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Percutaneous Retrieval of Dislodged Port-A Catheters by Loop Retriever

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Abstract

Objective: Port-A catheter fracture with embolization is a serious complication. The percutaneous retrieval of intravascular foreign bodies avoids the need for surgery in this high risk population. We report on 14 patients who underwent percutaneous retrieval of dislodged Port-A catheters by loop retriever.

Materials and Methods: Fourteen patients who had undergone percutaneous foreign body retrieval between 2002 and 2007 were evaluated retrospectively. In all procedures, retrieval of foreign bodies was performed using a 6.3-F angled wire loop retriever.

Results: The percutaneous retrieval procedure was successful in all 14 patients. Repositioning of the foreign body was done in seven cases using an RC1 catheter for the intracardiac Port-A catheter fragments. Additional surgery was not required. No further complications, such as damage to the vascular wall, were noted.

Conclusion: With the increasing use of indwelling catheters and interventional devices, we are frequently confronted with the problem of dislodged catheters. The percutaneous approach should be considered as the first choice when trying to resolve the problem of an embolized catheter in the cardiovascular system. (*Tzu Chi Med J* 2008;20(1):40–43)

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1. Introduction

Port-A catheters are inserted in the central venous system for the purpose of periodic injection of chemotherapeutic agents for the treatment of many kinds of malignant tumors. Catheter fracture with embolization is a serious complication. Since its first description, the percutaneous retrieval of intravascular foreign bodies has become a frequently applied technique. It avoids the need for surgery in this high risk population. Based on our experience with 14 patients, we report on the strategies, methods and techniques of percutaneous retrieval of dislodged port-A catheters by loop retriever.

2. Materials and methods

Fourteen patients who had undergone percutaneous foreign body retrieval between 2002 and 2007 were evaluated retrospectively. There were seven males and seven females, with ages ranging from 11 to 71 years. The catheters had been inserted in the central venous system for the purpose of periodic injection of chemotherapeutic agents to treat their underlying malignancies. All patients were clinically asymptomatic. In all cases, diagnostic chest radiographs were obtained to confirm the exact location of the Port-A catheter fragments and to assist in planning the percutaneous retrievals (Fig. 1). The procedures began after the patients had given legal consent. All procedures were performed using an Advantx LCA angiography system (GE Medical Systems, Milwaukee, WI, USA).

Dislodged catheters were primarily approached via the right femoral access. Standard 10-F vascular sheaths were used for an atraumatic vascular passage and to minimize potential injury to the internal vascular wall. Removal of foreign bodies, especially when centrally embolized in the heart, should be performed with electrocardiographic monitoring because cardiac arrhythmia might be provoked during the procedure. No medication, including heparin and antibiotics, was given before or after the interventional procedures. No contrast medium was used during these procedures. In all procedures, retrieval of foreign bodies was performed using a 6.3-F angled wire loop retriever (Cook, Bloomington, IN, USA).

A free end of the foreign body was initially targeted for snaring. If a free end could not be snared, a 4.1-F RC1 catheter (Terumo, Tokyo, Japan) was used to dislodge or reposition the foreign body before attempting to re-snare it. When a free end was obtained, the catheter fragment was captured and pulled out with the loop retriever (Fig. 2). The catheter was advanced to close the loop, and the loop retriever and catheter with grasped foreign body pulled out as a unit (Figs. 3 and 4). The length of each dislodged catheter was not recorded. Plain chest films were obtained for each case after the retrieval procedure to make sure there were no residual fragments.

3. Results

Of 14 centrally embolized Port-A catheter fragments, 12 were intracardiac, located within right heart chambers (right atrium and/or right ventricle), and five were

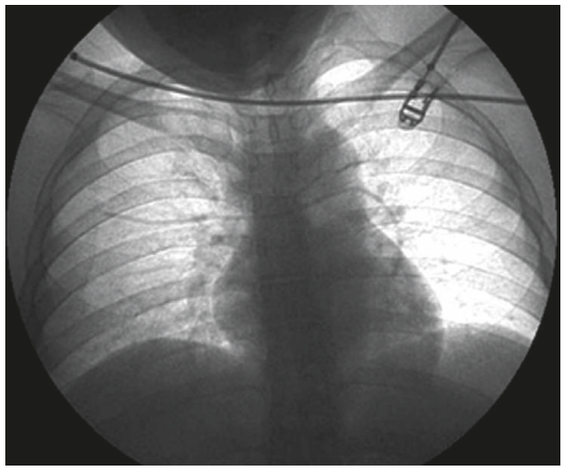

Fig. 1 — A long entrapped catheter fragment in the main pulmonary artery.

