the confluence of the left internal jugular vein and left brachiocephalic vein supports this theory. The presence of a fibrin sheath may also have aided in guiding the 0.014-inch wire into the catheter lumen. A port injection was not performed before the procedure for definitive identification of the fibrin sheath.

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Transvenous Biopsy of Retroperitoneal Tumoral Masses: Value of Cone-Beam CT Guidance

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Editor:

Solid retroperitoneal masses with indeterminate tissue characteristics are usually investigated by biopsy percutaneously under ultrasound (US) or computed tomography (CT) guidance. However, in cases of infrarenal, pericaval masses, safe access avoiding intervening structures such as colon, kidney, or major vessels may be difficult or even impossible. In these cases, a transvenous approach might be a reasonable alternative. To improve control of the transvenous approach and to avoid inadvertent passage of intervening organs, cone-beam CT guidance can be used.

Here we describe the image-guidance technique for transvenous biopsy in three patients presenting with infrarenal, pericaval indeterminate tumoral mass lesions that were judged difficult to assess by percutaneous techniques.

The first case was in a 64-year-old woman who presented with pain in the right iliac fossa. Contrast-enhanced CT scan revealed a mass lesion with a maximum diameter of 47 mm located in the retroperitoneum in close proximity to the aorta and invading the inferior vena cava (IVC). The nature of the lesion could not be clearly determined based on CT; subsequently, it was decided to perform a core biopsy. A percutaneous approach was considered difficult and potentially not representative, so a transvenous approach was chosen.

Under local anesthesia, a 30-cm-long, 8-F introducer sheath (Flexor sheath; Cook, Bloomington, Indiana) was introduced into the right common femoral vein. Cavo-
ography showed an almost complete occlusion of the infrarenal IVC and numerous paralumbar venous collateral vessels. The tip of the 8-F sheath was positioned in front of the mass lesion invading the IVC. An endomyocardial biopsy forceps (Novatome; Scholtes, Lodi, California) was introduced through the sheath and positioned in close contact to the mass. A cone-beam CT scan (Allura FD 20; Philips, Eindhoven, The Netherlands) was performed to assess the correct position of the forceps (Fig 1a), and, finally, four biopsy specimens were taken (Fig 1b). No complications were noted during or after the procedure. Histologic examination demonstrated a leiomyosarcoma with intermediate grading. The patient was treated surgically, and high-grade leiomyosarcoma was confirmed.

The second case was in a 74-year-old asymptomatic woman with a medical history of breast carcinoma who presented with several small mediastinal lesions and a retroperitoneal mass lesion on positron-emission tomogra-
phy CT. The retroperitoneal mass lesion had a diameter of 54 mm and was located between the aorta and the IVC with external compression of the IVC.

Figure 4. The entire system was slowly retracted under live fluoroscopy until the tip of the port catheter was appropriately positioned (arrows).
A histologic diagnosis of the retroperitoneal mass lesion was required for further treatment. A transvenous approach was preferred rather than percutaneous access, which was again considered technically difficult.

The right common femoral vein was punctured under local anesthesia, and an 8-F introducer sheath (Flexor; Cook) was placed into the right external iliac vein. Venography showed focal narrowing of the infrarenal IVC at the level of the retroperitoneal mass. The tip of the 8-F stiff cannula (Colapinto needle; Cook) was positioned in the direction of the mass; a cone-beam CT scan (Allura FD 20; Philips) confirmed the correct tip position and direction of the stiff cannula (Fig 2a), allowing a safe core biopsy procedure with use of a transvenous 21-gauge Tru-Cut needle (Quick-Core Biopsy Needle; Cook; Fig 2b). In total, we performed four biopsy passes. No peri- or postprocedural complications occurred. Pathologic analysis revealed a metastasis with similar cytologic characteristics to the initial breast carcinoma. The patient was further treated with an aromatase inhibitor, exemestane.

The third case was in a 57-year-old man who presented with bilateral lower-limb swelling. His medical history included non-Hodgkin lymphoma 12 years earlier that was successfully treated with several lines of chemotherapy.

