Clinical Practice Report of Contrast-Enhanced Ultrasound in Renal Artery Disease

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Abstract (300 word limit)

Statement of the Problem: Renal artery stenosis (RAS) is the main cause of secondary hypertension, which can lead to adverse cardiovascular events and renal failure. Researchers have reported that clinical consequences of RAS are correlated with the degree of stenosis, and early diagnosis play an important role in reversing resistant hypertension and protect renal function. Ultrasound (US) is safe and readily available, and often used as a screening method. However, conventional US assessment of renal arteries relies more on flow velocity than on direct visual imaging because it is difficult to show the whole process of renal artery satisfactorily. Contrast-enhanced ultrasound (CEUS) can visualize the renal arteries more clearly through intravenously injecting ultrasound contrast agent. The purpose of this study is to evaluate the diagnostic performance of renal artery CEUS with modified inspection section, and summarize subsequent changes in imaging assessment of renal artery disease.

Methodology & Theoretical Orientation: DSA was used as the gold standard to evaluate the diagnostic performance of CEUS in detecting RAS (≥30%) and severe stenosis (≥70%), as well as the diagnostic accuracy of classification of stenosis degree. Besides, annual proportion of patients underwent other imaging examinations such as computed tomography angiography (CTA) or magnetic resonance angiography (MRA) after CEUS was assessed to analysis subsequent changes in imaging assessment of renal artery disease.

Findings: CEUS can effectively detect RAS (≥30%) and distinguish severe stenosis (≥70%), and have a good performance in grading the degree of RAS. There was an increasing trend generally of CEUS in the diagnosis of renal artery disease, and the annual proportion of subsequent imaging examinations decreased for 4 consecutive years.

Conclusion & Significance: CEUS is a non-invasive, safe and valuable technique for the assessment of renal artery disease and worthy of promotion.

Image

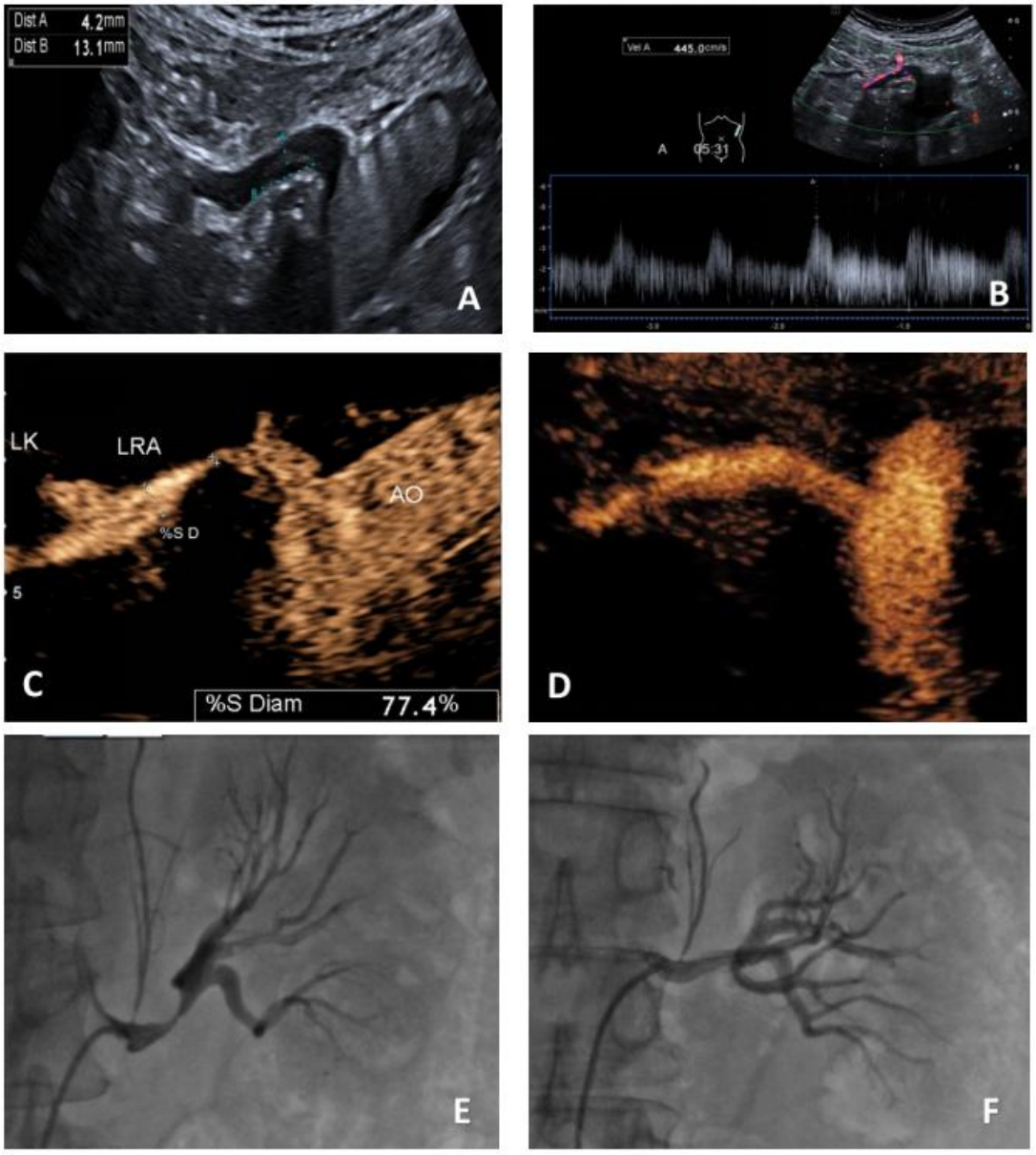


Fig.1. A 51-year-old male patient with severe stenosis of the proximal segment of the left renal artery. A, 2D US shows a hypoechoic plaque (arrow) of 13.1mm×4.2mm in the proximal segment of the left renal artery. B, Doppler US shows renal peak systolic velocity (PSV) at the stenotic site=445 cm/s. C, CEUS shows severe stenosis(arrow) with a diameter stenosis rate of 77%. D, Three months after stent (arrow) implantation, CEUS shows no stenosis in the proximal left renal artery. E, Corresponding arteriography demonstrates a severe stenosis (arrow) in the proximal segment of the left renal artery. F, Arteriography shows there is no residual stenosis (arrow) after stent implantation.



Clinical expertise in blood vessels and small organs direction, and the research direction is the clinical research of CEUS in renal vascular disease and renal function. She has extensive experience in one-stop assessment of renal artery and renal microvascular perfusion with CEUS for patients with suspected renovascular hypertension.

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Recent Publications

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3. Wang Y, Li Y, Wang SY, Ma N, Ren JH. Role of Contrast-Enhanced Ultrasound in the Evaluation of Patients With Suspected Renal Arterial Stenosis. Front Cardiovasc Med. 2022;9:721201. Published 2022 Mar 4. doi:10.3389/fcvm.2022.721201
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