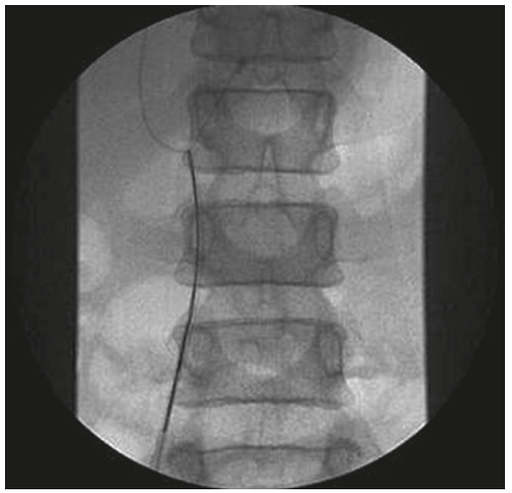

Fig. 2 — Retrieval of a group of catheters inside the inferior caval vein.

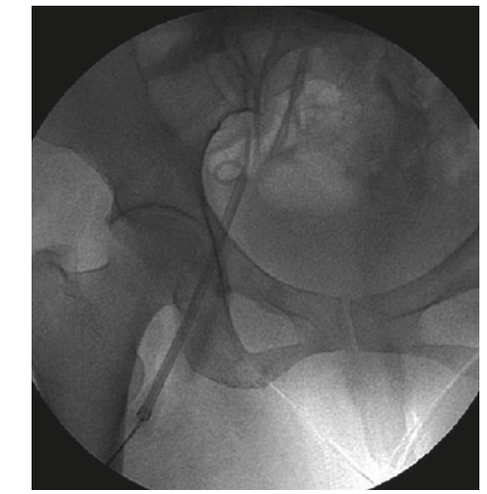

Fig. 3 — The fragment was pulled into the 10-Fr angiosheath in the right iliac vein, and was successfully removed smoothly.

distally located in the pulmonary artery. Most cases were asymptomatic and presented as incidental findings. The time interval between the dislodgment and percutaneous retrieval of the foreign bodies could not be definitely recorded. The percutaneous retrieval procedure was successful in all 14 patients (Table 1). The mean fluorotime for this procedure was 8.3 minutes. Repositioning of the foreign body was done in seven cases using an RC1 catheter for the intracardiac Port-A catheter fragments. All the percutaneous foreign body retrievals were performed without complications, except for transient atrial and ventricular arrhythmia during the retrieval procedure. Additional surgery was not required. No further complications, such as damage to the vascular wall, were noted. Late complications occurring during the follow-up period were not recorded. None of the fragments were torn during the retrieval procedures and no residual fragments were detected by fluoroscopy or plain chest films.

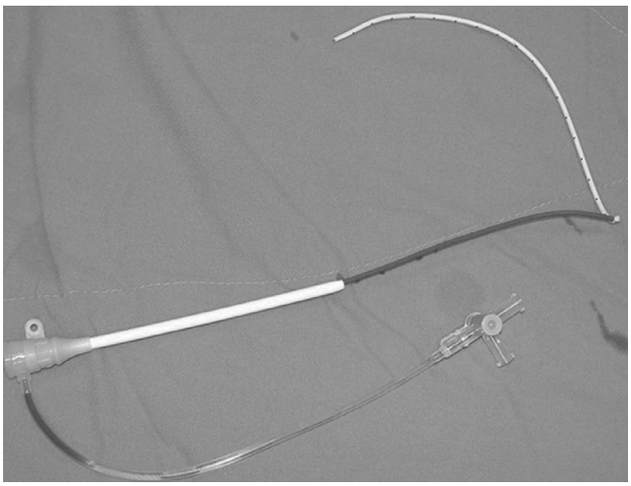

Fig. 4 — Relationship between the loop retriever and a terminal part of the port-A catheter.

