

Abdominal aortic aneurysm with periaortic malignant lymphoma differentiated from aneurysmal rupture by clinical presentation and magnetic resonance imaging

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ABSTRACT

Abdominal aortic aneurysm (AAA) associated with periaortic malignant lymphoma is difficult to differentiate from aneurysmal rupture because of similarities in their clinical presentation and appearance on computed tomography images. We here report a case of AAA associated with periaortic malignant lymphoma diagnosed preoperatively with an absence of typical symptoms, showing that AAA in periaortic malignant lymphoma can present without any clinical correlates. Magnetic resonance imaging was used to confirm the diagnosis. The patient was treated by endovascular repair, which may be safer and more effective than open surgery for AAA associated with malignant lymphoma because of the tight adhesion between the aneurysm and the lymphoid tissue. (J Vasc Surg Cases and Innovative Techniques 2018;4:95-8.)

Abdominal aortic aneurysm (AAA) concomitant with periaortic malignant lymphoma is extremely rare and is difficult to differentiate from aneurysmal rupture. The two conditions present similarly both clinically and on computed tomography (CT) images. Here, we report a case of AAA associated with periaortic malignant lymphoma that was differentiated from aneurysmal rupture by the absence of typical symptoms. Magnetic resonance imaging (MRI) was used to confirm the diagnosis. The patient was too frail for open surgery and was treated successfully by endovascular aneurysm repair (EVAR) and bilateral internal iliac artery embolization. Depending on the location, endovascular repair may be safer and more effective than open surgery for AAA associated with malignant lymphoma because of the strong adhesion between the aneurysm and the lymphoid tissue.

The patient consented to the publication of the images and information included in this article.

CASE REPORT

An 84-year-old man was admitted to our hospital's emergency department with edema of the right leg and a week-long fever.

He had no current or past history of cardiovascular disease or any specific diseases. On admission, the patient was fully conscious, his pulse rate was 70 beats/min, his blood pressure was 120/80 mm Hg, and his temperature was 37.5°C. Physical examination revealed a pulsatile mass in the abdomen. Laboratory findings were as follows: white blood cells, $4.6 \times 10^3/\mu\text{L}$; hemoglobin, 11 g/dL; and C-reactive protein, 3.6 mg/dL. He had unusually high levels of D-dimer (62 $\mu\text{g/mL}$), creatinine (2.5 mg/dL), and soluble interleukin 2 (IL-2) receptor (10,300 U/mL). Contrast-enhanced CT showed an infrarenal AAA (61 mm in diameter), bilateral common iliac artery aneurysms (left, 32 mm; right, 29 mm), and periaortic soft tissue density in the retroperitoneal lesion suggestive of hematoma or tumor (Fig 1). The periaortic lesion was situated centrally on the right side of the AAA and extended from the level of the right renal artery to the region of the right groin. It compressed the inferior vena cava and right urinary tract, causing deep venous thrombosis and hydronephrosis. Vitamin K antagonist therapy was started for the chronic deep venous thrombosis, but suprarenal inferior vena cava filter placement was not performed. The lower leg swelling gradually decreased thereafter. Plain MRI scans showed a hyperintense signal at the periaortic lesion on the diffusion-weighted image, which was compatible with malignant lymphoma (Fig 2, A). Because the patient was hemodynamically stable, with no typical symptoms of AAA rupture, he underwent open biopsy in the right groin on the fourth day after admission, and a diagnosis of diffuse large B-cell lymphoma was made (Fig 2, B). Sepsis due to a urinary tract infection subsequently developed, and he required mechanical ventilation and endotoxin adsorption therapy by polymyxin B-immobilized fiber column hemoperfusion. The patient recovered from the sepsis and respiratory failure in 9 days and provided preliminary informed consent for AAA and malignant lymphoma treatment. Because the patient was asymptomatic and had almost normal renal function, no therapeutic intervention for the unilateral hydronephrosis or right urinary tract compression was performed. He was too frail for open surgery after the intensive care

