Diltiazem Attenuates the Coronary Vasodilatory Response to Adenosine and Reduces the Regional Myocardial Blood Flow Disparity and Septal Defect Magnitude in Dogs With Critical Coronary Stenoses

Kenji Hatada, Mirta Ruiz, Denny D. Watson, George A. Beller, David K. Glover, University of Virginia Health System, Charlottesville, VA

Background: We previously showed that verapamil (Ver) markedly attenuates the vasodilatory response to adenosine (Ado) by inhibiting K_ATP channels. It is unknown whether this effect is specific to Ver or if it would also be observed with other calcium channel blockers like diltiazem (Dtz).

Methods: In 4 anesthetized dogs, hemodynamic responses to Ado boluses (60 µg/kg) were recorded in the absence or presence of increasing doses of Dtz (0.003-0.048 mg/kg/min). Next, an occluder was adjusted to produce a critical LAD stenosis and an infusion of Dtz was begun (0.048 mg/kg/min). Ten minutes later, Ado was infused (250 µg/kg/min) and sestamibi (296 MBq) and microspheres were injected at peak LCx flow. Ex vivo imaging of heart slices and gamma well counting was performed.

Results: Dtz produced dose-dependent decreases in resting HR and aortic pressure and, as shown, increased resting flow (open bars). As with Ver, Dtz markedly attenuated the LAD/LCx count ratio (0.74±0.02) compared with our historical data without Dtz (0.62).

Conclusion: Dtz markedly attenuated the vasodilatory response to Ado giving further evidence that calcium channel blockers should be withheld temporarily in patients undergoing Ado stress perfusion imaging to avoid the potential for a submaximal stress test.

Abnormal Hemodynamic Response to Adenosine and Poststress Left Ventricular Ejection Fraction Provide Incremental Prognostic Information in Patients Undergoing Gated Myocardial Perfusion SPECT

Adien Aboody, Rory Hachamovitch, Alan Rozanski, Sean W. Hayes, John D. Friedman, Ishac Cohen, Xingping Kang, Guido Germano, Daniel S. Berman, Cedars-Sinai Medical Center, Los Angeles, CA, University of Southern California, Los Angeles, CA

Background: Both post-stress LV EF and abnormal heart rate (HR) response to adenosine (Adeno) stress, defined as a low peak/rest HR ratio (Abni-HRR) have been shown to be a strong independent predictor of cardiac death (CD) in pts undergoing gated myocardial perfusion SPECT (MPS). However, these variables have heretofore been assessed in isolation so that their potential synergistic role in predicting CD is not known.

Methods: We identified 2,972 unique pts (49% women, mean age 71±11 yrs) who underwent Adeno-MPS and were followed up for 2.7±1.3 yrs. Multivariable Cox proportional hazards analysis was used to assess the prognostic value of clinical/MPS variables in predicting CD. Abni-HRR to Adeno-stress was defined as a presence of the low tertile of peak/rest HR ratio.

Results: 201 CD (6.8%) occurred during follow-up. In a multivariable model the significant predictors of CD were age, diabetes, shortness of breath, peak/rest HR ratio, post-stress EF, extent and severity of stress perfusion defect, and inability to perform an adjunctive walk, with interaction peak/rest HR*adjunctive walk. Pts with post-stress EF<35% more often had Abni-HRR, compared to those with higher EF (61% vs. 29%, p<0.001); however, after risk adjustment Abni-HRR further risk-stratified pts within each EF category (Figure).

Conclusion: An Abni-HRR to Adeno-stress is a common finding in pts with LVEF<35%. Abni-HRR has an independent and incremental prognostic value among pts with either normal or abnormal LVEF.