4. Discussion

Port-A catheters are inserted in the central venous system for the purpose of periodic injection of chemotherapeutic agents for the treatment of many kinds of malignant tumors. The estimated rate of catheter fracture is 0.2% [1]. Although uncommon, snapping or malpositioning of these catheters does occur and may be associated with serious consequences. The rate of serious complications associated with foreign body embolism has been reported to be as high as 71%, with a mortality rate in the range of 24–60% [2–4]. The locations of embolized catheter fragments have been mainly in the central veins (subclavian vein, superior vena cava and inferior vena cava), right heart chambers (right atrium and ventricle) and pulmonary artery [5]. The probable causes of dislodgment of port-A catheters include bad connection between the port and catheter, angulation or distortion at the anastomosis site, severing of the catheter during insertion or removal of the catheter, improper catheter position, and fatigue of the catheter [6]. Embolized fragments are associated with a number of complications, including pulmonary embolism, sepsis, arrhythmia and cardiac perforation.

Since its first description more than three decades ago, the percutaneous retrieval of intravascular foreign bodies has become a frequently applied technique [7]. It has been used as a safe and effective procedure in numerous patients. Reported intravascular foreign bodies include broken catheter fragments, spring coils, dislodged guidewires, bullets, fragments from percutaneous transluminal coronary angioplasty sets, metallic stents and pacemaker

Table 1 — Summary of patient details

Case	Age (yr)	Gender	Location	Device	Fluorotime (min)
1	49	Female	SVC, RA	Loop retriever	2.8
2	48	Female	RA, RV	Loop retriever	15
3	11	Male	RA, IVC	Loop retriever	11.1
4	44	Male	LSV, SVC	Loop retriever	1.2
5	25	Male	IVC, RA	Loop retriever	8.1
6	43	Female	IJV, RA	RC1+loop retriever	7
7	49	Female	RA	Loop retriever	5.1
8	71	Male	LPA, RA	RC1+loop retriever	15.3
9	41	Female	RPA, RA	RC1+loop retriever	0.3
10	34	Male	RPA, RA	RC1+loop retriever	4.5
11	46	Female	RA	Loop retriever	1.8
12	39	Male	RV, LPA	RC1+loop retriever	33.7
13	42	Female	LPA	RC1+loop retriever	9.2
14	59	Male	LSV, SVC	RC1+loop retriever	1.2

SVC = superior vena cava; RA = right atrium; RV = right ventricle; IVC = inferior vena cava; LSV = left subclavian vein; IJV = internal jugular vein; LPA = left pulmonary artery; RPA = right pulmonary artery.

electrodes (8). Many devices have been used as tools to retrieve various types of intravascular objects, including snares, grasping forceps, baskets, tip-deflecting wires, pincher devices, over sheaths and balloon catheters (9–11). The loop retriever has a right angle design. This design provides easy capturing of foreign bodies. As reported in the literature, the success rate for percutaneous retrieval of intravascular foreign bodies varies from 71% to 100% (12). The causes of failure include absence of a free end, small fragments lodged deeply in the peripheral arterial branches, and foreign bodies anchored and entrapped deep in the vascular wall, lodged in a thrombosed vessel or escaped outside the vessels (11).

When there was no free end accessible or in order to avoid intracardiac manipulation by this more rigid device, we used the RC1 catheter to relocate a dislodged fragment to a more favorable position for subsequent retrieval by the loop snare catheter. In our 14 cases of dislodged Port-A catheters, none was significantly adhered to the vessel wall and all were removed using the loop retriever. Repositioning of the intracardiac port-A catheter fragments required more fluorotime. The mean fluorotime in our study was 8.3 minutes, which was less than for a hepatic angiogram (mean fluorotime, 12.1 minutes; mean entrance skin dose, 340 mGy) (13).

The embolization of part of a catheter is an urgent case because there are risks of arrhythmia or thrombosis. With the increasing use of indwelling catheters and interventional devices, we are frequently confronted with the problem of dislodged catheters. The percutaneous approach should be considered as the first choice when trying to resolve the problem of an embolized catheter in the cardiovascular system.

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