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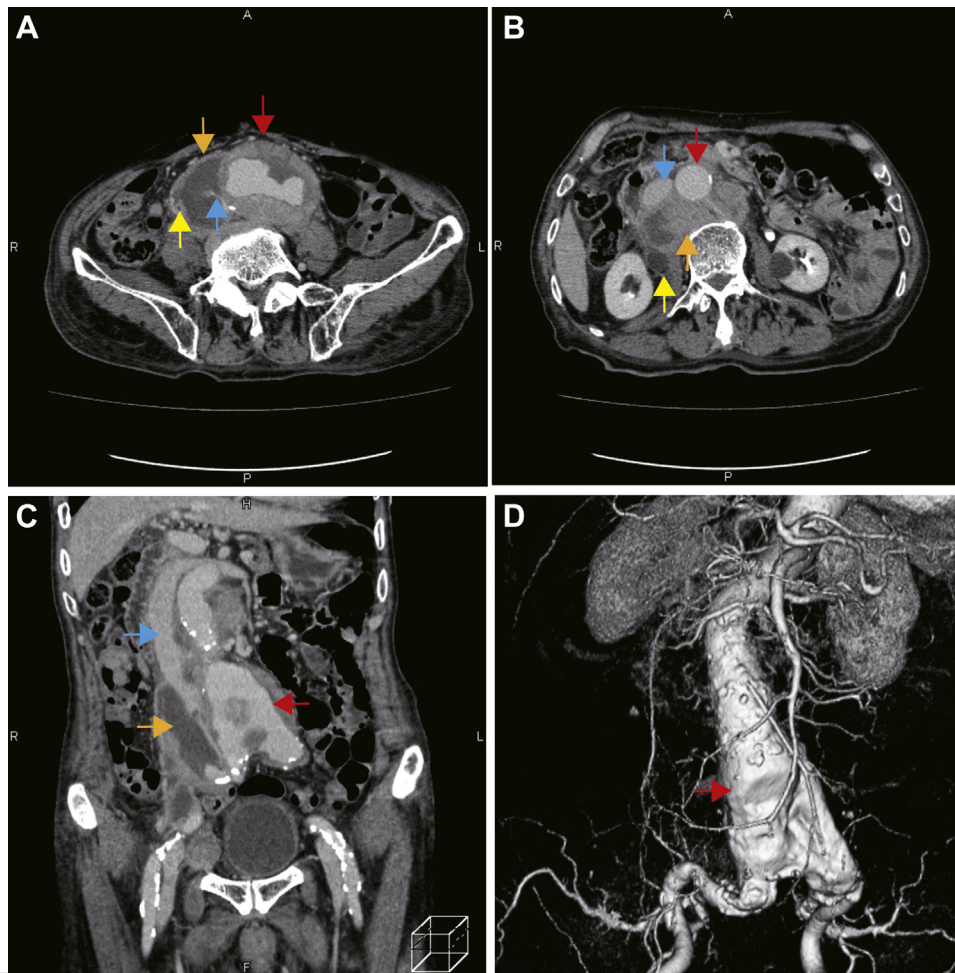


Fig 1. **A** and **B**, Delayed enhanced computed tomography (CT) axial images at the levels of the second lumbar vertebra (L2) and L4. **C**, Coronal view of delayed enhanced CT, showing the periaortic lesion compressing the inferior vena cava and right urinary tract, causing deep venous thrombosis and hydronephrosis. **D**, Three-dimensional visualization of the abdominal aortic aneurysm (AAA) in a contrast-enhanced CT image. The *red, orange, yellow, and blue arrows* indicate the AAA, periaortic lesion, right urinary tract, and inferior vena cava, respectively.

treatment, so we chose to perform EVAR rather than conventional aortic replacement. The right internal iliac artery was embolized on day 14 after admission (Fig 2, C). On day 18 after admission, the patient underwent simultaneous endovascular repair with the Excluder device (W. L. Gore & Associates, Sunnyvale, Calif) with left internal iliac artery embolization (Fig 2, D). Completion angiography did not show any endoleak. The patient had no postoperative aortic events. The patient did not eventually undergo chemotherapy for the malignant lymphoma for personal reasons. He was discharged on postoperative day 49 after rehabilitation. Follow-up CT scans obtained 2 weeks after the operation showed no change in the size of either the aneurysm or the lymphoma (Fig 3). In the 19 months after the operation, this man has been able to spend most of his time in his own home in the company of his family.

DISCUSSION

This case highlights two important points. First, AAA with periaortic malignant lymphoma can present

without any clinical correlates, in which case it can be differentiated from aneurysmal rupture. MRI can be used to confirm the diagnosis. Second, endovascular repair can be safer and more effective than conventional open surgery for AAA associated with malignant lymphoma because of the tight adhesion between the aneurysm and the lymphoid tissue.

