

MINI-FOCUS ISSUE: IMAGING

INTERMEDIATE

IMAGING VIGNETTE: CLINICAL VIGNETTE

An Unexpected Cause of Heart Failure in a Young Woman With Treated Lymphoma



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ABSTRACT

Arteriovenous fistula is a rare complication of lumbar surgery that may cause high-output cardiac failure. We describe the case of a patient with treated lymphoma and recent spinal surgery who presented with heart failure. Logical deduction from clinical and imaging findings helped us arrive at this unusual diagnosis. **(Level of Difficulty: Intermediate.)**

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CASE DESCRIPTION

A 30-year-old woman presented with progressive exertional dyspnea for 9 months. She had history of Hodgkin lymphoma treated with chemoradiotherapy and had been disease free for 8 years. She underwent a L4-L5 lumbar discectomy for low back pain a year before. Her blood pressure was 130/70 mm Hg. Her jugular venous pressure was elevated. A third heart sound, a pericardial rub, and a soft continuous murmur from the upper to lower back were audible. There was bilateral pleural effusion.

Echocardiography showed normal chamber sizes and ventricular function. There was a mild pericardial effusion (**Figure 1A**). There was no evidence of constrictive pericarditis or pulmonary hypertension. The inferior vena cava (IVC) was dilated (4 cm) and pulsatile. Pulsed-wave and color-flow Doppler in the proximal thoracic descending aorta showed continued diastolic forward flow (**Figure 1B, Video 1**). Computed tomography (CT) of the abdomen revealed a very dilated contrast-enhanced IVC in the arterial phase (**Figure 1C**). The left common iliac vein (CIV) was grossly dilated. There was a communication between the left common iliac artery (CIA) and the left CIV (**Figure 1D, Video 2**).

A left CIA angiogram confirmed the presence of an arteriovenous fistula (AVF) (**Figure 1E, Video 3**). It was sealed off by 2 cover stents deployed in the left CIA (**Figure 1F, Video 4**). The patient's symptoms immediately improved. Reassessment echocardiography showed resolution of the pericardial effusion and normalization of the IVC size.

Dyspnea with pericardial effusion in a patient with treated lymphoma initially raised the concern of recurrent malignant disease. Her history of lumbar surgery, a continuous murmur, and echocardiographic findings of a severely dilated, pulsatile IVC and continued diastolic forward flow in the descending aorta suggested a diagnosis of high-output heart failure (HF) secondary to a large abdominal AVF.

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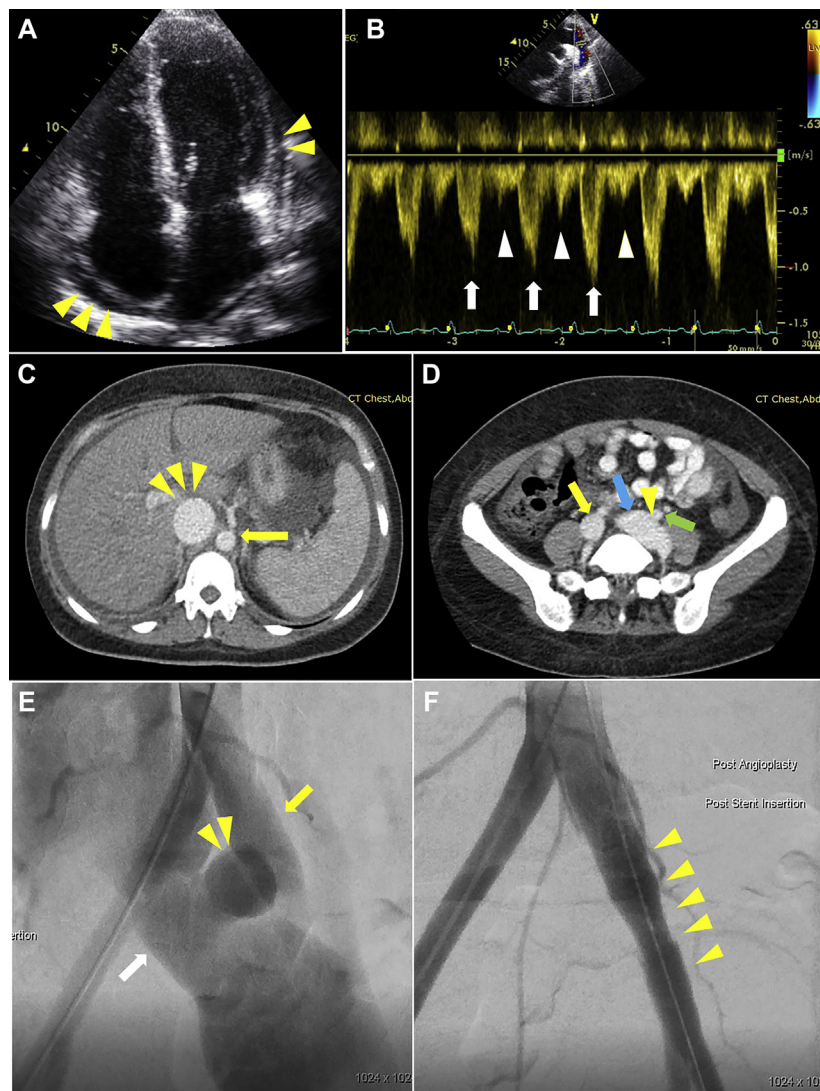
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Iatrogenic abdominal vascular injury is a rare complication of lumbar surgery (1). Early presenters may develop acute hemorrhagic shock. However, patients with AVF or pseudoaneurysms may present months to years after the index operation. Clinical manifestations are highly variable, ranging from subtle nonspecific symptoms to overt high-output HF resulting in dilated cardiomyopathy and end-stage HF (2). Highly variable presentations and the lack of an apparent temporal relationship between symptom onset and timing of surgery impose diagnostic challenges. This case highlights the importance of a systematic diagnostic approach and a high index of suspicion in disease management.

**ABBREVIATIONS
 AND ACRONYMS**

- AVF** = arteriovenous fistula
- CIA** = common iliac artery
- CIV** = common iliac vein
- CT** = computed tomography
- HF** = heart failure
- IVC** = inferior vena cava

FIGURE 1 Multimodality Imaging of the Iliac Arteriovenous Fistula



(A) Pericardial effusion on an echocardiogram (**arrowheads**). **(B)** Pulsed-wave Doppler imaging in the descending aorta showed normal systolic forward flow (**arrows**) and lower-velocity diastolic forward flow (**arrowheads**). **(C)** Computed tomography (CT) of the abdomen revealed a very dilated inferior vena cava with contrast enhancement (**arrowheads**) to the same extent as the smaller abdominal aorta (**arrow**). **(D)** Computed tomography of the abdomen showed a communication (**arrowhead**) between the left common iliac artery (**green arrow**) and the left common iliac vein (**blue arrow**). The left common iliac vein was larger than the right common iliac vein (**yellow arrow**). **(E)** Left common iliac artery angiogram showed the presence of an arteriovenous fistula (**arrowheads**) between the left common iliac artery (**yellow arrow**) and the severely enlarged left common iliac vein (**white arrow**). **(F)** Two cover stents (**arrowheads**) deployed at the left common iliac artery sealed off the fistula.

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KEY WORDS arteriovenous fistula, chronic heart failure, computed tomography, echocardiography, high-output heart failure

 **APPENDIX** For supplemental videos, please see the online version of this paper.