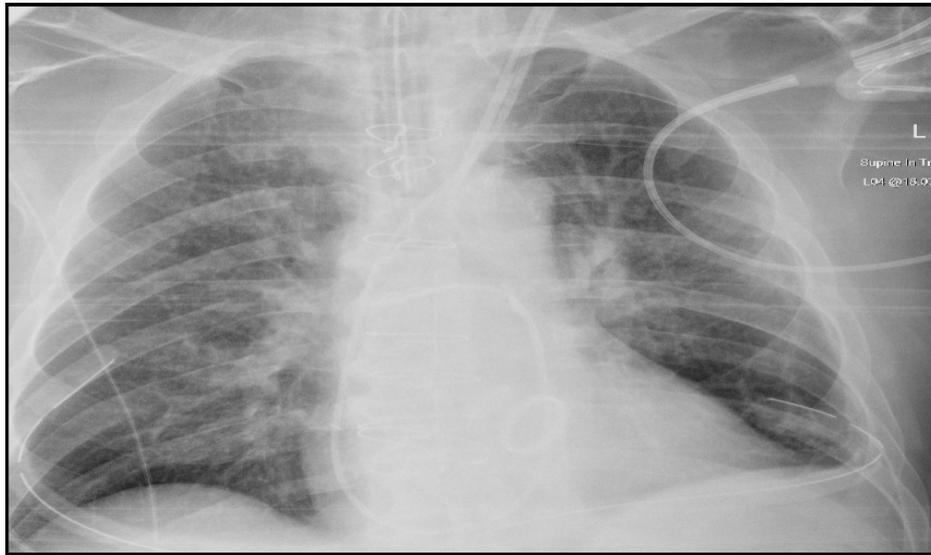
We are reporting the case of a 66y old gentleman who had the Swan-Ganz pulmonary catheter intraoperatively for cardiac study through left subclavian vein and inadvertently stitched to the main pulmonary artery.

He underwent coronary artery bypass graft and mitral valve replacement one year ago due to ischaemic mitral regurgitation. After the surgery, he was in intensive care unit for 60 days due to respiratory failure. He was discharged home in 6 months time. Follow up echo revealed good LV function, well seated mitral valve with competent aortic valve.

Six months after discharge, he developed severe respiratory distress that jeopardised his day-to-day activities. Transthoracic echocardiogram demonstrated good left ventricular function but severe aortic regurgitation. The mitral valve replacement seemed well seated with mild MR. There was mild tricuspid regurgitation and pulmonary artery systolic pressure was 70 mmHg. A transoesophageal echocardiography (TOE) showed trileaflet aortic valve.

A calcified 12x4mm mobile vegetation attached to the NCC was visualised. There was severe AR (PHT 116ms) centrally with a further jet originating at the base of the NCC, suggestive of leaflet perforation. He was treated for suspected infective endocarditis and heart failure. Blood cultures grew *Streptococcus lutetiensis* which was sensitive to penicillin and teicoplanin. He was treated with appropriate antibiotics and redo Surgery was planned for AVR. Central venous catheter, arterial line, swan ganz catheter and foley's catheter were inserted in the anaesthetic room for monitoring and drug/fluid administration. The surgery was performed through re-do median sternotomy. The patient was put on cardiopulmonary bypass through aortic and right atrial cannulation. PA vent was also inserted at the root of the main pulmonary trunk. The native valve with infective mass were excised and mechanical prosthesis was inserted. The patient was shifted to the intensive care unit with satisfactory TOE report. The immediate post-operative CXR did not reveal any kink in the PA catheter.

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The following day, attempts were made to remove the PA catheter by gentle traction but failed. Hence, it was decided that the safest option was to remove it in operating theatre under general anaesthesia.

As the PA catheter was inserted through the left subclavian vein, the innominate vein was dissected. The catheter was retrieved and divided. The proximal part was pulled by the anaesthetist from the insertion site. But the distal half cannot be removed with gentle traction. After forceful traction distal part recovered in its entirety. At this point, torrential bleeding was identified at the PA vent site. This was controlled with compression. Cardiopulmonary bypass was established expeditiously, and the PA vent site was repaired with 5/0 prolene pledgeted sutures. The patient was weaned off CPB uneventfully with minimal inotropic support. Patient was discharged home and under routine follow up in valve clinic.

DISCUSSION

The use of Swan-Ganz pulmonary artery catheter in valvular heart surgery patients is not uncommon. It is frequently used for monitoring of cardiac output, systemic vascular resistance, mixed venous oxygen saturation and PA pressure. However, it is not entirely free of complications. The observed complications include tachyarrhythmias, heart block, pulmonary artery rupture, catheter knotting and entrapment. The overall incidence of all these complications is 3%. Nevertheless, the entrapment of PA catheter is one of the rare complications accounting to 0.065% only.¹ In literature, entrapment of PA catheter in cardiac surgery has been reported. It usually occurred to the

cannulation sites on the right atrium.² In this case, the PAC was inadvertently stitched to the PA vent site which is uncommon occurrence.

The entrapment of PA catheter is suspected if there is acute angulation of the catheter seen on the chest radiograph.³ Many of these events are detected after surgery hence necessitate re-exploration.⁴ Resistance to mobilise the pulmonary artery catheter and/or pulsating catheter warrant prompt further diagnostic investigations which include TOE and fluoroscopy.

Attempts to pull the entrapped catheter out can cause catastrophic bleeding. The safest approach is to remove the catheter in the operation theatre.

The PA catheter should be withdrawn during the surgery and should be floated again once the surgery has been completed in order to avoid any entrapment in the haemostatic stitches. Also, the mobility of the catheter should always be checked before sternal closure. On suspicion of suture entrapment TOE and other investigations should be utilised peri-operatively. Cannulation should be established before any attempts to retrieve the PA catheter for identifying identify the location of entrapment that could avoid the crash institution of cardiopulmonary bypass.

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