

A ureteroiliac vein fistula was then diagnosed. Placement of an 8-F × 24-cm double-J stent (Flexima ureteral stent; Boston Scientific) was successfully performed after the ureterogram was obtained.

The ureteroiliac vein fistula was treated by inserting a 13-mm × 5-cm fully covered VIABAHN stent-graft (W.L. Gore and Associates, Flagstaff, Arizona) into the right common iliac vein in the supine position. There was no fistula on completion of the venogram of the right common iliac vein (Fig, d). Successful closure of the fistula (Fig, e) was demonstrated by the ureterogram through the nephrostomy obtained the next day. There was no infection or hematuria throughout the 6-month follow-up period after stent-graft placement.

Ureterovascular fistula is a rare complication following long-term indwelling of a double-J ureteral stent (1). Most cases of ureterovascular fistula consist of an ureteroarterial fistula between the ureter and the iliac artery (1,2). To our knowledge, there has been only one case report regarding an ureteroiliac vein fistula developing 1 week following double-J stent insertion for a malignant ureteral obstruction (3). The long-term use of a ureteral stent, previous radiation therapy, and the distorted anatomic relationship of the iliac vessel to the ureter have generally been thought to contribute to the development of ureterovascular fistula (3). In the present case, previous surgery and radiation therapy would have contributed to the formation of fistula, but cutting balloon dilation along with conventional balloon dilation seemed to be the direct predisposing factor. A 4-mm balloon was fully dilated without much difficulty, and an 8-mm balloon was not fully expanded while a 6-mm cutting balloon was fully dilated.

Cutting balloon dilation has been reported to be a safe and effective treatment option for resistant biliary duct and ureteral strictures (4). The blades of the cutting balloon are sufficiently small so as to not overly disrupt the neointimal or fibrotic tissue, but large enough to break the tissue at the stenosis and allow dilation where regular balloons fail (4). However, a cutting balloon should be used with caution in patients who have undergone pelvic surgery or radiation therapy because the distorted anatomic relationship between the ureter and iliac vessels, as well as the loss of the elasticity of these structures, might increase the risk of rupture during balloon dilation.

An interesting phenomenon regarding the ureteroiliac vein fistula in the present case was the rapid contrast medium leakage from the ureter into the common iliac vein, which allowed an immediate and correct diagnosis of the fistula. Although the previously reported case of ureteroiliac vein fistula was managed conservatively (3), we suggest immediate occlusion of the fistula with a stent-graft in the iliac vein to prevent possible hemorrhage and urinary flow into the vessel, as seen in the present case. Balloon inflation of the fistulous iliac vein could be considered as an alternative, although the fistulous defect could be extended with balloon inflation.

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## Creation of an Artificial Hydromediastinum for Radiofrequency Ablation of Lung Tumor: A Report of Two Cases

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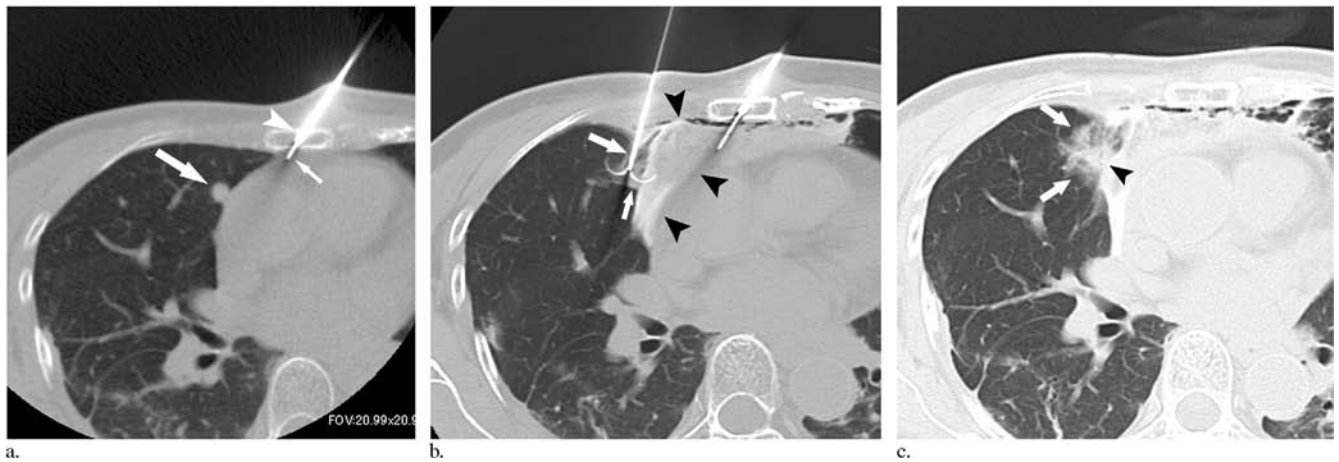
### Editor:

Radiofrequency (RF) ablation is an increasingly popular local therapy for lung cancer. However, RF ablation has limited local efficacy for tumors that are in contact with large vessels, primarily because of the heat-sink effect. Iguchi et al (1) showed that the local control rate for 15 tumors in contact with the heart or aorta was only 9% after 1 year. Another possible limitation is thermal injury to structures in close proximity to the tumor (2). These limitations can be overcome if the tumor is separated from these structures. We report two cases in which tumors in contact with the mediastinum were separated from the mediastinal structures for RF ablation by using an artificial hydromediastinum. Approval from our institutional review board and informed consent from the patients were obtained for these case reports.

