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Technique for Noninvasive Replacement of a Damaged PleurX Drainage Valve

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Editor:

The present report describes a technique for noninvasive replacement of damaged tunneled pleural catheter drainage valves. The authors' institutional review board does not require approval for case reports such as this.

Pleural catheter drainage devices are effectively used to manage medically refractory malignant and nonmalignant pleural effusions (1). Case reports have demonstrated that the associated drainage valve can break, inadvertently be cut or damaged during drainage, or fall off (2). The drainage valve is an important component of the catheter

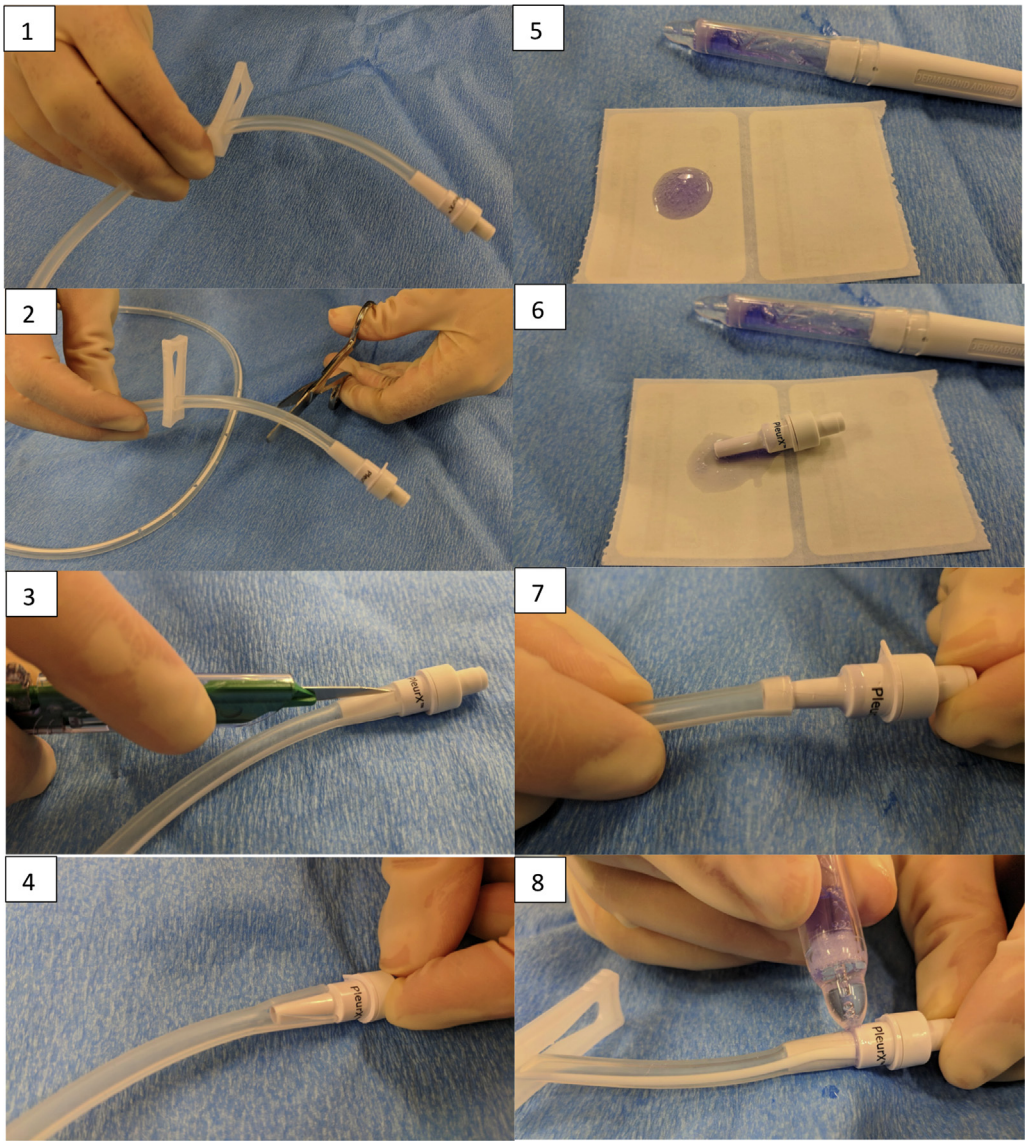

Figure. Steps to replace PleurX valve: (*1*) clamp tubing on patient's catheter, (*2*) cut tubing approximately 2 cm from the damaged valve, (*3*) create longitudinal incision to the base of the valve on a new PleurX catheter, (*4*) remove new valve from tubing, (*5*) squeeze a small amount of Dermabond adhesive onto a clean surface, (*6*) roll the base of the new drainage valve in the Dermabond, (*7*) place the valve with Dermabond into the tubing still connected to the patient, and (*8*) seal the connection of the valve and tubing with a ring of Dermabond.

