



Silent myocardial ischaemia in the elderly: 'deathening' silence

By Gregory Peterson

Scenario 1

A 78-year-old patient, without symptoms, was referred for a cardiology opinion following the incidental discovery of Q waves on a routine ECG being performed prior to orthopaedic surgery. There was no definite history suggestive of myocardial ischaemia, and cardiovascular risk factors included previous smoking and hypertension. Cardiac magnetic resonance imaging was subsequently undertaken and revealed an extensive transmural right ventricular myocardial infarction. The patient was discharged from hospital five days later. Secondary prevention therapy of aspirin, a beta-blocker, an angiotensin-converting enzyme inhibitor, and a statin were prescribed.¹

Scenario 2

Staff at an aged care facility requested a GP visit for one of their residents, who looked unwell, was hallucinating, and was experiencing breathing problems. The resident did not have a history of chest pain. It was not possible to schedule a GP visit until early afternoon. At this point a telemonitor, capable of monitoring vital signs and being trialled in the home, was connected to the resident and ECG, heart rate, blood pressure, temperature and oxygen saturation measurements were taken and transmitted to the server. The doctor viewed the data over the website and saw from the ECG reading that the patient was having an acute ischaemic attack and bradycardia. An ambulance was called and the patient was admitted to hospital.²

Silent myocardial ischaemia

Typical ischaemic chest pain (such as occurs in angina pectoris) is a retrosternal or band-like tightness or discomfort radiating to the neck, jaw or arm,^{3,4} although atypical pain, shortness of breath or light-headedness is experienced by some. Additionally, there are patients who may have no significant symptoms ('silent' or asymptomatic ischaemia).³ It may come as a surprise to some readers that silent myocardial ischaemia and infarction (i.e. without the classic chest pain) are relatively common (perhaps accounting for 20 to 40% of all myocardial infarctions),⁵⁻⁷ and occur more often in the elderly. This has only been studied and appreciated by clinicians in relatively recent times.

'Since the description in the 1770s of the syndrome of angina pectoris by William Heberden, the importance of chest pain for the diagnosis of coronary artery disease



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has remained unabated. However, several decades ago it became apparent that both myocardial infarctions and transient episodes of myocardial ischaemia could occur in the absence of chest pain.⁸

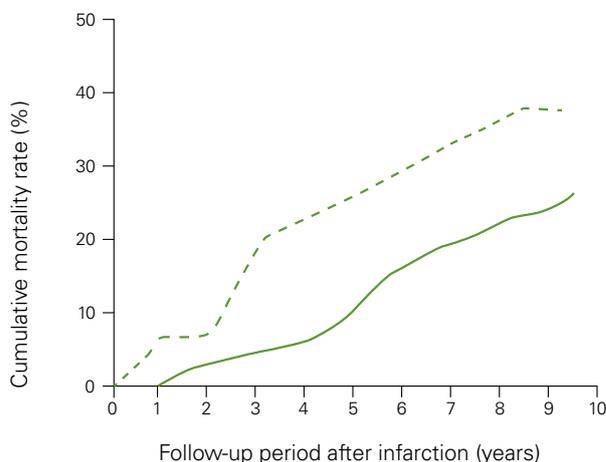
Both symptomatic and asymptomatic myocardial ischaemia often coexist in a given patient. In fact, patients with silent myocardial ischaemia can be:

1. completely asymptomatic;
2. asymptomatic with persistent ischaemia after having had a myocardial infarction, or
3. experiencing both symptomatic (angina) and asymptomatic ischaemic episodes.⁵

Silent myocardial infarctions are not minor events. It is known the prognosis in these cases is similar or perhaps inferior to, typical myocardial infarctions.^{6,7} At least with the latter, patients are more likely to present promptly for life-saving management, including aspirin and thrombolysis. Data from the Honolulu Heart Program indicated that the 10-year prognosis for silent infarction, in terms of mortality from all causes and heart disease, was worse than that for typical infarction, even after adjusting for age and other possible determinants (Figure 1).^{6,9}

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Figure 1: Mortality after silent (dotted line) and typical (solid line) myocardial infarction (from the Honolulu Heart Program;⁹ modified from Sheifer, et al.⁶)



Pain in the elderly

In general, pain becomes a less frequent presenting symptom of all acute medical conditions in the elderly, e.g. myocardial infarction may be 'silent' in up to 40% of cases in older patients.¹⁰ Of elderly patients with documented acute myocardial infarction, 19–66% present with chest pain, 20–59% with dyspnoea, 15–33% with neurological symptoms, and 0–19% with gastrointestinal symptoms (e.g. vomiting, nausea, heartburn, indigestion).¹¹ Furthermore, elderly patients with acute myocardial infarction tend to delay longer than younger patients in seeking medical assistance after the onset of chest pain or other typical presenting symptoms of myocardial infarction.¹¹

Sajadieh, *et al.* studied 678 healthy men and women aged between 55 and 75 with no prior heart disease.¹² Ambulatory electrocardiography (ECG) monitoring detected episodes of silent myocardial ischaemia in 11.4% of the subjects. During the five-year follow-up of, more than 20% of those individuals detected with silent myocardial ischaemia had a major cardiac event (sudden death or myocardial infarction).

