

Percutaneous retrieval of a fractured multipurpose catheter by an indigenous snare in a 25-year-old patient: a safe and feasible approach

Przezskórne usunięcie złamanego cewnika wielozadaniowego za pomocą pętli własnej konstrukcji u 25-letniego chorego – bezpieczna i dostępna metoda

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Abstract

Since the first report of percutaneous retrieval of intravascular foreign body in 1964, it has become a favourite approach for intravascular foreign body removal. Snares, biopsy forceps, dormia basket or tip deflecting wires are available options for this approach. Herein, we report percutaneous retrieval a fractured multipurpose catheter by an indigenous snare in a 25-year-old patient. The patient was a 25-year-old male being admitted with ostium secundum atrial septal defect and catheterization study was planned for shunt quantification. During manipulation to right ventricular outflow tract, multipurpose catheter got broken approx. 4 cm. proximal to tip. The broken part was captured through right femoral vein by a self-constructed snare. While removal, it broke at tip of venous sheath. Smaller one was retrieved and bigger was recaptured and finally retrieved by exaggerating the curve of same snare without any complications. Use of snares for intravascular foreign body removal is frequently reported and has been successful with low complication rates.

Key words: fractured multipurpose catheter, intravascular foreign body, percutaneous retrieval, self-constructed snare

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Introduction

Secundum atrial septal defect (ASD) is one of the most common congenital heart defects making up to 6–10% of all congenital anomaly. If size is equivocal, one needs shunt quantification before device closure. Complications of catheterization study are rare and are like any angiographic procedure. Diagnostic catheter fracture is extremely rare. Non-invasive retrieval of intravascular foreign bodies has become a preferred approach for intravascular objects removal since the first report by Thomas et al. in 1964 [1]. Further efforts with various techniques have led to higher success rates and fewer complications. Herein, we

report retrieval of fractured multipurpose catheter by an indigenous snare in a 25-year-old male.

Case report

A 25-year-old male was admitted with exertional palpitation. His electrocardiogram was normal with complete right bundle branch block (RBBB). His vitals were stable with normal biochemistry. Echocardiogram was showing secundum ASD with borderline right atrial (RA) and right ventricle (RV) dilatation. Catheterization study was planned for shunt quantification. After obtaining proper consent, the skin was infiltrated with 2% xylocaine as local anesthesia. The femoral

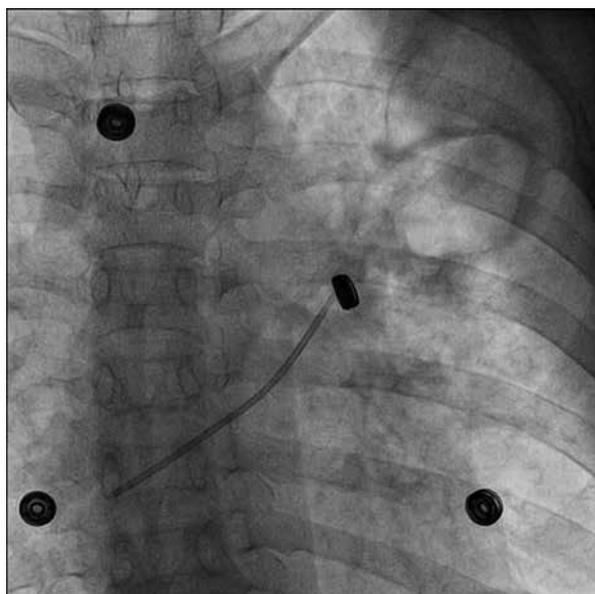


Figure 1. Fractured catheter-distal part in right ventricular outflow tract whereas proximal in right atrium

