

Device Entrapment: A Rare Complication of Percutaneous Coronary Intervention

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ABSTRACT

Device entrapment is a rare complication of percutaneous coronary intervention. It has hazardous potentials for the patient. Emergent cardiac surgery is the only option after failure of retrieval devices. We have described here a case of a 55 years old male. During percutaneous coronary intervention, the balloon inflated only partially at its ends and entrapped in the lesion along with the stent. Multiple attempts at inflation failed and the patient developed severe chest pain for few minutes. Surgery was contemplated but final attempt at inflation was successful and the patient stabilized. It was an emergent situation and could have led to fatal outcome, although this patient escaped narrowly from any fatal outcome.

Key words: *Device entrapment. Complications. Percutaneous coronary intervention.*

INTRODUCTION

One of the serious and rare complications during percutaneous coronary intervention is entrapment of catheter remnants like guidewire, stent with balloon and Rotablator in the coronary arteries. These catheter remnants can be readily recovered from the coronary arteries with the use of various interventional devices with a high success rate.¹ Device entrapment like this can lead to serious complications by causing myocardial ischemia, infarction, or lethal arrhythmia due to intra-coronary thrombosis. Surgery should be promptly arranged in case of failed recovery of these devices by interventional procedure. These patients usually undergo emergency bypass surgical procedure, however, the mortality and morbidity associated with these procedures remain quite high. Entrapment of a guidewire or an intact angioplasty balloon is a rare event.^{2,3}

This case report describes this rare complication in a case where a fatal outcome or an emergent surgery was narrowly avoided.

CASE REPORT

This patient is a 55 years old male who was suffering from occlusive coronary artery disease for 2 years. His predominant symptom was typical cardiac chest pain of functional class II-III. Due to strong clinical and

electrocardiographic evidence of ischemia we decided to perform left heart catheterization. The test revealed critical stenosis of circumflex artery in mid segment and mild disease of the proximal left anterior descending artery (Figure 1). Percutaneous coronary intervention with stenting was contemplated. During the procedure the balloon edges could inflate only partially (Figure 2). The unexpanded balloon was entrapped in the lesion and could not inflate further despite multiple attempts at inflation and change of inflation device. It was attempted to pull the stent in guider but the device could only reach the distal left main and got stuck there (Figure 3). The device was pushed back into the original position. Patient was hemodynamically stable throughout the procedure except when the balloon of the stent was not inflated completely and patient was complaining of severe chest pain and his blood pressure rose to 190/100. He was stabilized after deployment of stent. No predilation was done as the lesion was discrete and no predilation balloon was used. The stent used was a bare metal stent. We decided to intervene surgically but a final attempt at inflation was successful because probably the displacement of the guidewire from obtuse marginal branch to the circumflex temporarily sealed the hole in the balloon catheter which was found later on examination of the balloon catheter. After completion of the procedure, the delivery system was examined and it was noticed that the stem of the balloon was leaked 2-3 cm below the balloon so it was reported to the company.

DISCUSSION

Reports of device entrapment have been described in literature but a case like this has not been described previously. Nishiwaki and colleagues reported a case of balloon catheter entrapment in the circumflex coronary artery. They removed this fragment through a coronary arteriotomy. Madronero reported a case in which they