Abdominal CT scan revealed a bulky retroperitoneal mass lesion (maximum diameter, 78 mm) invading the infrarenal IVC and extending into the suprarenal segment. A transvenous biopsy approach was considered safer than a percutaneous approach.

Under local anesthesia, an 8-F long sheath (45-cm reinforced sheath; Arrow, Reading, Pennsylvania) was...
introduced into the IVC. Cavography revealed an almost complete occlusion of the infrarenal IVC. A stiff 8-F cannula (Colapinto cannula; Cook) was introduced into the IVC and oriented with its tip into the direction of the lesion. A cone-beam CT scan (Allura FD 20; Philips) was performed, confirming the correct position and orientation of the stiff cannula. Subsequently, four transvenous 21-gauge Tru-Cut biopsies (Quick Core needle; Cook) were performed, revealing a giant B-cell non-Hodgkin lymphoma. Appropriate supportive care was initiated.

The present report demonstrates that, in selected cases, the transvenous approach might offer a valuable alternative to the percutaneous, transcaval approach, as proposed by Sofocleous et al (1). These authors successfully performed biopsy of pancreatic and peripancreatic retroperitoneal lesions by using a percutaneous translumbar approach, thereby even traversing the IVC or renal vein in selected cases. These authors used a 22-gauge needle in 46 of 58 biopsy procedures, a 20-gauge needle in another eight patients, and an 18-gauge biopsy gun in four patients. Although only cytologic examination was obtained for pathologic analysis in the large majority of cases, the diagnostic accuracy rate reported was 86% (1). In contrast, we performed transcaval biopsy with use of a Tru-Cut needle or forceps, and a core biopsy specimen was obtained, which may provide additional information compared with cytologic needle aspiration. The technique is similar to the transcaval biopsy technique described by Hechelhammer et al (2) and Abdel-Aal et al (3) for cavoatrial masses.

To minimize complications related to inadvertent puncture of adjacent organs, we used a combination of radiologic guidance with fluoroscopy, digital subtraction angiography, and cone-beam CT to guide the stiff cannula and Tru-Cut or forceps needle into the targeted mass lesion. The cone-beam CT images were generated when the long sheath and stiff cannula had been oriented toward the tumoral mass, but before the Tru-Cut or forceps needle was introduced into the mass lesion. This allows correction of cannula orientation if cone-beam CT images should demonstrate incorrect positioning of the cannula tip. Additionally, to avoid potential inadvertent puncture, measurement of the distance between the tip of the cannula and the target point within the mass was performed. A safe margin between the target point and adjacent organs was respected, and can be obtained by using cone-beam CT.

If cone-beam CT technology is not available, other imaging techniques, such as intravascular US or transesophageal echocardiography in case of cavoatrial diseases, might be an alternative.

In conclusion, we demonstrate the feasibility of transfemoral biopsy of retroperitoneal, infrarenal, pericaval masses by using different types of core biopsy needles, including the Tru-Cut needle or forceps. In addition, we show that acquisition of cone-beam CT images during the biopsy intervention increases the efficacy and safety of these transvenous biopsy procedures.

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Iliac Stent-Graft Placement for Treatment of a Cutting Balloon–Induced Ureteroiliac Vein Fistula

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Editor:
This case report was approved by our institutional review board. A 52-year-old female patient showed the development of right-sided hydronephrosis 8 months after hysterectomy and bilateral salpingo-oophorectomy combined with chemoradiation therapy for endometrial carcinoma. Percutaneous nephrostomy was performed. The patient was then transferred to our hospital for double-J stent insertion.

A 0.035-inch guide wire (Terumo, Tokyo, Japan) was advanced into her right renal pelvis through the previous nephrostomy tube. The nephrostomy tube was then replaced by a 9-F vascular sheath (Pinnacle; Terumo). The following pyelogram showed a 4-cm-long severe stricture in the right distal ureter. A 0.035-inch stiff guide wire (Terumo) was introduced into the urinary bladder with difficulty. However, it was impossible for a 5-F Kumpe catheter (Cook, Bloomington, Indiana) to pass through the stricture.

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