

Mini-HTA: The Use of Myocardial Perfusion Imaging (MPI) in the diagnosis of cardiac pathology in patients presenting with chest pain in the Emergency Department

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Introduction

- Approximately 10% of A&E attendances are for chest pain in Singapore.^[25] It might be due to either coronary or noncoronary origin. A large portion of acute myocardial infarct patients presents atypically.
- This presents significant diagnostic and resource challenges as the exclusion of cardiac pathology remains fraught with difficulty and current clinical protocols call for admission and observation.
- Coronary Artery Disease (CAD) refers to cardiac disease caused by an impaired blood flow and deficient oxygen supply to the myocardium, mostly induced by atheromatous narrowing of one or more coronary arteries.
- Early and accurate detection of coronary and noncoronary causes in patients with acute chest pain through advanced diagnosis procedure can help to reduce the burden of inpatient hospitalizations.

Fast Facts: Ischaemic Heart Disease (IHD)

IHD is a disease characterized by reduced blood supply to the heart muscle, usually due to coronary artery disease.

IHD is 2nd leading cause of death in Singapore – (3393 deaths) 19.8% of total deaths in 2007.^[24]

IHD is also 3rd leading cause of hospitalization in Singapore – (16028 discharged cases) 3.7% of total discharges from hospitals in 2007.^[24]

Aim

To examine the evidence for the use of MPI in the Emergency Department

Population	Emergency Department patients with chest pain and non-diagnostic electrocardiogram
Intervention	MPI
Comparators	Serial ECG
Outcome	Diagnostic yields, hospital readmission rate

Technology

- Nuclear cardiology is a medical specialty that utilizes small doses of radioactive injections for diagnosis, maintenance and prevention of CAD.
- In MPI, a radiopharmaceutical tracer is administered intravenously after stress and at rest. Tracer distribution within the myocardium is imaged using a specialized camera, thus revealing the presence or absence of inducible ischaemia and/or infarction.



Figure reproduced from www.medic.com/philips_cardiomd.htm

Methods

Search terms: Myocardial Perfusion Imaging OR Myocardial Perfusion Scintigraphy AND chest pain AND Emergency Department AND electrocardiogram AND diagnosis.

Databases: PubMed, NHS Centre for Reviews & Dissemination databases, Cochrane database of systematic review and National Guidelines Clearinghouse

Search hits: 1 HTA report^[2], 1 systematic reviews^[1], 3 cost evaluation analysis^[11,16,17], 16 primary articles^[3-10, 12-15, 18-21] and 1 guideline^[22]

Research & Evidence

- MPI had substantially better diagnostic value with higher specificity (84% vs. 71%) and negative predictive value (98% vs. 77%) compared to serial electrocardiograms.^[2, 3, 13, 20, 21]
- The percentage of Emergency Department patients with chest pain admitted following MPI and without MPI was average 18.4% vs. 32.7%.^[5, 8, 10]
- Economic analyses suggest that MPI usage leads to lower overall mean cost (US\$5,030 vs. US\$6,044) mainly through reduction of unnecessary hospital admissions and diagnostic angiograms.^[4, 1, 2, 11, 16, 17]
- American College of Cardiology guidelines recommend that rest/stress MPI should be used in the diagnosis and assessment of myocardial risk in possible acute coronary syndrome in patients with non-diagnostic electrocardiogram and initial serum markers and enzymes.^[22]

Conclusion

MPI appears to be safe, cost effective, have high diagnostic yield and is promising for ruling out acute myocardial ischaemia in an emergency department setting.

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