As many as 40% of elderly patients with no prior history of coronary artery disease may have underlying asymptomatic disease and up to 50% of elderly patients with known coronary artery disease might have evidence of silent myocardial infarction.¹³ Fleg and colleagues reported a progressive increase in the prevalence of exercise-induced silent ischaemia, using maximal treadmill exercise ECG and thallium scintigraphy, in apparently healthy individuals from one decade to the next. The prevalence rose from 2.5% for those aged under 60, to 15% for those above 80 years of age.¹⁴

It is not entirely clear why the elderly are more likely to experience silent myocardial ischaemia. It could be due to age-related decreases in sensory nerve function. There does appear to be an age-related increase in the pain threshold.¹⁰ While silent myocardial infarction has the same major features associated with a heart attack with pain, (e.g. duration of attack, heart rate and the extent of ST-segment depression on ECG), it has been noted that the pain threshold in patients with silent myocardial ischaemia exceeds that in patients with the typical chest pain by more than 50%.¹⁵ It has also been postulated that abnormal central processing of afferent cardiac pain signals could be involved in the pathophysiology of silent myocardial ischaemia.¹⁶

Silent myocardial ischemia is also relatively common in patients with type 2 diabetes mellitus, particularly in the presence of autonomic neuropathy, and patients with renal disease; it is also more likely in women.^{5-7,16-19}

It has been clearly established that patients with silent myocardial ischaemia (angina) have a greater than three-fold increased risk for future major coronary events, i.e. sudden death or myocardial infarction.^{5-8,12,15,16,19-22} Recurrent silent ischemia may cause irreversible changes related to the development of scarred or fibrotic myocardium, which in turn may lead to life-threatening arrhythmias, or congestive cardiac failure.¹⁶

Early detection

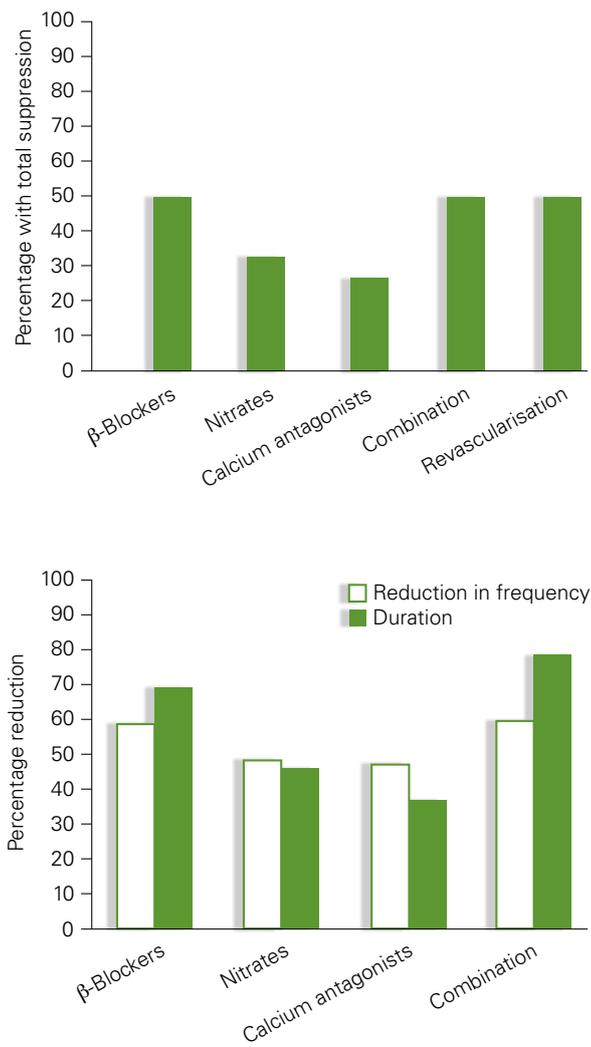
The early detection of silent myocardial ischaemia therefore may help to prevent later cardiac events. It is important to investigate every patient in whom multiple risk factors of heart disease have been recognised, even in the absence of chest pain.²⁰ Controversy exists concerning the specific screening guidelines for the asymptomatic population, but there is a growing consensus that some form of stress



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Figure 2. Comparison of the reduction in frequency and duration of silent ischaemic events with different classes of anti-anginal drugs, and surgery. Combination denotes the use of any combination of beta-blockers, nitrates and calcium antagonists (from Deedwania¹³)



testing (such as standard treadmill stress ECG) in high-risk individuals (e.g. patients with type 2 diabetes and peripheral vascular disease or proteinuria) is appropriate.^{19,21,22}

Treatment

As with typical myocardial ischaemia, the goal of therapy for silent ischaemia should be to reduce or, ideally, abolish it either pharmacologically or by interventions such as balloon angioplasty or coronary bypass surgery.²⁰ The elimination of episodes of silent ischaemia can be confirmed by 24-hour ECG monitoring or ECG exercise test. There should also be close attention to any cardiovascular risk factors, including smoking.

Essentially, the drug treatment does not differ from the treatment of symptomatic angina; unless contraindicated, this includes treatment with aspirin, a β-blocker or calcium channel blocker, an angiotensin-converting enzyme inhibitor, long-acting nitrate, and statin (Figure 2).^{5,6,13,16}

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