

# **The role of myocardial perfusion imaging in the assessment of cardiovascular risk in patients referred with end-stage liver failure for liver transplantation**

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## **Background:**

Orthotopic liver transplant (OLT) recipients are at a higher risk of developing ischaemic heart disease (IHD) than an age/sex-matched population. As demand for liver transplant outstrips supply, identification of IHD is important to minimize risk of peri-operative cardiovascular events and early cardiovascular death. The pre-transplant protocol of the Liver Transplant Unit, UHB consists of history, examination, 12-lead electrocardiogram and transthoracic echocardiography. Candidates with major cardiac risk factors are further evaluated with 99m-technetium-tetrofosmin gated SPECT imaging with vantage auto-correction (MPI) and/or conventional coronary angiography (CA).

## **Methods:**

Information from pre-transplant assessments carried out between December 2000 and December 2006 was obtained from the unit's prospectively compiled database. MPI and CA findings were recorded. The rate of cardiovascular death and non-fatal myocardial infarction (MI) was recorded up to 90 days post-OLT.

## **Results:**

A total of 1343 patients were assessed. 93 underwent further cardiac investigation, including direct CA (5), MPI (76), and MPI followed by CA (12). 46 of these patients proceeded to transplantation. Of the 42 patients who had an MPI scan pre-transplant, 7 had reversible ischaemia. Two (28.6%) of the 7 patients with positive MPI had MIs within 90 days post-transplant compared to none of the 35 with negative scans. Of the 13 patients assessed with angiography pre-transplantation, one patient had significant vessel occlusion and was treated with PCI pre-transplant. The two patients who suffered MIs had normal coronary arteries on CA following positive MPI. There were no cardiovascular deaths in the transplanted group.

## **Conclusions:**

A negative MPI identifies patients at low risk of cardiovascular complication during OLT. MPI is an effective method of clarifying risk in those with an intermediate pre-test probability of disease on history and risk factor profile. A positive MPI identifies increased risk irrespective of subsequent findings at CA, presumably a reflection of microvascular disease in end-stage liver failure.

## **Use of incremental adenosine infusion in patients with airways disease.**

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**Introduction:** In patients unable to perform dynamic exercise use of adenosine pharmacological stress is well established in terms of prognostic accuracy and patient acceptability (1). In comparison to dobutamine there is a reduced incidence of serious side effects. Asthma and/or COPD are perceived to be relative contraindications for adenosine stress however the ASNC guidelines recommend an incremental adenosine protocol when airways disease is well controlled.

**Aims:** To evaluate the safety and tolerability of an incremental adenosine protocol in patients with airways disease in routine practice over a 12 month period.

**Method:** All patients with airways disease attending for stress myocardial perfusion imaging were evaluated on arrival. Patients were excluded if they had received oral steroids within the last 3 months, were taking oral theophylline/dipyridamole, had a recent hospital admission due to an exacerbation of airways disease or had active wheeze on auscultation. Adenosine infusion was commenced at 50mcg/kg/min and, if tolerated, increased at 1 minute intervals to 100mcg/kg/min then 140mcg/kg/min. After 2 minutes at the full rate the radiopharmaceutical was injected and the infusion continued for a further 2 minutes.

**Results:** Of 187 patients 181 (97%) completed the protocol; of these 5 (2.7%) developed wheeze at the end of the infusion which responded to salbutamol. 6 (3%) patients did not complete the protocol. Adenosine was discontinued in 3 cases and dobutamine stress performed (wheeze (2), dyspnoea/cough (1)). Adenosine was terminated prematurely following radiopharmaceutical injection in 2 cases; imaging was performed but reported as sub-optimal stress. 1 patient developed wheeze prior to radiopharmaceutical injection and the procedure was cancelled.

**Conclusion:** Incremental adenosine stress is safe in the vast majority of patients with airways disease. Careful patient assessment allows exclusion of patients who are unlikely to tolerate the procedure.

**References:** (1) American Society of Nuclear Cardiology Clinical Guidelines. Henziova et al. Journal of Nuclear cardiology Vol 13, No 6, pp 80 – 90.

## **Probabilistic modelling of the cost-effectiveness of myocardial perfusion scintigraphy in coronary artery disease**

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### **Abstract**

**Aims:** Diagnostic and management strategies in patients with suspected coronary artery disease (CAD) classically involve the stress electrocardiogram (sECG) and coronary arteriography (CA). Previous deterministic economic models have shown that strategies including myocardial perfusion scintigraphy (MPS) are cost-effective. We have extended these findings using a combined decision tree and Markov model.

**Methods and results:** The cost-utility of diagnostic strategies in patients presenting with stable chest pain and suspected CAD was modelled from the perspective of the UK National Health Service. Data inputs (e.g. costs, accuracy, adverse event rates) for a number of clinically relevant strategies combining sECG, MPS and CA were supported by published data and expert opinion.

The cost-effectiveness of the strategies was dependent upon the prevalence of CAD. At 20% prevalence the most cost-effective strategy was sECG followed by MPS then CA, at 50% prevalence MPS then CA was more cost-effective than sECG then CA, and at 80% prevalence the most cost-effective strategy was direct to CA.

**Conclusion:** Including MPS in diagnostic strategies is therefore cost-effective in populations with low and intermediate prevalence of CAD. In high prevalence populations direct CA may be most cost-effective although the model may have over-estimated the cost-effectiveness of this strategy when used in routine practice.