

Detection of Myocardial Ischemia with Myocardial Perfusion SPECT in Patients with Diabetes Mellitus

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Purpose: Diabetes mellitus(DM) is a critical disease associated with higher rates of cardiovascular morbidity and mortality. Atherosclerosis accounts for 65-80% of all deaths in diabetic patients and patients with DM are known to show high prevalence of coronary artery diseases(CAD). We evaluated the incidence of scintigraphic evidence of CAD in diabetic patients and results were compared with cardiovascular symptoms and clinical factors. **Methods:**169 patients with DM(mean age 62.9years, 68 males) were referred for evaluation of CAD between Jan 2002 and Dec 2003. 101(60%) patients were with chest pain and 68(40%) were asymptomatic. Patients underwent exercise(n=6) or adenosine stress(n=163) SPECT myocardial perfusion imaging(MPI). Exclusion criteria included history of documented myocardial infarction, prior revascularization, clinically significant valvular heart disease, left-bundle branch block on rest ECG. We evaluated symptoms associated with cardiac problem and other clinical and laboratory data to reveal correlation with presence of CAD. MPI were assessed visually and semi-quantitatively with C-Equal program. **Results:**Myocardial ischemia was detected in 52(31%) patients. Among them, 41 had 1-vessel and 9 had 2-vessel disease. In 52 patients with ischemia, 28(54%) were male and 24(46%) were female. 20/68(29%) asymptomatic and 32/101(32%) symptomatic patients had ischemia. Higher prevalence of neuropathy, hypertension, higher blood glucose level, HbA1c and CRP was noted in patients with myocardial ischemia. Serum levels of cholesterol and LDL was not significantly different between patients with ischemia and with normal MPI findings. Abnormal MPI findings were not related with gender and age. **Conclusion:**These results show a high prevalence of abnormal MPI results in diabetic patients regardless of symptoms. Screening stress MPI in diabetic patients should be indicated irrespective of symptoms, especially in patients with neuropathy, hypertension, higher level of blood glucose, or increased CRP.

Bioluminescence Imaging of Cord Blood Derived Mesenchymal Stem Cell Transplantation into Myocardium

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Purpose: The conventional method of analyzing myocardial cell transplantation relies on postmortem histology. We sought to demonstrate the feasibility of longitudinal monitoring transplanted cell survival in living animals using optical imaging techniques. **Methods:**Umbilical cord blood was collected upon delivery with informed consent. Umbilical mononuclear cells were obtained by negative immuno-depletion of CD3, CD14, CD19, CD38, CD66b, and glycoprotein-A positive cells, followed by Ficoll-Paque density gradient centrifugation, and plated in non-coated tissue culture flasks in expansion medium. Cells were allowed to adhere overnight, thereafter non-adherent cells were washed out with medium changes. After getting the MSCs, they were transfected [multiplicity of infection (MOI) = 40] with Ad-CMV-Fluc overnight. Rats (n=4) underwent intramyocardial injection of 5×10^5 MSCs expressing firefly luciferase (Fluc) reporter gene. Optical bioluminescence imaging was performed using the charged-coupled device camera (Xenogen) from the 1st day of transplantation. **Results:**Cardiac bioluminescence signals were present from 2nd day of transplantation. Cardiac signals were clearly present at day 2 (9.2×10^3 p/s/cm²/sr). The signal reduced from day 3. **Conclusion:**The locations, magnitude, and survival duration of cord blood derived MSCs were monitored noninvasively. With further development, molecular imaging studies should add critical insights into cardiac cell transplantation.