vein was punctured. A 6 F 11 cm INPUT™ TS introducer sheath (Medtronic, USA) was inserted into the femoral vein. 5 F MPA-1 (multipurpose catheter) was put into superior vena cava and sampled for oximetry. After pulling little to right atrium and while manipulating to go to pulmonary artery, catheter got broken approx. 4 cm. proximal to its tip. Fluoroscopy was performed to check for dislodgement. Distal fragment was found in right ventricular outflow tract (RVOT) whereas proximal was in RA (Figure 1). The patient was asymptomatic. Retrieval was planned, but we had no snare available at that time. A 0.014" 180 cm percutaneous transluminal coronary angioplasty wire (BMW wire; Abbott, USA) was taken and its loop was passed through standard 6 F JR4 Proflo® guiding catheters (Medtronic, USA), the lengths of which were shortened by cutting 30 cm from the tip to accommodate the loop, as the length of both the JR4 and the loop was 90 cm, and thus a snare was constructed by catching both free ends with arterial forceps (Figure 2). Guiding catheter was passed into the venous sheath over 0.035" Terumo straight-tip wire and parked into right atrium. After withdrawing Terumo wire, indigenous snare was passed through guiding catheter under fluoroscopic guidance and the fractured segment was trapped (Figure 3). While retrieval, trapped fragment got caught at the tip of venous sheath. As snare was inadvertently pulled, it broke the trapped segment into two parts but both of them were snugly fitted into venous sheath (Figure 4). Snare and sheath were removed as a unit. Smaller part of the broken fragment came out but larger part was still lying in the common femoral vein (Figure 5). A 7 F 11 cm INPUT™ TS introducer sheath (Medtronic, USA) was re-inserted into the femoral vein. A small curve was provided 2 cm proximal

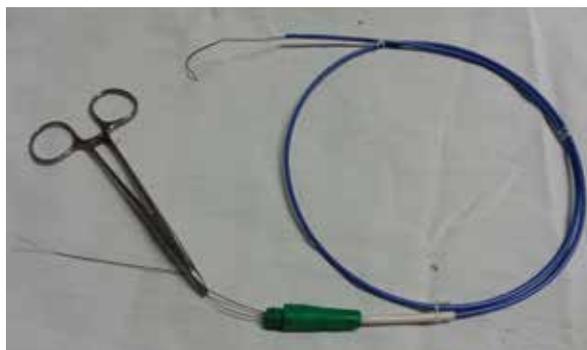


Figure 2. Indigenous snare – both free ends being caught by arterial forceps

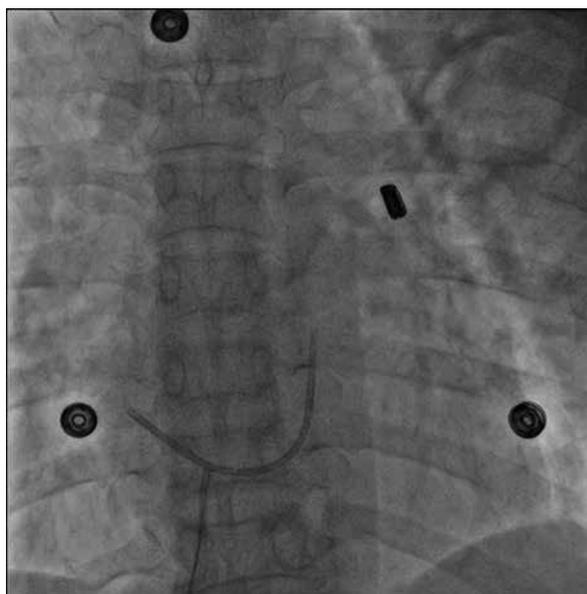


Figure 3. The fractured segment was trapped by snare



Figure 4. Broken fragment of trapped catheter at the tip of venous sheath



Figure 5. Larger part of fractured catheter still lying in the common femoral vein

to distal tip. This snare was re-introduced into the common iliac vein (Figure 6A). Venous sheath and guiding catheter were pulled helping to open the snare (Fig 6B). Larger part

was captured (Figure 6C) and retrieved along with venous sheath and guiding catheter as a one unit. (Figure 6D). The procedure was completed successfully (Figure 7). The patient was discharged in stable condition after two days and has been called again for further work-up.

