

Death due to unrecognised myocardial infarction causing left ventricular rupture: can we improve the diagnostic rate?

GE Baker, BHB, Medical Student; TD Koelmeyer, MB BS, FRACS, FRCPA, Associate Professor of Forensic Pathology, School of Medicine, University of Auckland, Auckland.

Abstract

Aim. To investigate the clinical presentations of ruptured myocardial infarction, where the initial diagnosis of myocardial infarction was missed, to enhance the diagnostic rate of primary care physicians.

Methods. We studied 67 cases of myocardial infarction, terminating with left ventricular rupture, between January 1988 and December 1996. The study was restricted to sudden death where, at coroner-directed autopsy, a ruptured myocardial infarction was determined as the cause of death. It was also restricted to patients who consulted a doctor within the two weeks prior to death. The report made to the coroner by attending police and the autopsy report was studied, and the requisite data were abstracted.

Results. Half of our study group did not present with chest pain. Of the atypical presentations: 15/67 cases (22%) were from referred pain (neck, arm, abdomen or back), 12/67 patients presented with "flu-like illness" (18%), 4/67 cases had respiratory presentations (cough or shortness of breath) (6%) and 2/67 falls (3%). Of those with chest pain, 16/34 (47%) were diagnosed or referred and 2/15 infarcts with atypical or referred pain were diagnosed. None of those presenting with "flu like illness" or respiratory symptoms was diagnosed or referred.

Conclusion. Fifty per cent of our patients had "silent" myocardial infarcts. A large proportion of this group complained of a flu-like illness, which is currently not considered a presentation of this disease. Patients at higher risk of a myocardial infarct, should be treated with a high index of suspicion when unwell, especially when complaining of a flu-like illness. Pathologically, posterior and lateral infarcts accounted for over half the cases.

NZ Med J 1999; 112: 429-30

Angina pectoris, as the classical presentation of myocardial ischaemia, was first described by William Heberden in 1788 as "a painful and most disagreeable sensation in the breast which seems as if it could extinguish life, more often inclined to the left than to the right, very frequently extending from the breast to the middle of the left arm".¹

Thirty per cent of all myocardial infarcts are unrecognised.² However, only 17% of unrecognised myocardial infarcts are truly asymptomatic; the remainder are atypical presentations unrecognised by either patient or physician.³ Therefore, myocardial infarction without chest pain is more likely to be atypical than asymptomatic. This paper is a retrospective review of the presenting complaint and diagnosis of all patients with myocardial infarction and rupture, who sought medical opinion up to two weeks before death. The purpose of the paper is to emphasise the atypical presentations of myocardial infarct with rupture.

Method

All 67 of the cases in this study were selected from those proceeding to coroner-directed autopsies, performed at the Department of Pathology, Auckland School of Medicine, between

January 1988 and December 1996. We retrieved records of all cases in which myocardial infarction and intrapericardial free left ventricular wall rupture was the cause of death.

We selected only those patients who had consulted a doctor up to two weeks prior to death. Information from the autopsy and police reports was collected and patients were split into five categories on the basis of their presenting complaint.

These categories were: (a) chest pain; (b) "referred" pain: neck, shoulder, back or epigastric; (c) flu-like illness; (d) respiratory; (e) falls.

Presenting complaints were treated in the same manner as they would be clinically, i.e. chest pain as a symptom always took precedence over other symptoms and cases were classified under only one presentation. Classification under "flu-like illness" required these words or "viral illness" to appear in the report. The results were then collated. Age and sex information, as well as site of rupture, was also collected.

Results

There were 67 patients included in this study. The presenting complaint, the number attending a doctor in each category and the action are summarised in Table 1. The age and sex of the patients are summarised in Table 2. The site of myocardial rupture is shown in Table 3.

Table 1. Presenting complaint of patients with myocardial infarction and rupture and action taken by doctor.

Complaint	Number	Action by doctor
Chest pain	34	15 referred 10 no diagnosis/ treatment 4 antacids 3 antibiotics 1 anti-inflammatory 1 antianginal
Referred	15	5 no diagnosis/treatment 3 antacids 2 referred 2 diagnosed arthritis 2 antibiotics 1 diagnosed appendicitis
'Flu-like' illness	12	6 no diagnosis/treatment 5 given antibiotics 1 paracetamol
Respiratory symptoms	4	2 asthma 1 antibiotics 1 anti-failure treatment
Falls	2	2 referred
Total	67	

Table 2. Age and sex of patients with myocardial infarction and rupture.

Age	Male	Female
<50	1	0
50-59	1	2
60-69	5	11
70-79	15	14
80-89	2	13
>90	0	1

Two patients of unknown age are excluded from this table.

Table 3. Site of myocardial rupture in patients after myocardial infarction.

Site	Numer
Posterior left ventricle	17*
Lateral left ventricle	15
Anterior left ventricle	12
Apex	4
Anterior/lateral left ventricle	2
Septal/intraluminal	2
Posterior/lateral left ventricle	1

Site of myocardial rupture in 14 patients is unknown; *nine of the posterior left ventricular ruptures were recorded as "high posterior".

Due to the small sample size, no correlation was sought between age, sex, site of myocardial rupture and presentation.

Discussion

Clinically unrecognised myocardial infarcts are thought to represent between 20% and 60% of all myocardial infarctions.⁴ This group of unrecognised myocardial infarctions includes those patients with symptoms unrecognised by either patient or physician, and patients with truly no symptoms. Unrecognised myocardial infarcts are as likely as recognised ones to cause death, heart failure or strokes.

