Myocardial contrast echocardiography map
- A new noninvasive gate way to detect myocarcdial ischemia in angia pectoris -

Introduction: Peak systolic strain map (SM) is used to detect angina pectoris (AP) by segmental left ventricular wall (SLVW) dysfunction. SLVW dysfunction is not always caused by myocardial ischemia. It could be more accurate and direct to observe whether SLVW is ischemic.Therefore myocardial contrast echocardiography map (CM) was created and was compared to SM to see which is more accurate to detect AP. All procedures were performed in accordance with Declaration of Helsinki of the World Medical Association.

Objects: 198 coronary arteries (CAs) of 66 patients with coronary angiography within the last three months were enrolled; informed consents were obtained. Among the 198 CAs, 111 CAs were <50% stenosis; 36 were 50%; 32 were 75% and 20 were 90%≤.

Method: The left ventricular wall of the figures of APLAX, AP2ch and AP4ch was divided into 17 segments (seg.s) in both CM and SM. Among them the middle-anterior seg.7 was regarded as LAD, the middle-posterior seg.11 was regarded as LCX and the middle-inferior seg.10 was regarded as RCA. Sonazoid® was employed as a contrast agent for CM. In the CM, differences of intensity value between the mid-point of the left ventricular cavity and of each seg. were shown, while in the SM strain values of the mid-point of each seg. were illustrated. In both maps, sensitivity (SC), specificity (SP), diagnostic accuracy (DA) of each CA stenosis were investigated by ROC. From the data, which map more accurately detected AP and its severity was concluded.

Results: CM group: average intensity difference values <50% −8.9±2.9db, 50% −15.4±1.1db, 75% −18.8±1.9db, 90%≤ −21.7±2.2db. Cutoff values were 50% :−14.0db, 75%:−16.0db and 90%≤:−19.0. SC were 50% 1.000, 75% 1.000, 90%≤ 1.000. SP 50% 0.902, 75% 0.984, 90%≤ 1.000. DA 50% 0.939, 75% 0.989, 90%≤ 1.000. There were significant differences between <50% and 50%, 50% and 75%, 75% and 90%≤ (p<0.0001). SM group: average strain values <50% −20.7±3.9%, 50%−18.4±4.6%, 75%−17.5±4.6%, 90%≤−12.1±4.0%. Cutoff values were 50% −18.0%, 75% −17.0% and 90%≤−16.0%. SC were 50% 0.631, 75% 0.630, 90%≤ 0.857. SP were 50% 0.689, 75% 0.787, 90%≤ 0.869. DA were50% 0.667, 75% 0.739, 90%≤ 0.866. There was significant difference between 75% and 90%≤ stenosis only (p <0.0002). There were significant differences between CM and SM in all 4 CA stenosis pairs (p<0.0001).

Conclusion: Based on the results, CM accurately and directly detected myocardial ischemic extent and its severity at the same time which SM suggested only.