

Retrieval of Devices –Percutaneous Techniques

Dr. Prabhu Halkati, Dr. Suresh Patted, Dr. Ranjan Modi, Mr. Rajesh Tasgaonkar

Department of Cardiology, JN Medical College, Dr. KLES and MRC, Belgaum

Abstract- Intravascular foreign bodies which are retained are a complication of percutaneous procedures. Recently percutaneous retrieval of intravascular foreign bodies has become a frequently used technique. Various intravascular foreign bodies include fragments of central venous catheters (most common), knotted pulmonary artery (Swan Ganz) catheters, lost guidewires or guidewire fragments, misplaced embolisation coils and metallic stents.

We present 3 cases of retrieval of devices from percutaneous intervention.- Retrieval of Innove wire, Retrieval of central venous catheter wire, Retrieval of central venous catheter.

I. INTRODUCTION

Retained intravascular foreign body is a rare, but well-documented complication of percutaneous procedures¹. In the past, surgical removal of intravascular foreign bodies has been well described, but recently percutaneous retrieval of intravascular foreign bodies has become a frequently used technique. Commonly encountered intravascular foreign bodies include fragments of central venous catheters (most common), knotted pulmonary artery (Swan Ganz) catheters, lost guidewires or guidewire fragments, misplaced embolisation coils and metallic stents.

The rate of serious complications caused by foreign body embolism is as high as 71%, with the mortality rate ranging from

24% to 60%^{2,3}. In the case of intravenous foreign objects, such as a fragment of a central venous catheter, it is important that the procedure be done as soon as possible to prevent migration to pulmonary circulation several techniques, often complex, have been described for the retrieval of intravascular foreign bodies. Currently, the most commonly used retrieval technique involves using a snare, most often an Amplatz Gooseneck Nitinol Snare .

We present 3 cases of retrieval of devices from percutaneous intervention.

CASE 1 – Retrieval of Innove wire

In a 32 year old male present undergoing balloon mitral valvotomy (BMV) the innove wire broke in the left atrium(Figure 1) . Presence of the wire in the Left atrium was a big concern . Another transeptal atrial puncture was done to gain access to the left atrium(Figure 2) and the wire. A second innove wire was passed through the transeptal puncture site and was used to try and hook the previous broken wire (Figure3). Several attempts were tried but all were in vain . Later a multipurpose snare 15 was passed through the transeptal puncture(Figure 4) and the wire was removed (Figure 5) . The patient underwent BMV successfully post retrieval of the wire .

