

Objectives To evaluate the alterations of peripheral arterial structures and stiffness in patients suffering from symptomatic lower extremity arterial disease (PAD), as well as the factors correlated with femoral arterial stiffness.

Methods Thirty-one patients with lower extremity PAD and 34 age- and sex-matched control subjects were enrolled in this study. The intima-media thickness (IMT), diameter and two parameters of arterial stiffness (β , pulse wave velocity (PWV β)) were measured by displaying the longitudinal view of the common carotid arteries and common femoral arteries by using the technology of QIMT and QAS. The left ventricular ejection fraction was measured in order to exclude subjects with systolic dysfunction. These parameters were compared between these two groups. Univariable and multivariable analysis were carried out to evaluate the factors correlated with femoral arterial stiffness.

Results

1. The SBP, PP, smoking packyear and smoking extent (non-smoker, smoker with <40 packyear, or smoker with \geq 40 pack-year) were significantly higher in the PAD group than those in the control group.
2. The IMT (μ m) of the left common carotid artery (LCCA) was significantly increased in the PAD group ((727.29 \pm 136.51): (649.12 \pm 123.32), p <0.05), while the IMT of the right common carotid artery (RCCA) was insignificantly increased ((692.26 \pm 168.39):(626.09 \pm 98.57), p =0.06). The diameters (DIA, mm) of LCCA and RCCA were significantly enlarged in the PAD group ((8.81 \pm 0.87):(8.21 \pm 0.73), (9.00 \pm 0.94):(8.12 \pm 0.67), p <0.01). IMT/D of both sides were insignificantly decreased. As to the left and right common femoral artery (LCFA, RCFA), the IMT and IMT/D were significantly increased (LCFA_IMT (965.38 \pm 331.60): (690.76 \pm 193.31), RCFA_IMT (911.43 \pm 419.61): (633.88 \pm 202.92), LCFA_IMT/DIA (104.45 \pm 42.75):(75.59 \pm 19.08), RCFA_IMT/DIA (106.86 \pm 63.21):(68.57 \pm 20.35), p <0.01), while the DIA was insignificantly decreased. And the mean IMT (mIMT) of LCCA and RCCA, and that of LCFA and RCFA were significantly increased in the PAD group.
3. The stiffness indices β , PWV β of LCCA and PWV β of RCCA were significantly higher ((LCCA_ β (14.60 \pm 8.91):(10.35 \pm 2.48), LCCA_PWV β (9.43 \pm 3.08):(7.93 \pm 1.16), RCCA_PWV β (8.82 \pm 1.92):(7.75 \pm 1.42), p <0.05), and β of RCCA was insignificantly higher ((12.14 \pm 4.56):(10.46 \pm 3.84), p >0.05) in the PAD group than those in the control group. β and PWV β of LCFA and RCFA were significantly higher in the PAD group (LCFA_ β (27.59 \pm 20.55): (16.35 \pm 10.83), LCFA_PWV β (13.50 \pm 6.19):(9.46 \pm 3.40), RCFA_ β (27.93 \pm 28.90): (12.22 \pm 6.53), RCFA_PWV β (12.54 \pm 6.05):(8.49 \pm 2.52), p <0.05). The mean carotid and femoral β (m β) and PWV β (mPWV β) were significantly increased in the PAD group.
4. Univariable analysis showed that the femoral m β was correlated with femoral mIMT, SBP, PP, smoking amount and smoking extent (r =0.50, 0.46, 0.47, 0.29, 0.33, p <0.05–0.01). And the femoral mPWV β was also correlated with mIMT, age, SBP, PP, smoking packyear and smoking extent (r =0.51, 0.25, 0.59, 0.57, 0.31, 0.30, p <0.05–0.01). In Multivariable analysis, mIMT and PP were factors independently correlated with femoral m β by stepwise polynomial regression. SBP, smoking extent, and mIMT were independently correlated with femoral mPWV β .

Conclusions Patients with symptomatic lower extremity PAD have carotid and femoral remodelling as well as higher arterial stiffness. The alterations are more prominent in femoral arteries. The stiffened femoral arteries are due to atherosclerosis of the artery, higher blood pressure and smoking status.

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PERIPHERAL ARTERIAL REMODELLING AND STIFFNESS IN PATIENTS WITH SYMPTOMATIC LOWER EXTREMITY PERIPHERAL ARTERIAL DISEASE

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