

CASE REPORT

RETRIEVAL OF BALLOON FROM RIGHT CORONARY ARTERY
SURGICALLY

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Angioplasty balloon entrapment remains an infrequent but dangerous obstacle that requires forbearance and pre-built management strategies in order to avoid morbidity or worse, mortality. Here, we discuss an un-expected hurdle of an undeformed stuck balloon with fractured shaft during angioplasty of proximal right coronary artery (RCA) in a 60-year-old male which was attempted percutaneously and redeemed surgically but massive infarction to RCA territory was inevitable.

Keywords: Balloon retrieval; Emergency Cardiac Surgery; Cardiopulmonary Bypass; Calcified Coronary Arteries

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INTRODUCTION

Retrieval of fractured coronary balloon from intravascular compartment is an expanding issue in hemodynamic laboratories. Both percutaneous and surgical guidance have been outlined if we see the literature with the studies personalized to the situation of particular patients and their injury.¹ In this condition, various percutaneous procedures may be employed, but if the efforts are failed, surgical intervention is obligatory for extraction of the stent and coronary artery bypass grafting (CABG).² Hence, surgery plays a role at this time. Here we describe a case in which a coronary balloon catheter persisting inside the right main coronary artery and it was recouped by a surgical approach after percutaneous attempts were unable to do that.

CASE REPORT

A 60-year-old male known case of hypertension, presented at a tertiary care hospital with Inferior wall ST segment elevation Myocardial infarction (IWMI) on 16-8-2020. Electrocardiogram showed evidence of ST segment elevation (STEMI) in leads II, III & AVF with strain pattern (Figure-1A). Echocardiography revealed normal sized LV with mild RV dysfunction and Inferior wall hypokinesia with 40% ejection fraction.

With provisional diagnosis of acute myocardial infarction, patient was thrombolysed with Inj. Streptokinase infusion on Monday and percutaneous coronary intervention (PCI) was scheduled for Tuesday mid-day pharmaco-invasive approach. Coronary Angiogram revealed severe proximal RCA stenosis while subtotal Stenosis at mid-distal LCx was found. After proper authorization PCI of Right Coronary Artery (RCA) and Left Circumflex (LCx) was planned. The EBU 3.5/6F Guiding catheter was engaged in LMCA and

RINATO, FIELDER FC guiding wires were used to pass LCx. PCI to Mid LCx was performed successfully using ALEX (DES) 2.75×38 mm. JR 3.5/6F guider was engaged in RCA. Direct stenting with COFLEXUS (BMS) 4.0×22mm to Proximal RCA was done but operator was unable to get balloon deflated which resulted in undeformed balloon shaft fracture while pulling out Stent delivery system. RCA was the culprit vessel.

The patient was emergently referred to a tertiary care hospital at Karachi for interventional or surgical management of said complication. There was delay of 14 hours to reach from primary hospital to tertiary care hospital at Karachi. The interventional cardiology team at NICVD, Karachi was already on board for further evaluation and management.

On arrival, patient was vitally stable B 110/66 mmHg hr 100 b/min with mild chest discomfort while ECG showed dynamic changes. (Figure-1B). While his physical examination was unremarkable, one sheath at Right superficial femoral artery (SFA) was in place. Right sub-clavian venous sheath was for back-up so that we can pass TPM if needed. Patient was shifted to Cath lab.

Right radial artery was cannulated with 6F sheath. Patient had undergone PCI through radial access while it was uncertain where broken segment of balloon shaft was starting so we attempted through both but major access was radial keeping in view its possible broken segment. A Cine image was taken 1st to localize the exact position (b) and find if any material can be visualized. JR4/6F guider was taken. A Goose neck Snare was taken and multiple attempts were made in ascending Aorta to retrieve broken shaft segment in Snare (Figure-2C and D).

Then using MiniStar Technique, micro catheters (over the wire (OTW)) multiple wires (Conquest Pro, Miracle 12, Pilot 50, Cougar XT)

were tried to cross broken inflated balloon behind its stent subintimally to reach distal vessel (Figure-2B). A sprinter legend 1.5x6 was also used to make passage behind Stent. Procedure continued for 2 hours but wire could not reach distal vessel subintimally rather a minor perforation was noticed at the end of procedure. Patient remained hemodynamically stable. Serial echoes were done before taking patient for surgery in order to check for pericardial effusion.