Discussion

Percutaneous retrieval of intravascular foreign bodies was first introduced in 1964 by Thomas et al [1], presenting non-surgical retrieval of a broken segment of steel spring guide from right atrium and inferior vena cava. Today it is a more frequently applied technique as varieties of intravascular foreign bodies (including coils, stents, vena cava filters, etc.) has increased because of numbers of interventional procedures has skyrocketed [2]. So, multiple options in the form of snares, biopsy forceps, dormia basket or tip deflecting wires are being utilized as retrieval tools depending on the need [3–5]. Retrieval of foreign objects by snare is more convenient but many times commercial nitinol gooseneck micro snare are not available. Infection, thrombogenicity, distal ischemia, perforation of chambers and thrombo-embolism are the usual complications depending on the type of foreign object. Catheter fragments in right atrium can damage or embolize to pulmonary circuit, so requires their immediate removal as their edges are

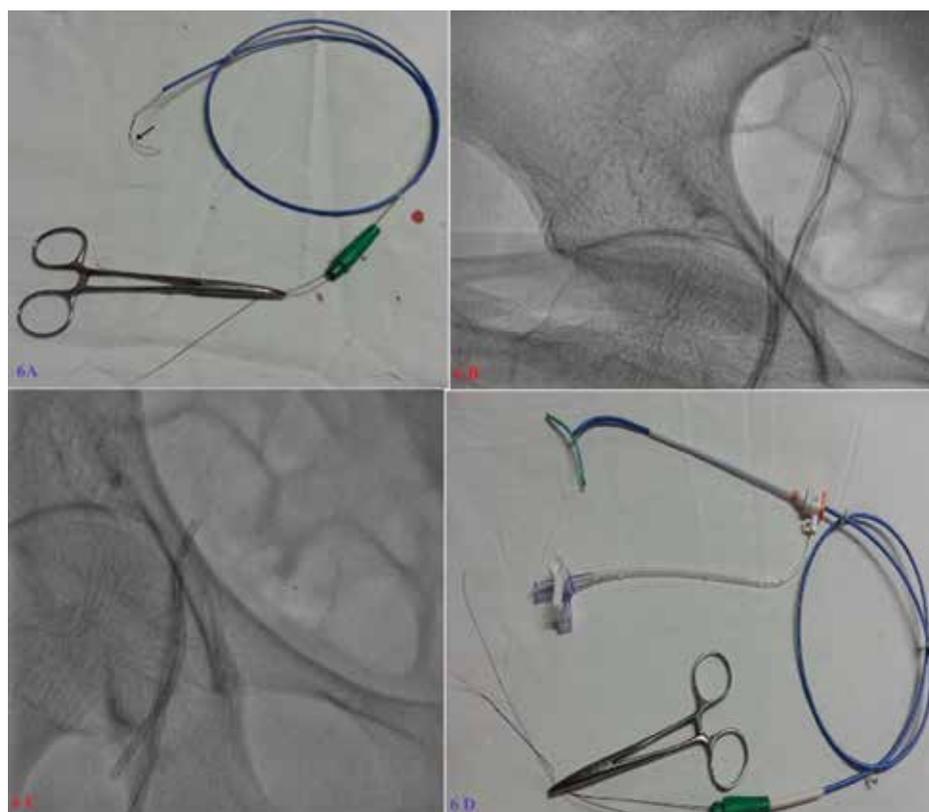


Figure 6A. Snare was reshaped by a proximal curve; **B.** This snare was re-introduced into the common iliac vein; **C.** Larger part was captured; **D.** Venous sheath, guiding catheter and snare along with retrieved part as a one unit

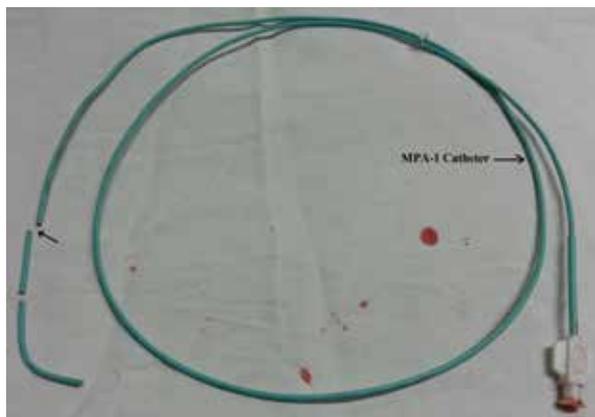


Figure 7. Snare with embolized fragment after successful retrieval

sharp [6]. Patients with cardiopulmonary localization of foreign objects are at risk of severe complications varying from cardiac arrhythmia to perforation of cardiac chambers [7]. The success rate of retrieval of dislodged guide wires

