Letters to the Editor

Prediction of reversibility of wall motion abnormalities after revascularization using F18-fluorodeoxyglucose single photon emission computed tomography

Recovery after revascularization is possible in patients with chronic dysfunctional but viable myocardium; positron emission tomography (PET) can detect viable myocardium and predict functional outcome after revascularization using F18-fluorodeoxyglucose (FDG)[1]. Recently we have described the feasibility of imaging myocardial FDG uptake with single photon emission computed tomography (SPECT)[2]. In this brief report, we describe two patients who underwent FDG SPECT prior to revascularization; the findings are compared with the regional and global LV function before and after revascularization.

To delineate regional myocardial perfusion a resting thallium SPECT was performed[3]. FDG SPECT was performed during a hyperinsulinaemic glucose clamp[4]. The midventricular short-axis slices were analysed qualitatively using criteria for viability as developed by PET studies: a perfusion defect with relatively increased FDG uptake was considered viable tissue (FDG-perfusion mismatch), whereas a perfusion defect with concordantly impaired FDG uptake was considered necrotic tissue: FDG-perfusion mismatch[5]. The SPECT data were compared with regional wall motion assessed with 2D echo before and 3 months after revascularization. The myocardium was divided into five segments (anterior, lateral, inferior, septal and apical) for comparison between the two techniques. Each segment was scored quantitatively: 0=normokinesia, 1=hypokinesia, 2=akinesia and 3=dyskinesia. Improvement of regional wall motion in an akinetic segment at baseline was regarded as recovery in contractile function.

Both patients were referred for CABG. Patient 1 had a previous inferolateral infarction. On angiography he had 3-vessel disease and a LVEF of 26%. The inferior and posterolateral wall were akinetic on 2D echo. The SPECT images revealed a severe perfusion defect in the inferolateral region. The FDG uptake was also decreased, indicating necrotic tissue. After complete revascularization, no improvement of the initial wall motion abnormalities was seen; the LVEF was 21%.

Patient 2 was a 50-year-old male who had a previous anterior infarction. On angiography he had 3-vessel disease and a LVEF of 13%. On 2D echo, the LVEF was 14% and the anterior and inferior wall showed akinesia. The SPECT images showed severe perfusion defects in the anteroseptal and inferior regions (see Fig. 1, top). The FDG uptake was similarly decreased in the anteroseptal region (Fig. 1, bottom), indicating necrotic tissue in this area. In the inferior wall the FDG uptake was relatively enhanced compared to the perfusion in this region, suggesting residual viable tissue. After revascularization, recovery of wall motion was seen in the inferior wall; wall motion in the anterior and septal wall remained unchanged. Improvement in global LV function was seen, as the LVEF increased to 32%.

In the present report we described the use of FDG SPECT, to predict functional outcome after revascularization. The fact that improvement in regional and global LV function after CABG was seen in the patient with a FDG-perfusion mismatch supports the concept that FDG SPECT can identify viable tissue. In addition, good agreement between cardiac FDG uptake imaged with SPECT and PET in patients with coronary artery disease was demonstrated recently[6,7].

In conclusion, these results suggest that FDG SPECT can potentially be used in the detection of viable tissue and may allow the use of FDG on a larger scale in the clinical setting. However, the potential of the FGD SPECT approach to predict reversibility of wall motion abnormalities needs to be established in a larger population.

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References

Haemorrhagic retinopathy in patients admitted with acute cardiac chest pain

Coronary heart disease is the most common cause of death in diabetic patients\(^1\), and up to 25% of all patients presenting with acute myocardial infarction (AMI) are diabetic\(^2\). Patients with AMI benefit from treatment with thrombolytic agents both in terms of reduced mortality and reduced morbidity\(^3\). It has been stated that patients with diabetic retinopathy should not receive thrombolytic therapy because of the risk of intraocular bleeding\(^4\); indeed there have been a few anecdotal reports of intraocular haemorrhage complicating thrombolytic therapy\(^5\) but no prospective trials have systematically assessed this risk. Junior medical staff may have difficulty in obtaining adequate fundal views in patients who may have opiate-constricted pupils, and thus patients may not receive thrombolysis if there is doubt about the presence of diabetic retinopathy. This study reports a survey of retinopathy in patients passing through a coronary care unit, having presented with possible MI.

All patients presenting to the Coronary Care Unit at Seacroft Hospital over a 4-month period were eligible for inclusion in the study. Informed consent was obtained from all patients in the study, which was approved by the local ethical committee.

All patients had a history typical of cardiac chest pain (CCP) and ECG changes compatible with ischaemia or infarction. In all patients not known to be diabetic a formal glucose tolerance test (GTT) was carried out at day 3 and repeated after 6 weeks if abnormal. Visual acuities were checked, the pupils dilated and direct and indirect fundoscopy carried out, and where technically possible a retinal photographic survey was carried out using a 30° field retinal camera.

Sixty patients (41 male, 19 female) with a mean age of 65 years were admitted with CCP and 24 were given thrombolytic agents (23 streptokinase, 1 t-PA) during the study period.

Sixteen patients were diabetic and nine were hypertensive. Thirty patients had normal retinas. Nineteen patients had significant cataract, and three had retinal haemorrhage, two of whom had received thrombolysis. One of these patients was a newly diagnosed type II diabetic, with background retinopathy, whilst the other was not diabetic but had evidence of cholesterol embolus, with cotton wool spots and haemorrhage. There were no cases of vitreous haemorrhage or of altered visual acuity. The third patient had a flame-shaped haemorrhage in one eye, but was neither diabetic nor hypertensive.

This study demonstrates that in the routine practice of a CCU using thrombolytic therapy on a regular basis, the incidence of visual complications from thrombolysis is low, and there is no evidence that thrombolysis should be withheld from diabetic patients or patients in whom diabetes might be suspected on the grounds that there is significant risk to vision. This study does not address the risk to the small group of patients in whom there is proliferative retinopathy present at the time of chest pain for which thrombolysis might be given. The data suggest that a high proportion of patients presenting with CCP are in fact diabetic (16/60) and that the suggestion that diabetic patients should not be given thrombolysis should be doubly refuted on the grounds that the risk to vision is small if they are diabetic or not, and that to exclude diabetic patient from thrombolysis would be to deny treatment to a significant proportion of patients who might benefit from it most. This study shows that there can be retinal haemorrhage after thrombolysis which may not be associated with pre-existing retinopathy, or with non-diabetic retinal pathology. We believe the prospect that similar sub-clinical changes might occur in other tissues such as the brain following thrombolysis is intriguing but should not inhibit the use of a life-saving treatment.

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References