AAA associated with periaortic malignant lymphoma is extremely rare, with only five reported cases.¹⁻⁵ This condition is difficult to differentiate from aneurysmal rupture because of similarities in both clinical presentation and CT imaging. In AAA associated with periaortic malignant lymphoma, abdominal pain may result from the infiltration of lymphoma cells into the aortic wall with subsequent rapid aneurysmal dilation, and this type of lymphoma-related abdominal pain can continue after treatment of the AAA.¹ Because diffusion-weighted MRI and serum soluble IL-2 receptor

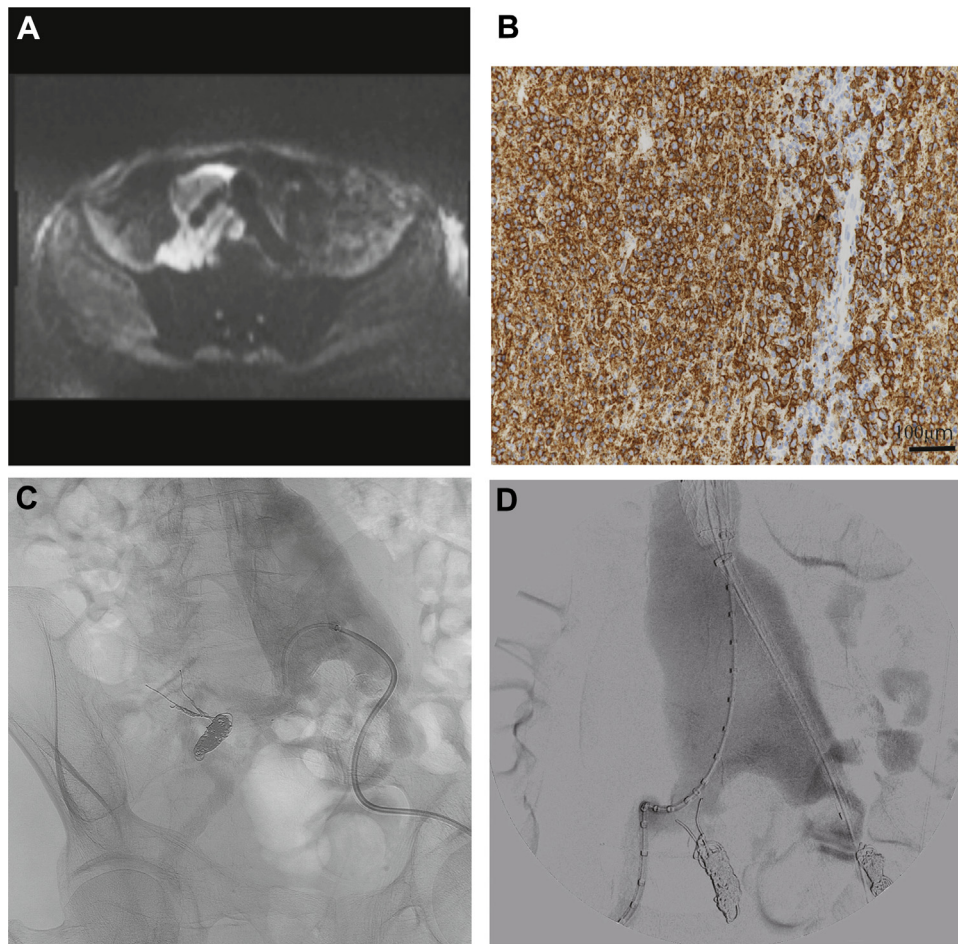


Fig 2. **A**, A diffusion-weighted magnetic resonance imaging (MRI) axial image at the L5 level, showing that the periaortic lesion had a hyperintense signal compatible with malignant lymphoma. **B**, Strong CD20 staining of tumor cells in the right groin consistent with diffuse large B-cell lymphoma. **C**, Radiographic imaging during right internal iliac coil embolization. **D**, Digital subtraction angiography imaging during endovascular aneurysm repair (EVAR).

are reported to be useful for the diagnosis of malignant lymphoma,^{6,7} these tests may help confirm a diagnosis of this rare condition. Fluorodeoxyglucose positron emission tomography is also becoming an important tool for diagnosis of the initial stage of malignant lymphoma. Thus, the diagnostic accuracy for malignant lymphoma may be improved by adding imaging modalities such as diffusion-weighted MRI and fluorodeoxyglucose positron emission tomography to the soluble IL-2 receptor level determination. Because strong adhesion between the aneurysm and the lymphoid tissue makes emergent open repair technically difficult, the ability to make an accurate clinical determination as to whether the aneurysm has ruptured is important. The difficulty in distinguishing the AAA in periaortic malignant lymphoma from aneurysmal rupture means that emergent aortic repair usually precedes the diagnosis. To our knowledge, this

is the first reported case of a preoperative diagnosis of AAA by clinical presentation and MRI.