Patient was emergently transferred to cardiac surgical team. After all emergent workup patient was taken to operating room. Median sternotomy was performed and patient was shifted to cardiopulmonary bypass. On gross examination patient had massive infarcted area overlying RCA territory with markedly depressed right ventricular contractility (Figure-3B). Systemic cooling to 28°C and myocardial protection with ante grade and

retrograde cardioplegia was performed. Saphenous vein graft (SVG) to mid RCA was anastomosed, RCA was calcified, aortotomy was performed and balloon with stent was found impacted to RCA ostial calcification which was pulled back through broken end of wire (Figure-3C and D). Aortotomy was closed. Weaning from bypass went difficult despite maximum inotropic and mechanical circulatory support.

There was markedly depressed right ventricular function as evident on TEE performed in operation theatre. Patient was further managed afterwards in the intensive care unit but due to progression of right heart failure resulting in ventilation perfusion mismatch, hypo perfusion, secondary organ dysfunction and finally systemic hypotension he was unable to make it through and couldn't survive after maximum efforts.

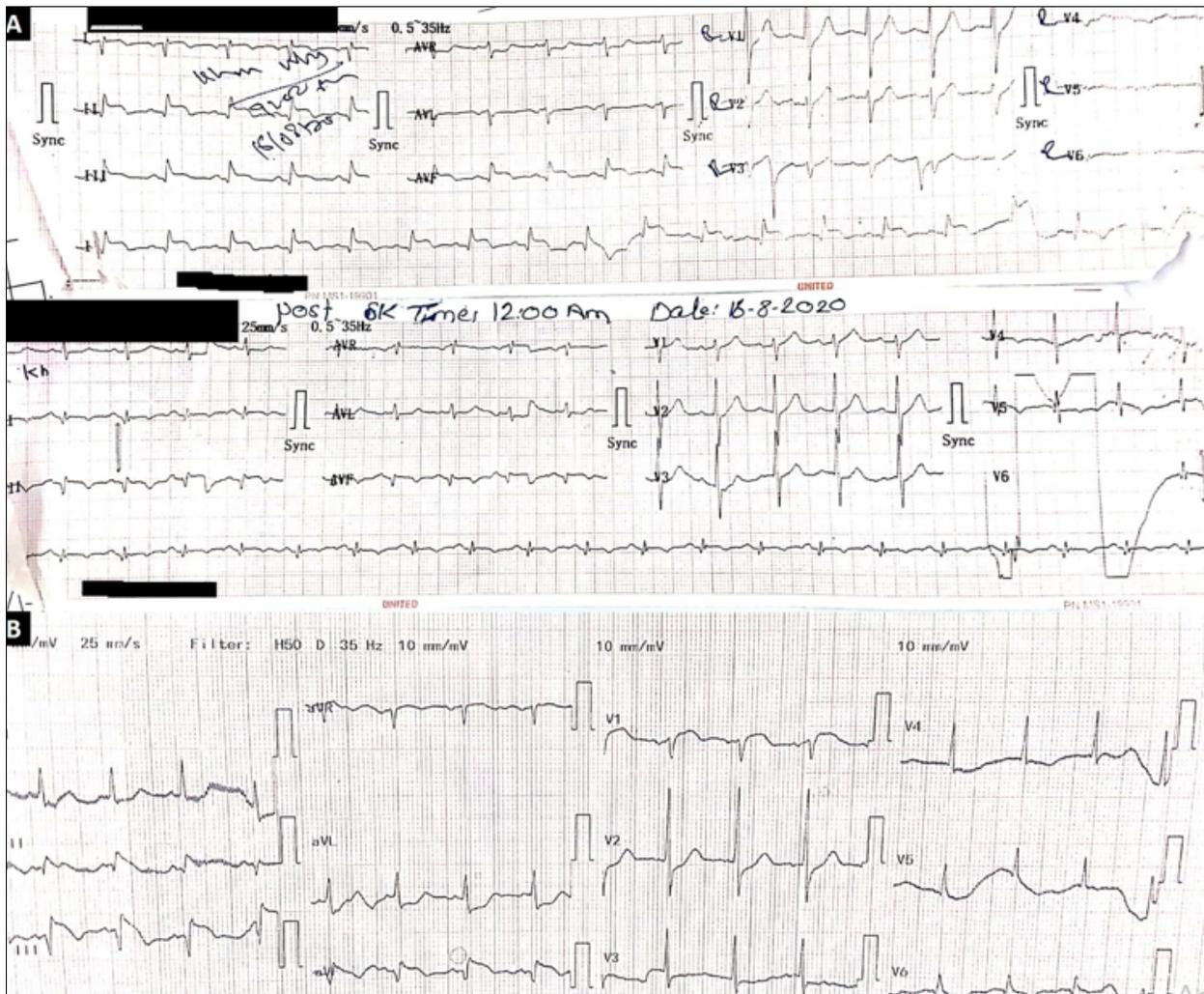


Figure-1: Electrocardiogram (ECG) showed evidence of ST segment elevation (A) and evidence of dynamic changes (B)

