Limitation of infarct size with preconditioning and calcium antagonist (Diltiazem): Difference in $^{99m}$Tc-PYP uptake in the myocardium

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Ischemic cell injury and the uptake mechanism of $^{99m}$Tc-PYP (Pyrophosphate) were studied with preconditioning and calcium antagonist. Method: The coronary artery of an adult mongrel dog was clamped for 1 hour, followed by reperfusion and $^{99m}$Tc-PYP injection. A control group (group C, n = 8), a group in which continuous drip infusion of diltiazem (10 mg/kg) (group D, n = 7), and a group preconditioned by six 5-minute clampings and perfusions before occlusion (group P, n = 6) were compared. Results: Wall motion was fully recovered in group D but not in group P after 2 hours of reperfusion. The $^{99m}$Tc-PYP uptake ratio showed a significant (p < 0.05) reduction in group D (11.5 : 3.6 compared with group C), but not in group P (11.5 : 9.1, p = 0.25). The infarct area was 1.2 ± 0.6% of the left ventricle in group D, 1.3 ± 0.4 in group P, and 6.4 ± 1.0 in group C (p < 0.01 in groups D and P vs. group C). Conclusions: These findings suggest that preconditioning does not alleviate stunning, but it improves cell injury in spite of high uptake of $^{99m}$Tc-PYP. Diltiazem protects from both stunning and cell injury, suggesting a different mechanism of myocardial protection from that of preconditioning.

Key words: stunning, calcium-antagonist, $^{99m}$Tc-pyrophosphate, preconditioning, myocardial protection