Endovascular repair for AAA associated with malignant lymphoma may be safer and more effective than conventional open surgery for two reasons. First, extensive adhesion between the aneurysm and the lymphoid tissue presents a technical challenge for conventional open repair. However, endovascular aortic repair is not impeded by the adhesion. Yiu et al⁴ successfully performed EVAR in a case of juxtarenal AAA associated with periaortic malignant lymphoma. The second reason is that EVAR is less invasive than open surgical repair, which is an important consideration in dealing with a malignant neoplasm. Operative stress has the potential to damage the immune system, resulting in serious infection and acute exacerbation of the malignant lymphoma. Several studies have reported advantages of EVAR over open repair in managing concomitant cancer and AAA.^{8,9}

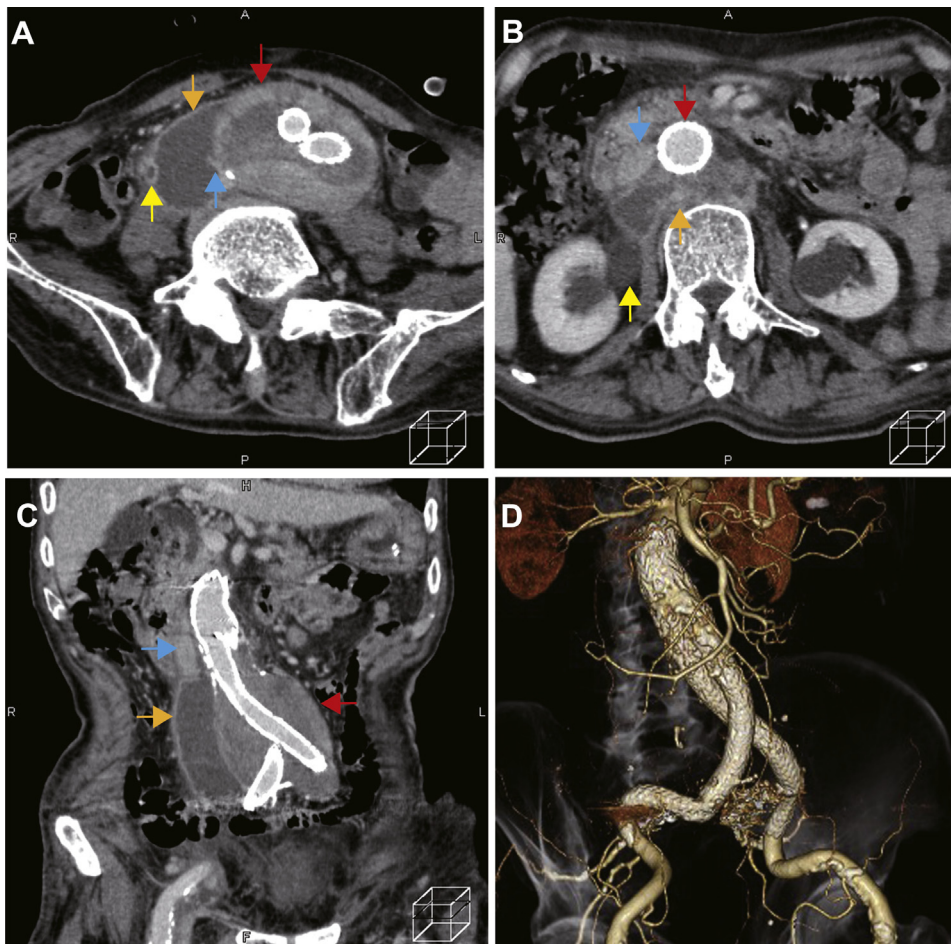


Fig 3. **A** and **B**, Delayed enhanced computed tomography (CT) axial images at L4 and L2. **C**, Coronal view of delayed enhanced CT. **D**, Three-dimensional CT image after stent graft placement. There was no evidence of endoleak. The red, orange, yellow, and blue arrows indicate the abdominal aortic aneurysm (AAA), periaortic lesion, right urinary tract, and inferior vena cava, respectively.

CONCLUSIONS

AAA associated with periaortic malignant lymphoma can present with no clinical correlates, in which case it can be differentiated from aneurysmal rupture. MRI is useful for confirming the diagnosis. Endovascular repair for AAA associated with malignant lymphoma can be considered a safer, more effective alternative to conventional open surgery and is advantageous for dealing with the tight adhesion between the aneurysm and the lymphoid tissue. When CT images are typical of an aneurysmal rupture but the patient has no corresponding symptoms, AAA associated with malignant lymphoma should be considered.

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