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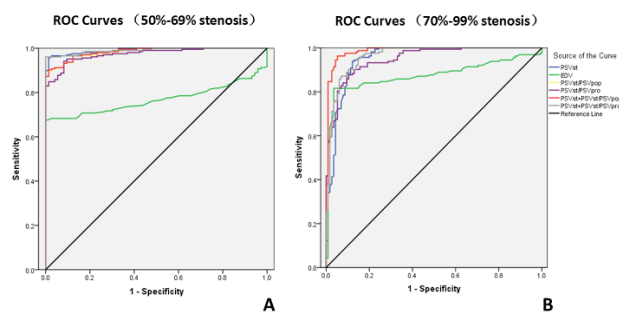
## OPTIMAL ULTRASOUND CRITERIA FOR GRADING STENOSIS OF THE SUPERFICIAL FEMORAL ARTERY

Mingjie Gao, Yang Hua, Xinyu Zhao, Lingyun Jia, Jie Yang and Beibei Liu

Xuanwu Hospital of Capital Medical University, China

**Objective:** This retrospective study determined the duplex ultrasound scanning (DUS) criteria for detecting 50-69% and 70-99% stenosis of the superficial femoral artery (SFA). Methods Examinations of 278 limbs in 185 subjects with peripheral arterial disease were performed. Duplex ultrasound scanning was used to measure the residual diameter of the stenotic segment and the diameter of the original lumen, the peak systolic velocity (PSV) at the stenotic segment of the SFA (PSVst), the segment proximal to the stenosis (PSVpro), and the popliteal artery (PSVpop; distal to the stenosis). The ratios PSVst/PSVpro and PSVst/PSVpop were calculated. Receiver operator characteristic curves were plotted, with digital subtraction angiography as the reference.

**Results:** The studied limbs included 205 limbs with stenotic SFAs: 43 (15.5%) with 50-69% stenosis, and 162 (58.3%) with 70-99% stenosis. The control group consisted of 73 limbs: 44 (15.8%) were normal and 29 (10.4%) had <50% stenotic SFAs. According to the results of the ROC analysis, the optimal cut-off values for detecting 50-69% stenosis of the SFA were PSVst  $\geq$  210 cm/s, PSVst/PSVpop  $\geq$  2.5, or PSVst/PSVpro  $\geq$  1.7. PSVst was the most useful hemodynamic parameter for predicting 50-69% stenosis, with 95.6% sensitivity, 98.6% specificity, and 96.4% accuracy. For predicting 70-99% stenosis of the SFA, the thresholds were PSVst  $\geq$  275 cm/s, PSVst/PSVpop  $\geq$  4.0, or PSVst/PSVpro  $\geq$  2.5. PSVst/PSVpop  $\geq$  4.0 was the most useful Doppler parameter, with 96.3% sensitivity, 93.9% specificity, and 95.3% accuracy. PSVst/PSVpop PSVst was the best combined parameter to detect SFA 70-99% stenosis with 96.3% sensitivity, 94.8% specificity, and 95.7% accuracy. Conclusions This study determined the cutoff values of DUS hemodynamic parameters for diagnosing 50-69% and 70-99% stenosis of the SFA. PSVst/PSVpop may be a better ratio parameter than the traditional parameter of PSVst/PSVpro for diagnosing SFA stenosis, especially for 70-99% stenosis



**Figure 1:** ROC curves for 4 individual parameters and 2 combined parameters. (A) 50-69% stenosis. (B) 70-99% stenosis. Blue, PSV at the stenotic segment; green, EDV at the stenotic segment; yellow, PSVst/PSVpop; purple, PSVst/PSVpro; red, PSVst+PSVst/PSVpop; grey, PSVst+PSVst/PSVpop. The black line indicates the reference values. ROC= Receiver operator characteristic.

### Recent Publications

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## Biography

Associate Professor Mingjie Gao has worked in the field of vascular ultrasound for more than 10 years and has good expertise in lower extremity artery ultrasound. Her research focuses on the following areas: 1) Systemical evaluation of the vessel structures and hemodynamics in lower extremity artery by multiple-modes of ultrasound in patients with peripheral arterial disease. 2) Evaluation of the vessel structures and hemodynamic alterations before and after interventional therapy such as stenting. She and her study group also performed a series of studies in the risk factors for SFA in stent restenosis. She has published almost 10 articles in the above areas.

gaomingjie163@163.com