Management of Entrapped Malecot Catheters

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Abstract
Malecot catheters have been widely accepted for use during nephrostomy, abscess drainage, and with gastrostomy tubes. Malecot catheters may occasionally be resistant to extraction because of tissue entrapment. Although entrapped catheters are typically removed using traction, this method may be unsuccessful in a few cases, which therefore become difficult to manage. We present 3 cases of entrapped Malecot catheters and discuss the interventional techniques used to treat these patients.

Key words: Malecot catheter, entrapped catheter, catheter management

Introduction
Conventionally, Malecot catheters have been used to provide larger bore drainage than pigtail or balloon catheters. A Malecot catheter is widely used as a drainage catheter during a nephrostomy, for abscess drainage, or during gastrostomy tube placement; however, its use can be associated with complications. Malecot catheters are occasionally resistant to extraction because of trapped stones and/or sludge that result from enlargement of the diameter of the catheter and the development of a fibrous tissue bridge or ingrowth of fibrous tissue \cite{1, 2}. At our hospital, most catheters are removed using conventional methods of traction; however, some instances of difficult extraction are known to occur. Moreover, no specific methods of removal have been established for the management of such cases. Over the last 4 years, among a series of 200 patients who underwent percutaneous drainage using a Malecot catheter, 3 in whom Malecot catheter entrapment was observed were treated at our hospital. We report 3 cases of entrapped Malecot catheters and discuss several strategies for their management, including a few interventional techniques.

Case reports
Institutional Review Board approval was not required for these case presentations.

Case 1: A 48-year-old man developed a mediastinal abscess after undergoing an esophagectomy for esophageal cancer. A 10-Fr Malecot catheter was placed via a paravertebral approach under computed tomographic and fluoroscopic guidance. Removal of the Malecot catheter was attempted 30 days after the abscess had been managed; however, the tip of the catheter was firmly entrapped in the mediastinal tissue and was difficult to retrieve. Further intervention could have led to vascular injury or mediastinal infection. Therefore, the catheter was cut above the skin in order to retract it (Fig. 1A) and then released so none of the catheter was protruding from the skin, leaving the tip behind (Fig. 1B). No post-procedural complications (infection, pain, or hematoma) were reported during regular 3-year ambulatory follow-up.

Case 2: A 71-year-old man developed an abdominal wall abscess following surgery for a cholangiocarcinoma. A 10-Fr Malecot catheter was placed under ultrasonographic guidance and subsequently exchanged 12 days after the initial intervention. Removal of the 10-Fr Malecot catheter was at-
Completely.

Two of the wings that had been anchored within the dense tissue were cut, after which the catheter could be retrieved and infection could be controlled. Gentle traction on the catheter caused the wings of the catheter to emerge outside the skin and to become anchored within the dense tissue. Two of the wings that had been anchored within the dense tissue were cut, after which the catheter could be retrieved completely.

Case 3: An 86-year-old woman underwent right percutaneous nephrostomy using a 12-Fr Malecot catheter for malignant ureteric obstruction, at another hospital. The patient was referred to our Department of Interventional Radiology to change the catheter 29 days after the placement of the catheter at the previous hospital; however, the indwelling catheter could not be pulled out from the renal pelvis. A balloon catheter was advanced into the inner lumen of the Malecot catheter to dilate the nephrostomy track. After several attempts at balloon dilation, the nephrostomy track could be adequately dilated. The balloon catheter was advanced parallel to the Malecot catheter via the same route as was used during the nephrostomy to divide the fibrous tissue. After dilation using the balloon catheter failed to divide the fibrous tissue, fluoroscopic examination revealed that the tip of the catheter had pierced the renal pelvis and entered the retroperitoneum (Fig. 2A). The balloon catheter was advanced into the inner lumen of the Malecot catheter and inflated. Gentle pulling of the balloon catheter led to the reversal of the tip of the Malecot catheter and facilitated successful retrieval of the latter (Fig. 2B). A new 10-Fr Malecot catheter was inserted to remain in the correct position; however, 22 days later, removal of this catheter failed because of entrapment of its wings. The previously successful balloon catheter technique also failed to retrieve the entrapped Malecot catheter, resulting in a rupture of the catheter shaft. Another route needed to be created, and the Malecot catheter fragment was retrieved using endoscopic forceps (Fig. 2C).

Discussion

The specific design of the tip of the Malecot catheter, which can lead to tissue bridge formation across the catheter wings, is a potential cause of Malecot catheter entrapment [3]. Frequent catheter changes cannot always prevent this complication because entrapment can occur rapidly, even within a week of placement in a few cases [4]. All 3 patients treated at our hospital presented with Malecot catheters that remained in situ for approximately a month after being placed in a small or shrunken cavity. Over time, a tissue bridge was observed to have developed through the openings of the catheter wings. Thus, placement in a small cavity predisposes the Malecot catheter to entrapment [2, 5]. We hypothesize that catheter flanges that remain in close proximity to the edge of the healing wound may result in the development of a tissue bridge.

Entrapped Malecot catheters are often resistant to removal using the conventional manual traction method and may require open surgery [2]. If the risks associated with extraction exceed those associated with the persistence of a foreign body, physicians should consider conservative observation of the patient ensuring optimal management of infection, as described in Case 1. This approach needs to be adopted because in patients who develop deep-seated adhesions (secondary to prolonged in-dwelling catheters), attempts at catheter removal with excessive force may cause severe injury, hemorrhage, or breakage leading to retained fragments that could serve as a nidus for further infection. Stewart et al. described 2 patients in whom the entrapped nephrostomy catheter was removed with breakage of the catheter wings, which were left in place [6]. Extraction of the Malecot catheter is easy in instances where adhesions are observed to occur close to the body surface, as was observed in Case 2. Although endoscopic intervention is the
the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Conflict of interest:** The authors declare that they have no conflict of interest.

**References**


**Conclusion**

Malecot catheter entrapment is rare; however, the use of certain interventional techniques discussed in this report can be useful in managing such complications.

**Informed consent**

No additional consent was obtained for the retrospective analysis of the clinical records.

**Ethical Approval**

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.