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Doppler Ultrasound Evaluation for Proximal Artery Occlusive Disease in a Hemodialysis Patient with Recurrent Thrombosis

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Case Study : Hemodialysis patients are known to have a higher incidence of arteriosclerosis than the general population. Therefore, in those presenting with arteriovenous (AV) access thrombosis, a Doppler ultrasound (US) examination on the inflow artery is vital. We introduce an 86-year-old female with a looped AV graft in her left forearm who visited for recurrent thrombosis despite having undergone a declot procedure a week prior. A pulsed wave (PW) Doppler US on her left brachial artery showed spectral waveforms consistent with a tardus parvus pattern (Figure 1A). Further investigation of the left distal subclavian artery revealed a prolonged acceleration time and decreased acceleration index (Figure 1B), and the left vertebral artery exhibited a "Bunny waveform sign" (Figure 1C). Suspecting proximal artery occlusive disease, a computed tomography angiographic scan was conducted, unveiling significant in-stent restenosis in a previously placed bare metal stent in the left subclavian artery (Figure 2). After an angioplasty ensured subclavian artery patency, a thrombectomy on the AV graft restored the blood flow volume to 869 ml/min. For over three months, the patient has successfully undergone hemodialysis using the AV graft without thrombotic flow-related complications. For hemodialysis patients experiencing frequent recurrent thrombosis in AV access, it's essential to evaluate potential inflow artery insufficiency. However, in the presence of proximal artery occlusive disease, direct US scanning of the stenotic lesion is challenging, necessitating indirect identification through spectral waveforms of Doppler US. Consequently, even in patients with complete AV access occlusion, evaluating waveform patterns in the inflow artery is crucial. If brachial artery waveforms exhibit a tardus parvus pattern compared to the contralateral side, extended assessment for the subclavian and vertebral arteries is suggested. Addressing proximal artery occlusive disease before an AV access thrombectomy is critical to maintain its patency.

