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# Surgical Retrieval of an Entrapped Radial Artery Sheath After Primary PCI. A Rare Case Report

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## Abstract

Percutaneous coronary interventions have become the mainstay of treatment for coronary artery disease with more than two million procedures performed annually. Incidence of PCIs through transradial route has increased nowadays as it is easier, safer and cost effective than transfemoral route. With this increasing trend, mechanical complications are also on the rise. Although Radial access complications are rare, they have been reported. Radial access site complications occur in about 0.5 to 1% of all cases. Here we report a rare case of 57 years old lady, who presented to our hospital with Acute Inferior wall Myocardial Infarction, underwent Primary Percutaneous coronary intervention to Right Coronary Artery and post procedure, the 6Fr Terumo Radial artery sheath became entrapped in the Radial artery. It was successfully retrieved by emergency surgery using C arm fluoroscopy as multiple attempts to retrieve it in Catheterisation lab have failed.

**Keywords:** PCI; Entrapped Radial Artery Sheath; Mechanical Complications of PCI; CAG; C Arm Fluoroscopy; Exploratory Surgery

## Abbreviations

CAG: Coronary Angiogram; PCI: Percutaneous Coronary Intervention; RCA: Right Coronary Artery; LV: Left Ventricle; EF: Ejection Fraction; OR: Operation Room

## Introduction

Coronary interventions through transradial route have become mainstay these days because of its anatomy, easy access, cost effectiveness and fewer complications [1-5]. Incidence of Primary PCIs through transradial route has increased these days [2]. It was first introduced by Campeau in 1989 for diagnostic coronary angiogram and later improved by Kimenji for coronary angioplasty and stenting [4]. However, Radial access site complications are likely due to reasons like spasm of radial artery, lack of usage of newer hydrophilic sheaths, over manipulation of wires leading to dissection of radial artery and lack of usage of vasodilator cocktail (mixture of Verapamil, Heparin, NTG) during intervention etc [6]. Although the complications like entrapped sheaths through this approach account to less than 1%2 they can cause problems like acute limb ischemia, sepsis, stroke etc [7]. Here in our case after primary PCI, while removing the 6Fr Terumo Radiofocus sheath, the distal end got broken and entrapped in the Radial artery. Which was retrieved by emergency surgery with the help of C arm Fluoroscopy in the OR.

## Case Presentation

A 57 years old Diabetic and hypertensive female, came with complaints of sudden onset chest pain with profuse sweating. Her Electrocardiogram showed acute inferior wall myocardial infarction. Transthoracic Echocardiography showed hypokinesia of inferior wall of LV, with EF of 45%. So Coronary angiogram was done followed by primary percutaneous Coronary Intervention. CAG was done through Right Radial artery route using 6Fr Terumo Radiofocus sheath which showed mid RCA diffuse disease followed by distal total occlusion. So Primary PCI was performed with Cruz 2.5 mm x 40 mm and Cruz 2.75x20 mm Drug Eluting stents successfully. Procedure was uneventful. After the procedure, while removing the sheath in ICU; distal end of it got broken and entrapped in the radial artery. Fluoroscopy showed the location of sheath proximally from the site of the radial artery puncture, as shown in Figure 1.

**Figure 1:** Fluoroscopy shot taken in the catch lab showing the broken sheath in the radial artery.

Despite best efforts the entrapped sheath could not be retrieved, hence planned for an emergency surgery.

The patient had saturation of 95% at right index finger in room air and she had no signs of limb ischemia. Following an informed consent, patient was taken to OR. Under Local anaesthesia and mild sedation, an incision made one inch proximal to the Radial artery puncture site as per fluoroscopy image taken in cath lab. After meticulous dissection, proximal and distal control of the Radial artery obtained with vessel loupes. An arteriotomy was done, but sheath couldn't be found. Thinking it could have migrated proximally; C arm fluoroscopy guidance was used, that demonstrated proximal migration of Radial artery sheath (Figures 2 & 3).

