A peeled off and entrapped intraaortic balloon catheter in the femoral artery: an unusual complication

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Abstract

The intraaortic balloon is the most commonly used support device during perioperative period of cardiac surgery. A rare complication after its use is entrapment. In this case-report we present a 70-year-old man who had undergone coronary bypass and needed intraaortic balloon support early in the postoperative period with an extraordinary complication.

Keywords: Coronary bypass; Intraaortic balloon

1. Introduction

Intraaortic balloon (IAB) counterpulsation is a valuable device in life-threatening conditions and the risk of significant complications related with its use in these settings may be acceptable. Complications associated with its use arise frequently and frequency changes between 11 and 33%, but this high range interval is a reflection of various definitions of complications [1]. The most important limitation of its use has been associated with vascular problems.

Technical advances with wire guided percutaneous insertion, catheters with smaller sizes and sheathless methods, the major complication rate associated with IAB counterpulsation declined to 2.1% today [2]. Possible complications of its use are bleeding, limb ischemia, sepsis, false aneurysm formation and thromboemboli [3].

In this report, we present a patient who underwent coronary artery bypass and needed IAB support early in the postoperative period with an extraordinary complication.

2. Case report

A 70-year-old man was admitted to our hospital with stable angina pectoris. Cardiac catheterization showed triple-vessel coronary artery disease. There was moderate left ventricular hypokinesia with ejection fraction of 0.35 and end-diastolic pressure was 18 mmHg. Past medical history showed no complaint of intermittent claudication. Blood tests revealed mild hypercholesterolemia and hyperglycemia. Four-vessel coronary artery bypass was performed by using CPB. Separation from CPB required use of inotropic support of dopamine at the dose of 5 μg/kg per min because of high pulmonary artery pressure. Early postoperative period was uneventful. At eighth hour of postoperative period, severe multifocal ventricular arrhythmias refractory to medical treatment and hypotension occurred. Dopamine dose was increased and adrenalin was added to the regimen because of low mixed venous saturations and continued hemodynamic instability. IAB (Datascope 40 cc. 9.5Fr catheter, 10Fr introducer kit, NJ, USA) was inserted percutaneously through right femoral artery using sheathless method without any difficulty and complication. After the procedure, peripheral pulses were detected to be present while IAB was perfectly functioning and during the IAB support period no blood was detected in the gas line of the catheter. After 11 days when hemodynamical stability was achieved, we decided to remove the IAB without any
ischemic finding at the extremity. During attempted extraction after total deflation, no resistance was encountered but the balloon part was separated from the main shaft of the catheter and remained in the artery. During this short period of time ischemic changes began at right leg and then we heparinized the patient. Surgical exploration through the vertical groin incision was performed under local anesthesia. After exposing the artery proximal and distal control had been secured and it was seen that portion of the balloon was impacted at the puncture site. We did not exert any extra force to pull it out, instead we made a transverse arteriotomy to the puncture area and successfully removed the retained part from the femoral artery without any harm. It was seen that balloon part was totally detached from the proximal fixation point on the catheter (Fig. 1). By finger exploration, it was found that anterior part of the artery just proximal to the puncture site was heavily calcified without any thrombus formation. Sufficient antegrade flow and backflow from the distal femoral artery was detected after the foreign body removal and the arteriotomy was closed by interrupted 6–0 Prolene sutures (Ethicon Inc., Somerville, NJ). After completion of the procedure the patient had excellent pedal pulses. Patient was discharged from the hospital at 16th postoperative day and doing well today with no problem at the right leg.

3. Discussion

Although many assist devices have been developed for the purpose of hemodynamic support, IAB has the widest application because of its ease of placement using percutaneous technique and preoperative use [4]. Overall balloon-related complication rates in recently reported large series are between 2.8 and 6.5% [2,5]. Vascular complications reported in these large series are between 0.9 and 2.1% [2,5]. In a study by Ferguson et al. it is reported that the independent predictors of major complications were female gender, peripheral vascular disease, body surface area (<1.65 m²) and age (>75 years) [5].

The most challenging one of the IAB complications is balloon entrapment. In the previously reported cases IAB was perforated, filled with clotted blood, and impacted in the vascular system [6,7]. When this complication occurs, the balloon must be removed, but forceful extraction may result in severe vascular injury, and commonly surgical exploration has been employed in these situations. Injection of a thrombolytic agent into the catheter is another way of management [8]. The clot lysis technique is useful because it could eliminate the need for surgery but if this is not effective, surgery is mandatory.

Our case showed us that both ischemia and entrapment may occur at the same time. Upon removal we surprisingly saw that the only thing in hand was just the main body of the catheter without balloon at the tip and ischemia began shortly after that. After removal we saw that there was no clot in the balloon catheter that would suggest rupture but some resistance was encountered upon withdrawal of the balloon reminded us entrapment at a calcified plaque.

In high risk cases, we are now considering a preoperative screening test and identifying the patients at risk with subclinical PVD. Careful lower extremity pulse examination, noninvasive studies like Duplex ultrasonography will easily assess the degree of the obstructive arterial lesions.

Because of the high incidence of association of ischemic heart disease and PVD, some authors advocated routine arteriography of the aorta and iliac arteries before IAB insertion and thus avoid IAB-related vascular complications but the cost and associated morbidity of arteriography performed on routine basis precludes this way of evaluation but it is possible to do that at the time of heart catheterization in potentially high risk patients [9].

The surgical way of removal, in our opinion, will facilitate low complication rates especially in patients who have PVD and it also makes it possible to flush the lumen for the potential pericatheter stagnation thrombi.

Despite improvements in the instrumentation and technique of IAB insertion and removal, different types of ischemic complications continue to occur in surgical practice. The potential for vascular complication should always be kept in mind before insertion of the IAB and after removal. Early diagnosis and appropriate intervention is the critical point in this group of patients. We believe that the best and easy way to prevent such complication is detailed preoperative evaluation in especially high risk subgroups.

References