figure1.png

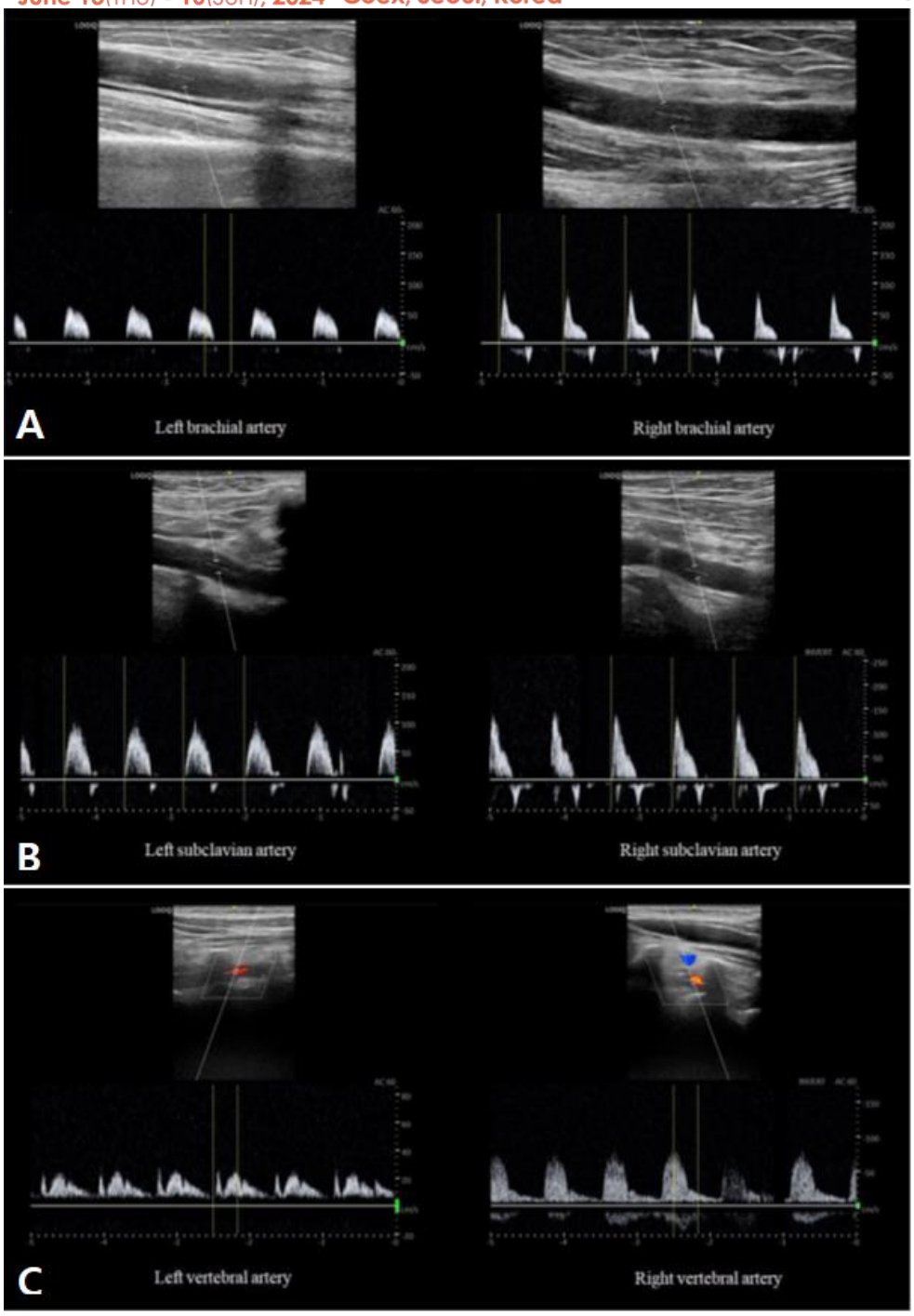
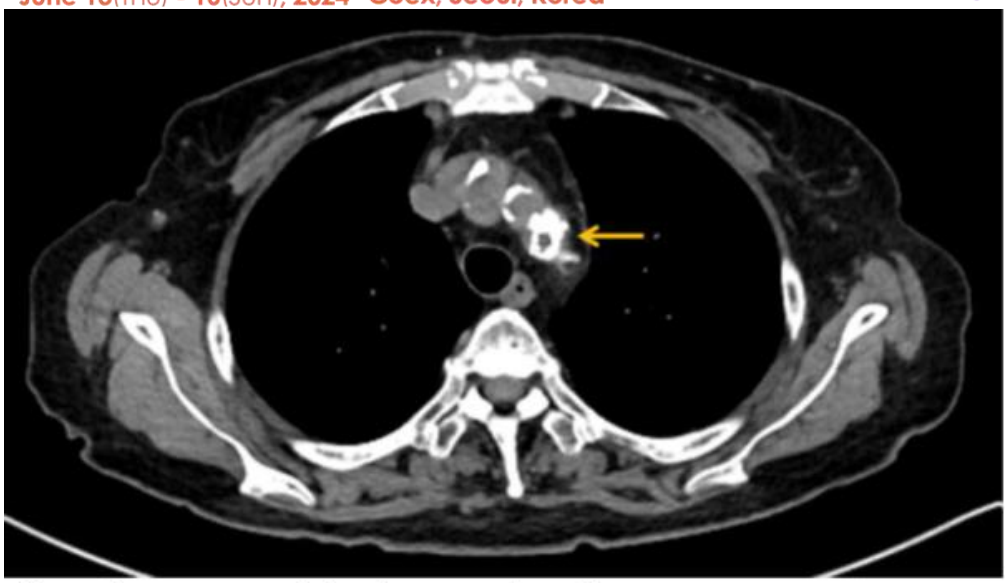

A
Left brachial artery
Right brachial artery
B
Left subclavian artery
Right subclavian artery
C
Left vertebral artery
Right vertebral artery

figure1.png



(Arrow: in-stent stenosis in a bare metal stent)