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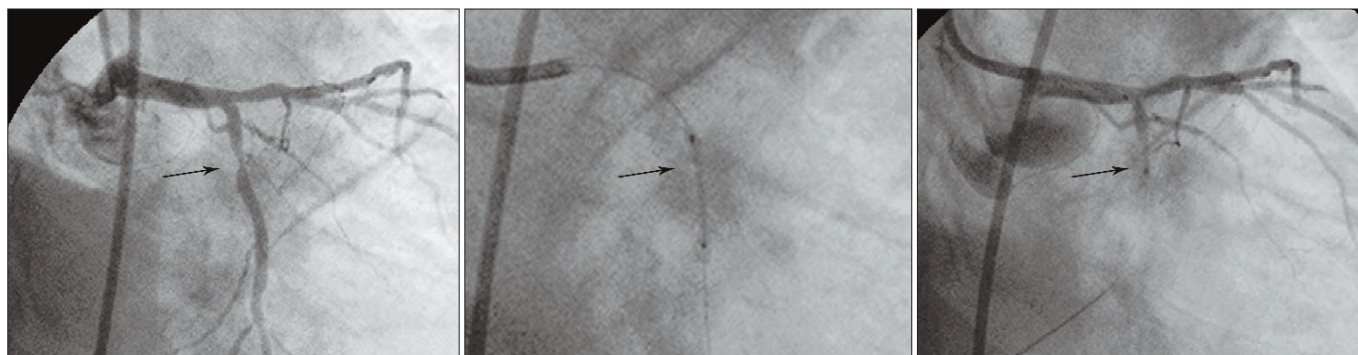


Figure 1: Showing disease of left anterior descending coronary artery and proximal circumflex artery.

Figure 2: Shows partially inflated balloon edges.

Figure 3: Showing device stuck in distal left main.

were dealing with more than a meter long entrapped guidewire. Furthermore, the site was obscured by the hematoma and would not have been ideal for coronary arteriotomy. Later on the entire equipment was removed by arteriotomy under direct vision. There was a high risk of damage to the coronary artery, hence, all the left-sided vessels were grafted. This was an extremely unusual case of entrapped guidewire and balloon. They removed whole system during triple bypass surgery. The intra-aortic balloon pump is an invaluable tool in such circumstances.⁴⁻⁶ The hemodynamic instability and myocardial ischemia secondary to the entrapped equipment necessitated emergency removal and revascularization, which alleviated the ischemic changes. Several methods of percutaneous removal have been described; however, these have been applied only to cases in which a fragment of the guidewire had gotten lodged in the coronary arterial tree, avoiding the need for surgery. However, the coronary arteries are likely to suffer damage at site of impaction. Seshadri and colleagues reported an unusual case of emergency coronary artery bypass grafting with retrieval of an entrapped stent, balloon, and guidewire.⁷

Another case study described a 60-year-old female who had stable angina pectoris and underwent stent insertion into the left circumflex artery. Unfortunately, the coronary stent with balloon catheter was entrapped while crossing the angulated segment between the left circumflex and left main coronary artery. The stent catheter was surgically removed, and the patient underwent coronary artery bypass grafting successfully. Physicians should keep in mind that extremely angulated segments may reduce the successful rate of coronary stenting and contribute to the stent entrapment complication.⁸

Overzealous, inappropriate or unnecessary use of novel or high profile devices may also lead to complications. Entrapment of balloon with a fully or partially deployed stent can have a favourable outcome or can also result in acute occlusion of coronary artery and actual

extraction of stent on withdrawal as well.⁹ Another case report described a case of a 61-year-old man who was treated with percutaneous coronary intervention (PCI) for unstable angina. Seven days after the procedure, he voluntarily suspended double anti-aggregant therapy and experienced acute coronary thrombotic occlusion. A repeat PCI procedure was undertaken but the stent and the balloon remained entrapped in the proximal left main-left anterior descending coronary artery. After ineffective attempt of stent removal using an Amplatz goose neck catheter, the patient who was hemodynamically stable underwent uneventful emergency coronary artery bypass grafting and removal of the damaged stent and Amplatz goose neck.¹⁰

In the event of failed interventional retrieval and persistent signs of ischemia, patients should be urgently referred to surgery. The success of surgery in this circumstance is determined primarily by the clinical status of the patient before the operation. For patients in cardiogenic shock, the risk of death remains 20% to 50%. Additional risk factors depend upon the duration, extent, and location of ischemia.¹¹

The literature on surgical intervention for entrapped stents is sparse, and the commonly proposed therapy is obligatory removal of the foreign body from the coronary circulation. In this case report, we could not use the retrieval devices as it was not possible due to whole system stuck in the coronary artery. The final attempt at inflation successfully avoided surgery.

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