Open Journal of Cardiovascular Surgery

CASE REPORT

Intra-Aortic Balloon Pump Entrapment in a Nonatherosclerotic Common Iliac Artery

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Abstract: Use of an intra-aortic balloon pump (IABP) is helpful for maintaining hemodynamic stability in patients with low cardiac output and compromised left ventricular function undergoing coronary artery bypass grafting. Although the incidence of complications has decreased significantly as experience with the device has increased, IABP use still carries a risk of complications. The most common complication is limb ischemia, mainly as a result of IABP entrapment and thromboembolism. Here we report a case of IABP entrapment in a nonatherosclerotic common iliac artery where forced removal caused fracture of the catheter.

Keywords: intra-aortic balloon pump, coronary artery disease, coronary artery bypass grafting, common iliac artery

Open Journal of Cardiovascular Surgery 2011:4 5–7

doi: 10.4137/OJCS.S7688

This article is available from http://www.la-press.com.

Introduction

The intra-aortic balloon pump (IABP) is a valuable device in patients with low cardiac output.[1] Complications associated with use of an IABP are common, ranging from 11% to 33%.[1] The most common complication is limb ischemia, usually as a result of thromboembolism.[2] Other major complications are bleeding,[3] arterial injury,[4] infection,[5] and paraplegia.[6] IABP entrapment is extremely rare. The first case of a retained IABP was reported by Aru et al.[7] In this report, we present a patient who underwent coronary artery bypass grafting with IABP support and subsequently developed this unusual postoperative complication.

Case Report

A 50-year-old man was admitted to Imam Ali Heart Center with acute left main coronary artery occlusion. His left ventricular ejection fraction was 25%, and angiography showed triple vessel disease. Coronary artery bypass grafting (CABG) was carried out urgently. Before CABG, a prophylactic IABP was inserted via the right groin in the operating room. An attempt to remove the IABP by a nurse two days later failed, and the patient was taken to theatre for exploration of the femoral artery under general anesthesia. A right femoral arteriotomy was performed, but the catheter was unable to be retrieved. A retroperitoneal laparotomy was then performed, and the right iliac artery was explored. The retained IABP was found to be entrapped in the midportion of a nonatherosclerotic common iliac artery. There was extensive intimal tearing, probably as a result of a forceful attempt to extract the catheter. A longitudinal arteriotomy was performed at the common iliac artery and the retained IABP was removed. Due to disruption of a long segment of intima between the iliac artery and the femoral artery, the segment replaced by a Dacron graft. A small blood clot was found inside the intra-aortic balloon which had formed into a very hard mass, causing entrapment in the iliac artery. Distal pulses in the affected lower limb returned to normal post operatively. The patient's cardiac condition remained stable, and he was discharged on day 12 after surgery.

Discussion

In almost all previously reported cases of IABP entrapment, the iliac artery was narrowed by underlying atherosclerotic changes.[8] However, the common iliac artery was normal in our case. We noticed evidence of balloon rupture by leakage of blood from the balloon which formed a hardened clot that was not easy to detect clinically. Shafei et al[9] and Lambert[10] reported that balloon rupture and leakage occurred in up to 15.4% of cases.[9,10] Tears can be attributed to design and manufacturing issues, insertion technique, and the atherosclerotic nature of the arteries into which an IABP is introduced.[11] Prevention of IABP entrapment requires avoidance of balloon rupture or leakage, and early detection if it occurs. Excessive angulation or kinking of the IABP catheter significantly increases the risk of balloon rupture.[12] If blood is observed within the catheter lumen, the device should be removed immediately. Resistance encountered during catheter removal is an indication of entrapment, and attempting forceful removal of the device may result in fracture of the catheter, retention of part of the device, and/or severe vascular injury. In most reported cases, surgical exploration and arteriotomy have been done to remove the entrapped IABP catheter,[12,13] with the iliac artery explored either transperitoneally or retroperitoneally. The extraperitoneal approach should be adequate for dealing with a balloon retained in the external or common iliac artery. Infusion of thrombolytic agents into the lumen of the entrapped balloon for dissolution of clots has been reported,[14,15] allowing the balloon catheter to be removed via the femoral artery without arteriotomy. This technique has the advantage of avoiding the trauma of open surgery in an already critically ill patient.

Acknowledgments

This study was funded by the Imam Ali Heart Center, Kermanshah University of Medical Sciences. The authors would like to thank Dr Nasser Hemati for critically reviewing the manuscript. The technical support of Ms F Keshavarz and Mr A Poormotaabed is also gratefully acknowledged.

Disclosures

Author(s) have provided signed confirmations to the publisher of their compliance with all applicable legal and ethical obligations in respect to declaration of conflicts of interest, funding, authorship and contributor ship, and compliance with ethical requirements in respect to treatment of human and animal

test subjects. If this article contains identifiable human subject(s) author(s) were required to supply signed patient consent prior to publication. Author(s) have confirmed that the published article is unique and not under consideration nor published by any other publication and that they have consent to reproduce any copyrighted material. The peer reviewers declared no conflicts of interest.

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