

Diagnostic Usefulness of 3 Dimensional Gadolinium Enhanced Magnetic Resonance Venography in Antiphospholipid Syndrome

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A 12-year-old white male who was previously healthy presented with progressive right arm pain and swelling for one month, which had started one day after an influenza vaccination into that arm. Review of systems was unremarkable except occasional knee pain and a long history of headaches. Examination showed diffuse swelling of right upper extremity with decreased radial and ulnar pulses. His laboratory tests were remarkable for thrombocytopenia ($103 \times 10^9/l$), positive lupus anticoagulant test, and IgG anticardiolipin antibody > 80 GPL. Conventional x-ray venography revealed right subclavian vein thrombosis (Figure 1). After 3 months taking enoxaparin 60 mg SQ twice a day, followup gadolinium enhanced magnetic resonance venography (Gd-MRV) including 3-dimensional image (A) and coronal raw image data (B) showed partially recanalized right subclavian and innominate vein thrombosis with residual moderate-to-severe stenosis. In addition, post-gadolinium axial 2D time-of-flight MRV (C) showed a filling defect in the left common femoral vein consistent with an old clot adherent to vessel wall (Figure 2).

The antiphospholipid syndrome (APS) is a distinct clinical syndrome associated with vascular thrombosis and/or pregnancy morbidity in the presence of circulating antiphospholipid antibodies, most commonly anticardiolipin antibodies and lupus anticoagulant¹. Venous thromboses due to APS can occur anywhere within the vascular tree. Arterial thromboses are most common within the cerebral vasculature; however, retinal, coronary, peripheral, mesenteric, renal, adrenal, and superficial arteries can also be involved. The timely detection of the thrombosis is crucial in the management of APS and 3D Gd-MRV is one of the new diagnostic tools.

Three-dimensional Gd-MRV data can be post-processed by using multiplanar reformations and maximum intensity projections to increase the information. These techniques

provide more diagnostic information about vascular anatomy by depicting the overlap of tortuous vessels and allowing multiple 3D views of the pathologic region. Three-dimensional Gd-MRV is well suited for evaluation of mediastinal veins and observation of venous obstructions in the axillary, internal jugular, subclavian, and innominate veins and the superior vena cava. This imaging modality can differentiate obstruction due to intraluminal thrombus from extrinsic compression by a mass or anatomic variation. Further, gadolinium has fewer side effects compared to iodinated contrast material, which is nephrotoxic and potentially allergic. Thus, MRV is especially suitable for patients with poor renal function in whom iodinated contrast may carry unacceptable risk, and is superior to conventional venography^{2,3}.

Conventional 2D time-of-flight imaging after intravenous administration of Gd may provide adequate visualization of the iliofemoral and popliteal veins for diagnosis of deep venous thrombosis and this technique is in clinical use for MRV³.

Clinicians should be aware of the usefulness and major advantages of gadolinium enhanced magnetic resonance venography in the diagnosis of thrombi and APS.

REFERENCES

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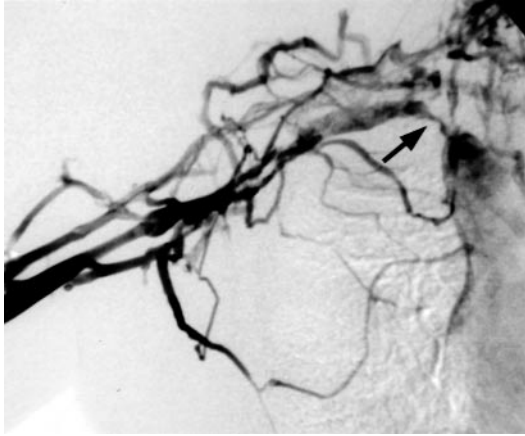


Figure 1. Conventional x-ray venography shows right subclavian vein thrombosis.

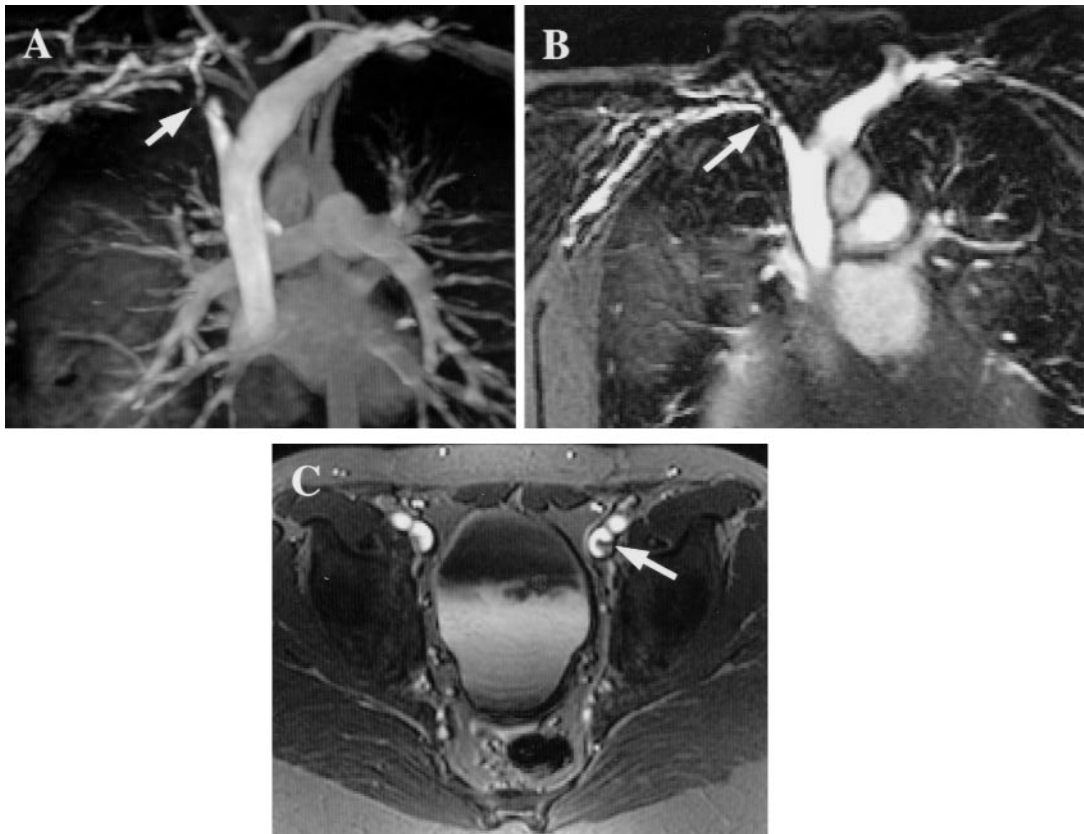


Figure 2. Gadolinium enhanced magnetic resonance venography. Three-dimensional image (A) and coronal raw image data (B) show partially recanalized right subclavian and innominate vein thrombosis with residual moderate-to-severe stenosis. Post-gadolinium axial 2D time-of-flight MRV (C) shows a filling defect in the left common femoral vein consistent with an old clot adherent to vessel wall.