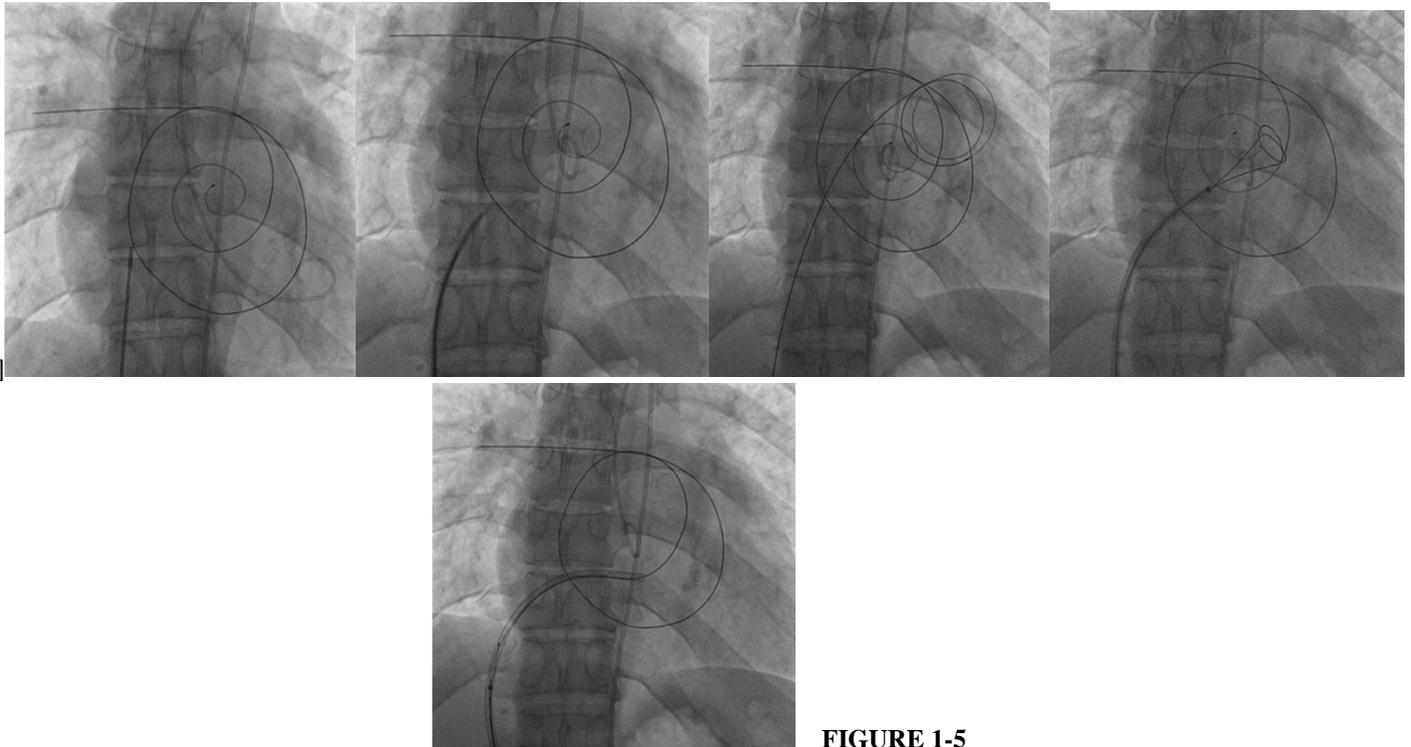


FIGURE 1-5

Initially another guiding wire was used through transfemoral route to hook and remove the stuck wire . But several attempts were unsuccessful (Figure 7,8) . A multipurpose snare 15 was then used to retrieve the wire through the same route but it was not able to hold on to the soft end of the guiding wire (Figure 9) . Finally it was decided to hook the hard end of the wire which was in the right atrium (Figure 10) . This approach was successful .

CASE REPORT 2 – Retrieval of central venous catheter wire

A 50 year old patient was admitted in intensive care unit , during the insertion of the central venous line the guide wire was mistakenly not removed , it slipped in to the right atrium passing through to the inferior vena cava. On flouroscopy the wire was seen extending from the right artium to the femoral vein (Figure 6) .



FIGURE 6 -10

CASE REPORT 3 – Retrieval of central venous catheter

A 47 year old female diagnosed with carcinoma breast on chemotherapy was referred to the hospital with history of breakage of central venous catheter (Figure 11) during removal of the venous line post chemotherapy. Chest x ray showed the presence of a piece of the venous catheter in the right atrium and the right ventricle. Various attempts were made to retrieve the

catheter using Multipurpose snare 15 but all were in vain (Figure 12,13). A LIMA catheter was then used to pull the broken piece of venous catheter into the inferior vena cava (Figure 14,15). Later the multipurpose snare was used again to hook the end of the catheter and was removed (Figure 16).



FIGURE 11-16

II. DISCUSSION

The first transluminal recovery of an intravascular foreign body, as well as the first such recovery done percutaneously can be credited to Porstmann in connection with his catheter technique for ductal closure⁴

Over the last few decades, there has been an increase in the number of percutaneous cardiovascular interventions. Unfortunately, with this rise has come an increase in the incidence of lost or embolized foreign bodies in the central and peripheral circulation. The true incidence of retained foreign bodies is unknown, however it is estimated at 0.1% to 1.5%^{5,6}. Examples of retained objects include J-wire, stents, Swan-Ganz catheters and pacemaker leads. Most common sites of retrieval are great veins, right heart and coronary circulation. Though patients may remain asymptomatic for many years, various serious complications including arrhythmias, myocardial perforation, infection and thrombosis have been reported. If symptomatic, removal of the object becomes necessary. The advances in the techniques of percutaneous intervention have made the retrieval of retained foreign bodies feasible, safe and effective, as well as limited the need for the need for surgery⁷.

Devices used in percutaneous extraction of retained foreign bodies include loop-snare, retrieval baskets and grasping forceps. Trans-femoral approach is commonly used with the trans-jugular approach as a second line option if the former approach fails⁸.

Results continue to prove that percutaneous removal of foreign bodies is highly efficient (success rates more than 90% in most studies) with few complications. The added attraction of the procedure is that many seriously ill patients with iatrogenic foreign bodies do not have to be exposed to the increased surgical/anaesthetic risk. Owing to the associated complication risk, surgery should only be considered when removal attempts with endovascular interventional techniques have failed.

