The Management of a Fractured Intra-Aortic Balloon

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Abstract

The fracture of an intra-aortic balloon must be carefully monitored and immediately managed. This report describes our experience with a fractured balloon occurring in a patient one day after aortocoronary bypass surgery. The rupture, noted by the presence of blood in the balloon tubing, required immediate isolation and removal. The patient tolerated the event well and recovered without complications.

Introduction

Intra-aortic balloon counterpulsation is now widely used to treat patients with cardiogenic shock following an acute myocardial infarction, and/or patients with low output failure following intracardiac surgery. The incidence of complications attributed to this device, as well as the insertion of it, is 10 to 16%. Documentation in the literature regarding rupture of the balloon during clinical use has recently been reported by Rajani, et al. It is the purpose of this paper to report a case of balloon rupture occurring in a patient following surgery and the immediate management of this potentially lethal complication.

Case Presentation

A 62 year-old woman was referred to the Loyola University Medical Center for cardiac catheterization. Three months earlier, at another hospital, a diagnosis of an acute myocardial infarction was made following an episode of chest pain and shortness of breath experienced by the patient while at rest. She had an uneventful recovery. She had a history of chronic hypertension. On admission, the physical examination was essentially unremarkable. Cardiac catheterization was performed on August 13, 1979, and the findings revealed hypokinesia of the inferior wall of the left ventricle. The coronary arteriogram showed an 80% obstruction of the left main coronary artery, a 60% occlusion of the left anterior descending and total occlusion of the right coronary artery. With these findings, myocardial revascularization was recommended. The following day the patient experienced chest pain and a 20 cc balloon* was inserted through the left femoral artery without complications. The same day she underwent a quadruple aortocoronary bypass to the obtuse marginal, left anterior descending, diagonal, and right coronary arteries under cardiopulmonary bypass. She tolerated the procedure very well. During postoperative day one, it was noticed that the intra-aortic balloon tubing contained fresh blood. Immediately the balloon was removed and a perforation in it was detected. The patient had an uneventful recovery and was discharged in good condition.

Discussion

A rupture of an intra-aortic balloon can be identified by the presence of blood in the tubing of the balloon.

When a rupture occurs, it is mandatory to discontinue counterpulsation in order to prevent additional gas embolus from forming. Bleeding into the balloon can be controlled by clamping the balloon tubing. Under no circumstance should the balloon be manually pumped. This would result in a serious gas embolus to the patient. In a previous report of a balloon rupture, one patient died due to gas embolism.\textsuperscript{3}

Once the rupture has been recognized and the tubing of the balloon clamped, thereby isolating the balloon, immediate surgical intervention to remove the balloon is imperative. In our patient, balloon fatigue developed one day postoperatively. When blood was seen in the tubing, the pump was shut down, the balloon tubing clamped, and the balloon was surgically removed. Since the patient was being weaned off the pump at that time at a 1:4 ratio, a second balloon was not inserted. The balloon was sent to the manufacturer for investigation.

Prior to sending the balloon to the manufacturer, it was thoroughly rinsed of blood. The ruptured area was then sent to Avco for SEM study. The area was mounted on aluminum plates and then gold coated. Then the area was taken through the scanning electron microscopy. As seen in Figure 1, an abraded area with a pinhole leak was found. This area apparently was caused by either the balloon coming into contact repeatedly with a sharp atherosclerotic plaque in the aorta, or the balloon was damaged during insertion. Further magnification of the hole in the balloon can be seen in Figure 2.

A ruptured intra-aortic balloon has been reportedly tolerated in several cases,\textsuperscript{3,5} as well as fatal in another case.\textsuperscript{4} If a rupture occurs, indicated by the presence of blood in the balloon tubing, pump shutdown and balloon isolation from the machine is paramount. Finally, balloon removal must be done immediately so as not to prolong pump downtime.

\textbf{Bibliography}