about 90% [8]. Catheter fracture is extremely rare but can happen at times if extremely manipulated and because of manufacturing defect. Since their sizes are big compared with wire or coils, retrieval is little easier. Self-constructed snare as in our case offers a great chance of rotational capabilities and a wider diameter to grasp the foreign object. Its profile also makes it extremely handy to guide into desired position. In addition, its cost-effectiveness makes it less of a burden to the patient as well. When snare was straight, it was not able to catch-hold the embolized wire but once it was little angled by providing a proximal curve, job was easily done. Greatest advantages of self-constructed snares are that they can be shaped depending on the need. Percutaneous removal should be the first choice in the management of intravascular foreign bodies and should be performed as soon as the diagnosis is made.

Conflict of interest(s)

None.

Streszczenie

Od opublikowania pierwszego doniesienia dotyczącego przezskórnego wydobycia ciała obcego zlokalizowanego wewnątrznaczyniowo w 1964 roku technika ta stała się preferowaną metodą usuwania obcych ciał ze światła naczynia. Do narzędzi, które mogą zostać użyte do tego zabiegu należą pętle, kleszczyki biopsyjne, koszyki Dormia lub przewodniki z elastyczną końcówką. W niniejszej pracy opisano usunięcie złamanego cewnika wielozadaniowego za pomocą wykonanej na miejscu pętli. Zabieg ten przeprowadzono u 25-letniego mężczyzny hospitalizowanego z powodu ubytku w przegrodzie międzyprzedsionkowej, u którego planowano diagnostyczne cewnikowanie serca w celu ilościowej oceny przecieku. W trakcie manipulowania cewnikiem wielozadaniowym w prawej drodze odpływu z prawej komory doszło do jego złamania około 4 cm od końcówki. Złamaną część uchwycono za pomocą pętli własnej konstrukcji wprowadzonej przez żyłę udową. Podczas usuwania cewnik złamał się na wysokości końcówki koszulki naczyniowej. Mniejszą część wyciągnięto, a większą uchwycono ponownie, po zwiększeniu wygięcia pętli, co udało się wykonać bez żadnych powikłań. Stosowanie pętli do usuwania wewnątrznaczyniowych ciał obcych jest często opisywaną metodą, cechującą się skutecznością i niskim odsetkiem powikłań.

Słowa kluczowe: złamany cewnik wielozadaniowy, wewnątrznaczyniowe ciało obce, przezskórne usunięcie, pętla własnej konstrukcji

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References

1. Thomas J., Sinclair-Smith B., Bloomfield D., Davachi A. Non-surgical retrieval of a broken segment of steel spring guide from the right atrium and inferior vena cava. *Circulation* 1964; 30: 106–108.
2. Sheth R., Someshwar V., Warawdekar G. Percutaneous retrieval of misplaced intravascular foreign objects with the Dormia basket: an effective solution. *Cardiovasc. Intervent. Radiol.* 2007; 30: 48–53.
3. Dotter C.T., Rösch J., Bilbao M.K. Transluminal extraction of catheter and guide fragments from the heart and great vessels; 29 collected cases. *Am. J. Roentgenol. Radium Ther. Nucl. Med.* 1971; 111: 467–472.
4. Curry J.L. Recovery of detached intravascular catheter or guide wire fragments. A proposed method. *Is. J. Roentgenol. Radium Ther. Nucl. Med.* 1969; 105: 894–896.
5. Kim J.Y., Yoon J., Jung H.S. et al. Broken guidewire fragment in the radio-brachial artery during transradial sheath placement: percutaneous retrieval via femoral approach. *Yonsei Med. J.* 2005; 46: 166–168.
6. Gabelmann A., Kramer S., Gorich J. Percutaneous retrieval of lost or misplaced intravascular objects. *AJR Am. J. Roentgenol.* 2001; 176: 1509–1513.
7. Doering R.B., Stemmer E.A., Connolly J.E. Complications of indwelling venous catheters, with particular reference to catheter embolus. *Am. J. Surg.* 1967; 114: 259–266.
8. Dondelinger R.F., Lepoutre B., Kurdziel J.C. Percutaneous vascular foreign body retrieval: experience of an 11-year period. *Eur. J. Radiol.* 1991; 12: 4–10.