**Figure 2:** Fluoroscopy image in OR, showing migrated Radial artery sheath. Marker showing the lower end of the broken sheath.

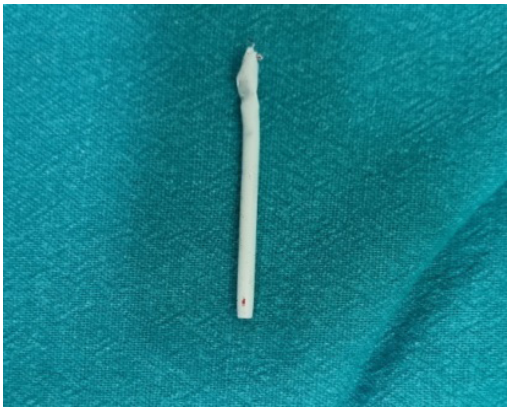

**Figure 3**: Retrieved broken 6Fr radial artery sheath.

So, skin incision extended, radial artery proximal and distal control obtained again, vertical arteriotomy done, the sheath was retrieved successfully and both arteriotomy sites were closed with 8/0 polypropylene continuous suturing, after giving heparin and saline wash. Distal pulse was palpable. Postoperative period was uneventful. On follow up patient is doing well (Figure 4).

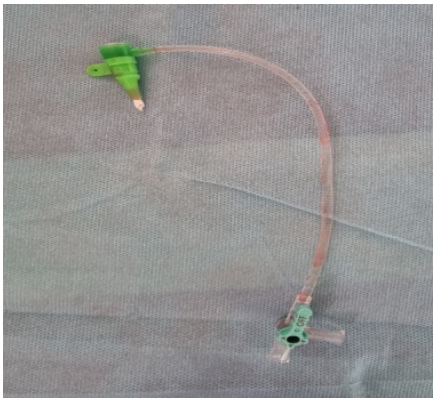

**Figure 4**: Proximal part of radial artery sheath.

## Discussion

Radial artery site access complications occur only in 0.5 to 1% of all cases. Retention of endovascular hardware like broken wire, broken sheath, catheters, and balloons is not unusual [7]. Presence of foreign objects in the circulation causes thrombosis, embolism and sepsis; hence it is necessary to remove them [8]. Radial artery sheath can get retained because of improper technique of removal after procedure, radial artery spasm, use of resterilized sheaths, lack of usage of hydrophilic coated sheath etc. In this case, resterilized sheath was used. Attempts to retrieve it in the catheterisation lab failed, fluoroscopy done in the cath lab showed the location of the broken sheath, but in the OR the sheath migrated proximally by few centimetres, so C arm fluoroscopy was used for the confirmation of the sheath and as we thought, it migrated proximally. Although the flow in the Radial artery is towards the fingers, the sheath migrated proximally because of limb movement and attachment of roughened distal part of the sheath to the endothelium of the Radial artery.

So, in such cases, although emergency, it is better to properly confirm the location before surgery [9] as mentioned by Victor et all in their paper published in 1979. In our case, the broken sheath could be retrieved by surgery successfully with the help of C arm fluoroscopy. Though few papers have been published about removal of broken sheath, intra operative use of Fluoroscopy was not mentioned in them [10].

## Conclusion

Although a rare complication, broken Radial artery sheath must be effectively and immediately retrieved. If not retrieved by endovascular approach, emergency surgery is limb saving. It is ideal not to use resterilized sheaths as they may cause such complications. It is always advisable to use C arm fluoroscopy or ultrasound guidance for better outcomes. As far as possible, it is advisable to use hydrophilic-coated sheaths and newer sheaths during primary PCIs. It is advisable not to open the radial artery at the puncture site as it may compromise the distal flow and vessel may not be repairable.

## Conflict of Interest

Authors have no conflict of interest.

## Patient Consent Form

Patient consent form has been obtained after proper explanation.

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