

Entrapment of pulmonary artery catheter in superior vena caval cannulation site during cardiac surgery

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Abstract

A pulmonary artery catheter (PAC) is a useful tool for monitor haemodynamics during cardiac surgery in patients with compromised ventricular function and helps in the perioperative patient management. During open heart surgery entrapment of a Swan-Ganz catheter to an intracardiac structure is rare but may lead to potentially life-threatening complications. Here, we report a case of an entrapped pulmonary artery catheter by accidental surgical suturing at the entry point of Superior vena cava into right atrium that necessitated reopening the chest and removing the catheter.

Key words: Swan-Ganz catheter, Entrapment, Mitral valve replacement surgery

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Introduction

The Swan Ganz catheter has revolutionised hemodynamic monitoring during cardiac surgery and critically ill patients in ICU. During open heart procedures where superior vena cava cannulation is done there are high chances of Swan Ganz catheter to be caught in suture by cardiac surgeon during closing of

cannulation site [1, 2]. In this case report we have described a very rare complication of Swan Ganz catheter which was entrapped in suture of superior vena cava and after failed attempt of removing the catheter, patient was taken for re-exploration where catheter was removed after cutting the suture.

Case Report

A 37-year-old female patient of Rheumatic mitral valve disease who underwent mitral valve replacement surgery. She presented with a history of, shortness of breath, palpitation, and orthopnoea. Echocardiography showed in addition to normal left ventricular function, severe mitral stenosis (MVA 0.8cm²) severe Tricuspid regurgitation and severe Pulmonary hypertension (PRVSP 84mmHg). Vital signs were within the normal range. The patient was receiving, furosemide, digoxin, and rovastatin as medications. All laboratory values were within the normal range.

In the operating room (OR), standard monitors and a left radial arterial catheter was placed. A 8.5-French percutaneous sheath introducer (Edwards Lifesciences, AVA HF) was placed in the right internal jugular vein, and a pulmonary artery catheter (PAC; Edwards Lifesciences) was threaded through it in the standard fashion visualizing the different pressure waveforms. Normal pulmonary artery (PA) pressure waveforms were observed. Hemodynamic data from the PAC were obtained intraoperatively without interruption.

Induction of general anesthesia and intubation of the trachea were smooth and without complications. Mitral valve replacement with mechanical valve and tricuspid annuloplasty was performed under cardiopulmonary bypass. Throughout the procedure, the Swan-Ganz catheter appeared to function normally. After successful weaning off

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cardiopulmonary bypass (CPB), patient was transported to the intensive care unit. A chest radiograph done in the ICU showed the PAC in its usual position.

The patient was extubated and was stable on the second postoperative day, and it was planned to shift the patient to ward after removing the PAC but when it was attempted to remove the PAC there was resistance on pulling out the PAC. Chest radiograph did not show abnormal finding or an angulation in the course of the PAC therefore possible diagnosis of PAC suture entrapment was suspected (Figure 1). The patient was transferred to operating room again to remove the PAC.

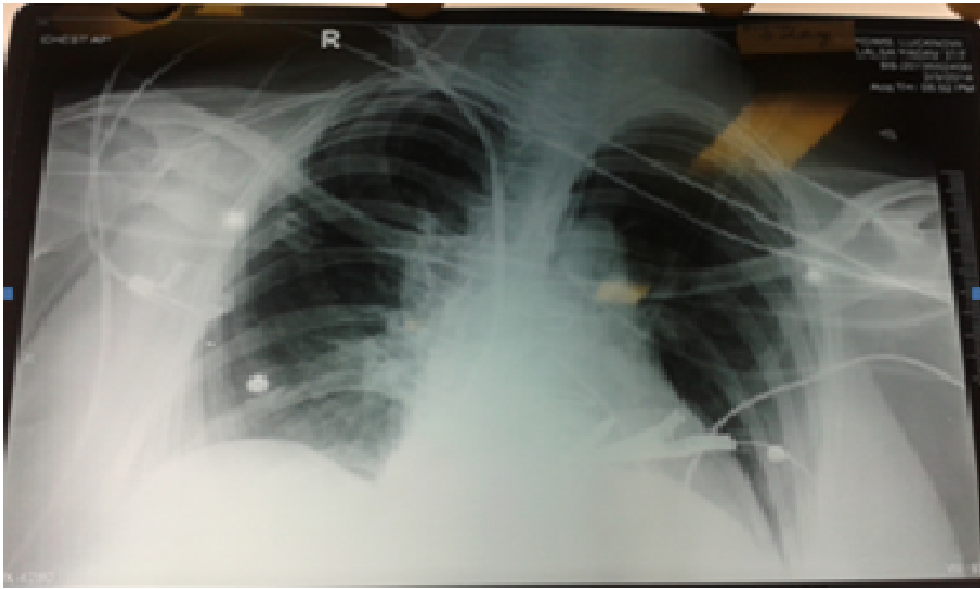


Figure-1: Chest radiograph on the first postoperative day. Shows no angulation of the PAC



Figure-2: PAC after removal

After opening the chest, PAC was found to be fixed to Superior vena cava purse string suture. Surgeon very gently managed successfully to free the catheter, which was then pulled out completely (Figure 2). The trachea extubated post operatively, and patient was transferred to the ward on the next day.

Discussion

Swan- Ganz catheter entrapment in the intracardiac structure during suturing in open heart operation has been reported sporadically. The overall prevalence of Swan- Ganz catheter entrapment was found to be 0.065% [3]. Whenever there is resistance in withdrawing of the Swan-Ganz catheter, the possible causes include catheter knotting, catheter deformation, and suture entrapment.

Kaplan et al. surveyed 10 cases of PAC entrapment complications, all of which involved valvular replacement surgeries [3]. Huang et al. similarly reported entrapment of a Swan-Ganz catheter in the purse-string suture in a patient undergoing aortic valve replacement. Our case of PAC entrapment was also during valve replacement surgery.

In most of pulmonary artery catheter entrapment reports, diagnosis was suspected when resistance was felt while attempting to withdraw the catheter, and confirmed by fluoroscopy postoperatively [4, 5].

In our case there was no angulation of PA catheter and CXR revealed normal position of catheter so it was planned to go for Re-exploration without further manipulation as the risk of rupture of suture site.

In this case although the PAC was pulled about 5 cm at the end of CPB there was bleeding from the site of the purse string after removing the CPB cannula from the superior vena cava after weaning from CPB; therefore, the surgeon took extra sutures to stop the bleeding from this place, probably at this stage, the PAC was sutured.

We do recommend pulling the PAC 5 to 10 cm at termination of CPB to ensure the free movement of PAC. The catheter, which can be verified for its mobility during suturing of cannulation sites, can be made free from contact with the right atrial wall. This

maneuver would exclude the possibility of Swan-Ganz catheter entrapment by suturing. Extra care taken during suturing, including palpating the catheter by the Surgeon to ensure its mobility, along with early recognition of this complication before chest closing, is very important in preventing PAC entrapment.

Thus we conclude that although the entrapment of PAC during suturing at cannulation site is not very uncommon but by making Anesthesiologists more aware and taking some extra precautions of checking the free movement of PAC at the end of surgery, we can avoid the re-exploration and help to decrease the morbidity and complications in patients.

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