Entrapped central venous catheter after mitral valve replacement and its surgical retrieval

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Abstract

Central venous pressure monitoring line insertion is routine prior to the conduct of cardiac surgery, and in rare instances, malposition can contribute to operative complications. We describe here how a central venous line lying in the right atrium became caught in a left atrial (LA) closure suture during a mitral valve replacement. The opening of the LA suture line is highly unsafe without cardiopulmonary bypass (CPB) because of the possibility of systemic air embolism, but by employing an ingenious method of suturing over and unraveling the continuous sutures closing the left atrium, it was possible to surgically retrieve it without the use of a CPB.

Keywords: Central venous catheterization • Complications • Catheter malposition

INTRODUCTION

Central venous catheterization is essential for patients undergoing an open heart surgery for perioperative fluid management, real-time monitoring of filling pressures and inotrope infusions. A fair proportion of complications reported relate to the malposition of the catheter, especially in instances where they are retained for a long time. The commonly described one is cardiac tamponade due to catheter tip eroding the right atrial wall [1, 2]. We would like to report yet another rare complication—the catheter being included in the left atrial (LA) suture line.

CASE REPORT

A 59-year old man with a severe mitral regurgitation (MR) underwent an elective mitral valve replacement. A preoperative echocardiogram showed myxomatous leaflets with bileaflet prolapse, a severe MR with a jet area of 14 cm², an annulus measuring 42 mm and an ejection fraction of 60%.

After induction of general anaesthesia, he was positioned and prepped for a right internal jugular vein cannulation. The percutaneous puncture point was guided by the landmark technique, having identified the apex of the triangle formed by two heads of the sternomastoid muscle, the needle was introduced in a direction pointing towards the ipsilateral nipple and a 7 F, and 16 cm central venous catheter (Multi Med, Edwards Life Sciences LLC, Irvine, CA, USA) inserted using the Seldinger technique. All three lumen were aspirated to ensure the free flow of blood, and the distal lumen was connected to a pressure transducer to display the central venous pressure waveform.

His recovery was uneventful until the 4th post operative day, when we attempted to remove the central venous catheter. The catheter could not be pulled out after removing the retaining skin sutures. The catheter was suspected to be caught in one of the cardiotomy site purse string sutures, and so the patient was taken up for surgical removal under general anaesthesia. After opening the chest, the superior vena cava (SVC), inferior vena cava and retrograde cardioplegia purse string sutures were removed and resutured while palpating through the right atrium for the catheter within to ensure that the catheter did not get caught in the new sutures. Gentle traction was applied to the catheter from outside, but the attempts were given up on realizing that the catheter was still very firmly held in place within the cardiac chamber. On-table fluoroscopy was done to determine the lie of the catheter. The exposure showed the catheter lying flush against the right border of the cardiac shadow. The surgeon then did a digital palpation from within the right atrial chamber, with a snugged purse string suture around the finger. The catheter was found to be caught in the LA suture line, which had inadvertently gone through the right atrial cavity, thus ensnaring the central venous catheter.

Removing the catheter in all probability would have, at that point, involved opening the LA suture line while on cardiopulmonary bypass (CPB). The patient was given heparin at a dose of 3 mg/kg to achieve systemic heparinization to keep open the option to go on CPB. The catheter was cut at the point of insertion flush against the skin, and the indwelling portion was pulled into the chest. The surgeon then put a series of discrete Prolene sutures across the length of the LA suture line and left them on rubber-shod artery clamps. Once all the single sutures were in place, keeping the respiratory excursions to the minimum in order to prevent air entrainment during expiration, the original...
continuous Prolene suture was cut from the end of the SVC and unravelled one turn at a time, while simultaneously tightening the single interrupted sutures at that level. During this manoeuvre, care was taken to see that the LA margins were kept closed to prevent air embolism, and limit blood loss. With each unravelling of the continuous Prolene suture, the catheter was released at that spot but could not be pulled out completely because of distal tethering. The whole length of the LA suture was released and re-sutured in this fashion, till the last bite that had transfixed the tip of the catheter and included it in the knot (Fig. 1). Heparin was reversed with protamine and the chest was closed after ensuring haemostasis. He was discharged from the hospital on the 4th day after catheter removal.

DISCUSSION

Catheter or guide wire entrapments are described complications of central venous catheter placements [3]. Although instances of the J tipped guide wire ensnaring and the different resourceful methods of their retrieval have been reported, instances of the catheter itself getting caught are rarer [4]. Retrieval by intervention radiological techniques is eminently more desirable, but unfortunately this is not possible in every situation. This case highlights a rare complication of intracardiac catheter placement, that of entrapment in the suture lines. Since the central venous catheter size has been brought down from 20 cm to 16 cm, the instances of intracardiac placement are believed to have lessened [5]. In this case, even a 16-cm long catheter did not preclude catheter tip placement in the right atrium and its subsequent ensnaring. Becoming caught in the right atrial suture lines would have been less risky since re-suturing would not entail the possibility of systemic air embolism, but the additional surgery and anaesthesia would undoubtedly contribute to the patient’s morbidity. In this case, the LA suture line had to be redone and CPB is deemed mandatory for such a procedure. The technique of sutured over followed in this case circumvented the need for CPB, thus significantly reducing patient morbidity. As a precaution, positioning of the central line tip proximal to the cardiac chamber is essential in patients undergoing cardiac surgery to ensure that the catheter does not get sutured in with the numerous purse strings, suture lines, prosthetic devices or patches that are an integral part of the surgical procedure. It would be advisable to limit the indwelling length to 10–12 cm from the skin and also confirm proper positioning using transoesophageal echocardiography so that malposition can be corrected before surgery.

Conflict of interest: none declared.

REFERENCES