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Early Report

## Visualisation of cell death in vivo in patients with acute myocardial infarction

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### Summary

#### Background

In-vivo visualisation and quantification of the extent and time-frame of cell death after acute myocardial infarction would be of great interest. We studied in-vivo cell death in the hearts of patients with an acute myocardial infarction using imaging with technetium-99m-labelled annexin-V<sup>125</sup> a protein that binds to cells undergoing apoptosis.

#### Methods

Seven patients with an acute myocardial infarction and one control were studied. All patients were treated by percutaneous transluminal coronary angioplasty (six primary and one rescue), resulting in thrombolysis in myocardial infarction (TIMI) III flow of the

infarct-related artery. 2 h after reperfusion, 1mg annexin-V labelled with 584 MBq Tc-99m was injected intravenously. Early (mean 3.4 h) and late (mean 20.5 h) single-photon-emission computed tomographic (SPECT) images of the heart were obtained. Routine myocardial resting-perfusion imaging was also done to verify infarct localisation.

## Findings

In six of the seven patients, increased uptake of Tc-99m-labelled annexin-V was seen in the infarct area of the heart on early and late SPECT images. No increased uptake was seen in the heart outside the infarct area. All patients with increased Tc-99m-labelled annexin-V uptake in the infarct area showed a matching perfusion defect. In a control individual, no increased uptake in the heart was seen.

## Interpretation

Increased uptake of Tc-99m-labelled annexin-V is present in the infarct area of patients with an acute myocardial infarction, suggesting that programmed cell death occurs in that area. The annexin-V imaging protocol might allow us to study the dynamics of reperfusion-induced cell death in the area at risk and may help to assess interventions that inhibit cell death in patients with an acute myocardial infarction.



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