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because it prevents the flow of air or fluid unless attached to the drainage line. With the PleurX catheter (BD, Franklin Lakes, New Jersey), which is the most commonly used pleural catheter at the authors' institution, the valve is proprietary and is designed to be used only with the associated drainage line adapter or PleurX vacuum collecting bottles. In addition, the replacement of a catheter over a wire involves risk to the patient. Specifically, the procedure has associated risks of infection, pain, pneumothorax, and fracture of the previously damaged catheter as a result of the fibrinous adhesions anchoring the cuff to the surrounding tissue (3). This letter describes a quick, noninvasive method for the replacement of damaged PleurX valves.

Two patients using PleurX catheters for management of malignant pleural effusions damaged the drainage valves on their devices. In one instance, the small pointed plastic protrusion designed to secure the cap broke off the hub. Without the cap, the drainage valve was exposed and potentially susceptible to infections. In the second patient, the hub completely detached from the tubing. Given the unnecessary risks associated with exchanging or replacing the catheter, an alternative approach was used to replace the broken drainage valves on the patients' pleural catheters.

Minimal readily available materials were used to perform the replacement, which included a new PleurX catheter with drainage valve, scalpel, Dermabond glue (Ethicon, Bridgewater, New Jersey), clamp, and scissors. First, the patient's pleural catheter was clamped to prevent leakage of fluid or introduction of air, and then the catheter was cut approximately 2 cm distal to the damaged valve. The catheter was squeezed to eliminate any fluid and provide a dry internal surface. Next, a new valve for insertion was prepared by using a scalpel to cut down the base of the catheter, which was then peeled away, and the new drainage valve was removed. Next, Dermabond was squeezed onto a clean work surface and the base of the new drainage valve was coated in the adhesive. Then, the new valve was slid into the existing tubing connected to the patient. A final ring of glue was added at the junction of the valve and catheter to ensure a strong bond. Finally, mechanical traction was applied to the junction of the valve and catheter to confirm the connection. The pleural catheter valve replacement process is illustrated in the **Figure**. After drainage valve exchange, the patients returned home and continued pleural effusion drainage for 3 months. Neither patient reported difficulty of use or repeat damage to the valve after the repair.

Indwelling pleural catheters have played an important role in improving survival and quality of life for patients with symptomatic pleural effusions (4). However, with the frequency of drainage and handling of the valve, damage to the device can occur, and a noninvasive replacement option is important. The main benefits to the procedure described here are the quick and simple technique with no discomfort to the patient. All supplies are readily available and affordable. Although the patients described here had PleurX catheter systems, a similar approach could be used with an Aspira pleural catheter valve (Merit Medical, South Jordan, Utah) in a desktop repair. The limitation of the procedure is that the Dermabond glue is designed for skin closure and the long-term adhesive quality in this scenario is unknown.

In conclusion, the method described here shows a simple technique for replacing damaged PleurX catheter drainage valves quickly, safely, and effectively.

REFERENCES

1. Warren WH, Kalimi R, Khodadadian LM, Kim AW. Management of malignant pleural effusions using the PleurX catheter. Ann Thorac Surg 2008; 85: 1049–1055.
2. Bower C, Mahmood K. Noninvasive repair of broken tunneled pleural catheters. J Vasc Interv Radiol 2011; 22:255–256.
3. Van Meter MEM, McKee KY, Kohlwes RJ. Efficacy and safety of tunneled pleural catheters in adults with malignant pleural effusions: a systematic review. J Gen Intern Med 2011; 26:70–76.
4. Chalhoub M, Zulfigar A, Sasso L, Castellano M. Experience with indwelling pleural catheters in the treatment of recurrent pleural effusions. Ther Adv Respir Dis 2016; 10:566–572.