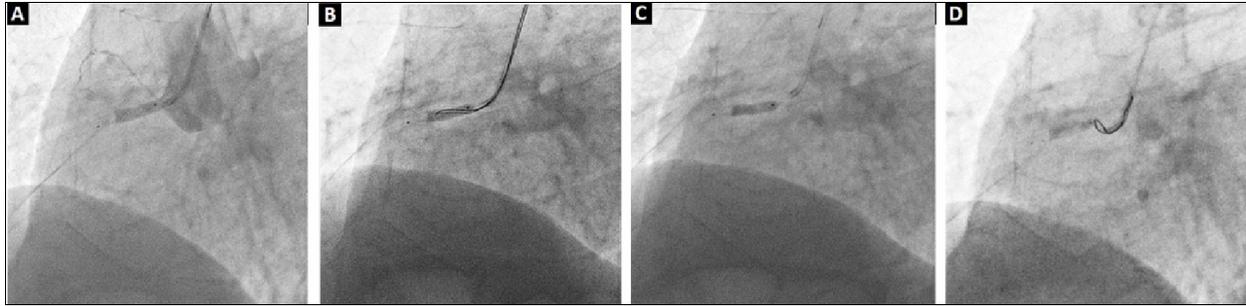


Figure-2: Right coronary angiography showing impacted balloon with stent (A), balloon position (B), impacted proximal RCA (C), and percutaneous attempt for retrieval of balloon (D)

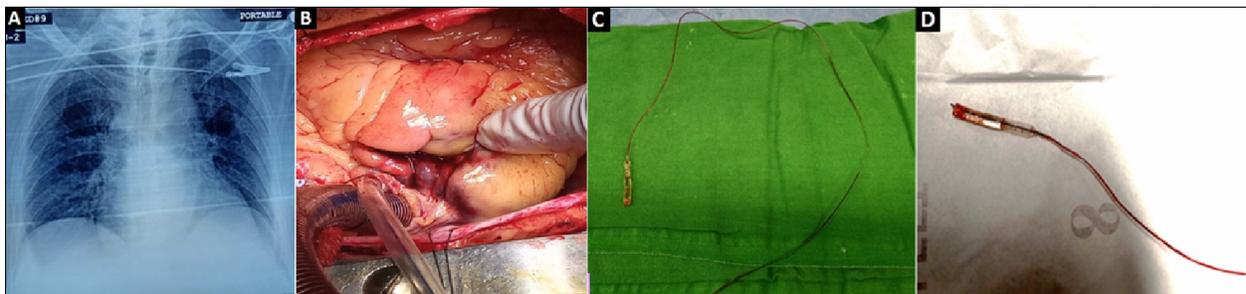


Figure-3: Pre-operative CXR of patient (A), Intra-operative view of acute infarct with hematoma overlying proximal right coronary artery territory (B), retrieved balloon catheter (C and D)

DISCUSSION

Retention of a coronary balloon in a target vessel may be under-reported and uncommon, but it continues to be an impediment of routine PCI. The entrapment of apparatus occurs mostly in twisting lesions with keen margins, chiefly in injuries involving the beginning section of the coronary arteries.³⁻⁶ All ostentation after the maximum adjusted pressures of the coronary balloon apparatus, inadequate shrinking and making fault may increase the chances of entanglement. There was no difference in the device entanglement associated with following enumeration: age, gender, other conditions associated or whether electively or the intervention was done in emergency.⁷

The successful resolution of this potentially dangerous complication was only possible due to collaboration between cardiology, interventional radiology, and cardiac surgery team. The patient was relatively stable throughout the procedure with no hemodynamic instability. He did have some symptoms that were effectively controlled with analgesia and sedation. This case highlights the importance of a multidisciplinary team approach and the importance of collaboration when facing any complication.⁸ Coronary artery bypass grafting persist the most invasive option for equipment retrieval. The management strategy must be individualized based on circumstances, operator knowledge and experience with retrieval techniques.

In the present case, collaborative approach to patient either percutaneous or surgically under same roof was required.

Primary PCI to coronary arteries is a lifesaving procedure but PCI to angulated; totally calcified chronic lesions could jeopardize the situation if done without surgical backup or hybrid suite. The golden period of reversibility of cardiac chamber is lost even after surgical revascularization if patient is referred to another hospital for surgery. Therefore, care must be taken and such procedures must be limited to those hospitals where both percutaneous and surgical facilities are present under one roof. A proper inter-hospital transfer arrangement is needed for maintenance of standard of care as well.

Conflict of Interest: We have no conflict of interests to declare. We have no funding sources to declare.

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