In the first case, a 71-year-old woman with chronic hepatitis B was referred to our department for RF ablation of a lung metastasis from hepatocellular carcinoma. The metastasis was 7 mm in diameter and was located in the right middle lobe of the lung. Because the tumor was in close proximity to the ascending aorta (Fig 1a), RF ablation alone risked injuring the aorta during deployment of the electrode and local progression after therapy. An artificial hydromediastinum was created in an attempt to separate the tumor from the ascending aorta.

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**Figure 1.** CT images in case 1. (a) A 13-gauge bone biopsy needle (arrowhead) is advanced through the sternum, and a 21-gauge needle (small arrow) is introduced into the anterior mediastinum through the biopsy needle. Note the tumor (large arrow) in close proximity to the ascending aorta. (b) The tumor (small arrow) is separated from the ascending aorta by diluted contrast agent (arrowheads) administered through the 21-gauge needle. A multitined expandable electrode (large arrow) is deployed to the tumor. (c) An ablation zone (arrows) includes the tumor (arrowhead) and marginal parenchyma, suggesting complete ablation immediately after RF ablation.

A transsternal rather than parasternal approach to the anterior mediastinum was adopted because this appeared to be the easier route. The patient was placed in the supine position, and a 10-cm-long, 13-gauge bone biopsy needle (Osteo-Site; Cook, Inc, Bloomington, Indiana) was passed through the sternum (**Fig 1a**). A 20-cm-long, 21-gauge needle (Create Medic Co, Ltd, Yokohama, Japan) was advanced into the anterior mediastinum through the bone biopsy needle (**Fig 1a**). Initially, room air was administered through the 21-gauge needle, but this was not distributed between the tumor and the ascending aorta. Next, 40 mL of a 5% contrast medium (Omnipaque 300; Daiichi-Sankyo Co, Ltd, Tokyo, Japan) diluted with saline was administered. The diluted contrast medium was distributed into the anterior mediastinum, successfully separating the tumor from the aorta (**Fig 1b**). Subsequently, a multitined expandable electrode (LeVein Needle Electrode; Boston Scientific, Natick, Massachusetts) with a 2-cm diameter array was advanced to the tumor, and the tines were fully expanded (**Fig 1b**). The tumor was ablated until the impedance showed a rapid increase, and the ablation was repeated once more at the same site. An ablation zone included the tumor and marginal parenchyma on computed tomography (CT) images immediately after RF ablation (**Fig 1c**). A small asymptomatic pericardial effusion occurred and was treated conservatively. CT images obtained the next day revealed that both the diluted contrast medium and the pericardial effusion had mostly disappeared. There were no complications related to the creation of the artificial hydromediastinum. Follow-up contrast-enhanced CT scans were performed 1 month and 4 months after RF ablation. The ablation zone decreased in size without contrast enhancement, indicating no evidence of local tumor progression.

In the second case, a 55-year-old woman presented with a lung metastasis from uterine leiomyosarcoma. The metastasis was 9 mm in diameter and was located in the right lower lobe of the lung. Because the tumor was in close proximity to the esophagus (**Fig 2a**), RF ablation alone risked thermal injury to the esophagus. The tumor was also close to the vertebral body, which was deemed an obstacle to the expanding tines of the electrode. The creation of an artificial hydromediastinum was considered.

With the patient in the prone position, a 21-gauge needle (Create Medic Co, Ltd) was advanced through the paravertebral space until its tip was close to the tumor (**Fig 2b**); 10 mL of 1% lidocaine followed by 10 mL of saline was administered through the needle. The fluid was distributed into the posterior mediastinum, successfully separating the tumor from both the esophagus and the vertebral body (**Fig 2c**). Subsequently, a multitined expandable electrode (LeVein Needle Electrode) with a 2-cm diameter array was advanced to the tumor, and the tines were fully expanded (**Fig 2c**). The tumor was ablated in a similar fashion as reported in case 1. Pneumothorax occurred after RF ablation and was treated with the placement of a chest tube for 2 days. There were no complications related to the creation of the artificial hydromediastinum. CT images obtained 1 month after RF ablation showed that an ablation zone involved the tumor and marginal parenchyma (**Fig 2d**). At 4 months after RF ablation, the ablation zone decreased in size without contrast enhancement, indicating no evidence of local progression.

Artificial widening of the anterior and posterior mediastinum has been used to create a safe access route for biopsies of mediastinal lesions by using large-bore biopsy needles (3). In the two cases described here,

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