Mortality is highest with the embolised fragment located in the right-hand side of the heart, slightly lower in the vena cava, and lowest in the PA.

There are numerous techniques described in the literature.⁹⁻
¹⁰ The majority of these techniques involve a Gooseneck snare,¹¹ Dormia basket,¹² the two-wire technique, a 6-F biopsy forceps, or even surgical intervention. Today, the most commonly used retrieval technique involves using a snare,¹³⁻¹⁴ with the first

documented use of the ev3, Inc. Gooseneck Nitinol Snare in 1991.¹¹

III. CONCLUSION

The various technique are applicable to all types of patients, especially critically ill patients who may not tolerate prolonged procedures. These technique is simple, rapid, and have broad applicability.

REFERENCES

- [1] A Novel Approach to the Removal of a Retained Guidewire Michael Tucciaronea,b, Hussein Othmana, Melissa Fredericka, Andrew Boguszewska, Kumara Ramaa J Med Cases • 2011;2(4):159-161
- [2] Fisher RG, Ferreyro R. Evaluation of current techniques for nonsurgical removal of intravascular iatrogenic foreign bodies. Am J Roentgenol 1978; 130: 541-548.
- [3] Richardson JD, Grover FL, Trinkle JK. Intravenous catheter emboli. Experience with twenty cases and collective review. Am J Surg 1974; 128: 722-727.
- [4] Porstmann W, Wierny L, Warulce H. Closure of persistent ductus arteriosus without thoracotomy. German Med Monthly 1967;12:1.
- [5] Bonvini RF, Rastan A, Sixt S, Noory E, Beschorner U, Leppan O, Mach F, et al. Percutaneous retrieval of intravascular and intracardiac foreign bodies with a dedicated three-dimensional snare: a 3-year single center experience. Catheter Cardiovasc Interv. 2009;74(6):939- 945.
- [6] Burri C, Henkemeyer H, Passler HH. [Catheter embolism]. Schweiz Med Wochenschr. 1971;101(44):1575- 1577 contd.
- [7] Bessoud B, de Baere T, Kuoch V, Desruennes E, Cosset MF, Lassau N, Roche A. Experience at a single institution with endovascular treatment of mechanical complications caused by implanted central venous access devices in pediatric and adult patients. AJR Am J Roentgenol. 2003;180(2):527-532.
- [8] Mazzetti H, Cichero CF, Tentori MC, Mascheroni O. Transjugular approach for lead extraction. Europace. 2008;10(2):156-160.
- [9] Bogart D, Jung S. Dislodged stent: a simple retrieval technique. Cathet Cardiovasc Interv. 1999;47:323-324.
- [10] Feldman T. Retrieval techniques for dislodged stents. Cathet Cardiovasc Interv. 1999;47:325-326.
- [11] Yedlicka JJ, Carlson J, Hunter D, et al. Nitinol gooseneck snare for removal of foreign bodies: experimental study and clinical evaluation. Radiology. 1991;178:691-693.
- [12] Dondelinger R, Lepoutre B, Kurdziel J. Percutaneous vascular foreign body retrieval: experience of an 11-year period. Eur J Radiol. 1991;12:4-10.
- [13] Fisher R, Ferreyro R. Evaluation of current techniques for nonsurgical removal of intravascular iatrogenic foreign bodies. Am J Roentgenol. 1978;130:541-548.
- [14] Watson L. Snare loop technique for removal of broken steerable PTCA wire. Cathet Cardiovasc Diagn. 1987;13:44-49.
- [15] Kessel D, Robertson I. Interventional Radiology: A Survival Guide. 2nd ed. London: Churchill Livingstone; 2000.

AUTHORS

First Author – Dr. PRABHU HALKATI, Department of Cardiology, JN Medical College, Dr. KLES and MRC, Belgaum
drprabhuhalkati@rediff.com

Second Author – Dr. SURESH PATTED, Department of Cardiology, JN Medical College, Dr. KLES and MRC, Belgaum
drpatted@yahoo.com

Third Author – Dr. RANJAN MODI, Department of Cardiology, JN Medical College, Dr. KLES and MRC, Belgaum
ranjan_modi@hotmail.com

Fourth Author – Mr. RAJESH TASGAONKAR
Department of Cardiology, JN Medical College, Dr. KLES and MRC, Belgaum, Rajeshtasgaonkar26@gmail.com