Margolis et al reported that upon retrospective interrogation, only 17% of those with unrecognised myocardial infarction had no symptoms and reported no illness at all.³ Atypical and hence undiagnosed myocardial infarctions accounted for the other 83% of unrecognised myocardial infarction.

An exhaustive list of masquerades for the presentation of myocardial infarction was published by William B Bean in 1977.⁵ These "masquerades" are ranked in order of their frequency: congestive heart failure; classical angina pectoris without any severe or prolonged attack; palpitation or arrhythmia, atypical locus of pain; central nervous manifestations such as hemiparesis, hemiplegia, convulsion etc; an overwhelming sense of apprehension, nervousness and a weird all-pervading anxiety, as if one were dying; sudden mania or psychosis; syncope; overwhelming weakness, sometimes with anxiety or sweating; acute indigestion; a peripheral embolism, especially in postoperative patients; cardiac neurosis (the patient who cries wolf) and the totally silent myocardial infarction.⁵

The intention of our study was to emphasise the atypical presentations of myocardial infarction terminating with left ventricular rupture. The results bear out previous research in that chest pain was the most common presentation, followed by referred pain, flu-like symptoms and finally respiratory symptoms caused by cardiac failure. Interestingly 12/67 of the group (18%) presented with a flu-like illness. Flu-like illness is not usually considered a presentation of myocardial infarction, yet at autopsy it represents almost exactly the proportion of patients who suffered referred pain.

On reviewing the literature, similar symptoms such as undue fatigue and mental and physical stress have been noted as prodromal symptoms in some patients.⁶ These symptoms preceded painful infarcts and hence were labelled prodromal. It is impossible to state exactly whether our patients' flu-like symptoms were prodromal or concurrent with the time of infarct. It is known that the symptoms preceded infarct and death by no more than two weeks.

Currently researchers are looking towards the role of infection and local inflammation as a trigger for rupture

and thrombus formation of atheromatous vessels.⁷ A baseline high systemic inflammatory marker (C reactive protein) has been linked with an increased risk of myocardial infarction in apparently healthy men.⁸ *Herpes simplex* virus, cytomegalovirus, *H pylori* and *C pneumoniae* are the implicated organisms and these produce respiratory or flu-like illnesses.^{7,9}

From previous literature it appears that patients with prior diabetes or high blood pressure³ and the elderly are more likely to have an unrecognised myocardial infarction.¹⁰

Left ventricular rupture complicates approximately 2.3% of all hospital diagnosed acute myocardial infarctions but it accounts for up to 20% of all deaths from acute myocardial infarction.¹¹ Many of these present post mortem as having been a sudden death.

Whilst it has been thought that left ventricular rupture is a sudden precipitous event, which is nearly always fatal, pathologically, rupture appears to be a stuttering progressive process¹² which is most likely to occur in the first week after infarction.¹³ Oliva et al¹² have constructed a clinical triad of symptoms that can be used to predict which patients are suffering from cardiac rupture. These include repetitive unprovoked emesis, restlessness and agitation, and pericarditis. More than 80% of patients with rupture had two or more symptoms compared with 3% of patients without rupture. These symptoms and ECG changes were used to identify and successfully treat two patients with left ventricular rupture.¹²

Current literature highlights the finding that rupture of the left ventricle during acute myocardial infarction is nearly always fatal and is found in higher frequency in women than in men, in hypertensives compared with normotensives, and during the first myocardial infarct compared with second or third infarcts.¹³

In conclusion, this paper shows that myocardial infarction leading to (fatal) left ventricular rupture in the absence of chest pain is a difficult diagnosis to make. The prevalence of ischaemic heart disease in our society should make the practitioner wary of its many guises. In particular, pay attention to those at risk with vague symptoms who appear quite unwell.

Correspondence. Associate Professor T D Koelmeyer, Department of Pathology, School of Medicine, University of Auckland, Private Bag 92019, Auckland.

- Heberden W. Some account of a disorder of the breast. Medical transactions of the Royal College of Physicians of London. Julian DG, editor. Angina pectoris. Edinburgh: Churchill Livingstone; 1977.
- Yano K, MacLean CJ. The incidence and prognosis of unrecognised myocardial infarction in the Honolulu, Hawaii, Heart Programme. Arch Intern Med 1989; 149: 1528-32.
- Margolis JR, Kannel WS, Feinleib M et al. Clinical features of unrecognised myocardial infarction- silent and symptomatic. Am J Cardiol 1973; 32: 1-7.
- Sigurdsson E, Thorgeirsson G, Sigvaldason H et al. Unrecognised myocardial infarction: epidemiology, clinical characteristics, and the prognostic role of angina pectoris. Ann Intern Med. 1995; 122: 96-102.
- Bean WB. Masquerades of myocardial infarction. Lancet 1977; i: 1044-5.
- Killip T. Problems in myocardial infarction. In: Russek HI, Zohman BL, editors. Coronary Heart Disease. Philadelphia: JB Lippencott; 1971. p389-92.
- Patel P, Mendall MA, Carrington D et al. Association of *Helicobacter pylori* and Chlamydia pneumoniae infection with coronary heart disease and cardiovascular risk factors. BMJ 1995; 311: 711-4.
- Ridker PM, Cushman M, Meir J et al. Inflammation, aspirin, and the risk of cardiovascular disease in apparently healthy men. N Engl J Med 1997; 336: 973-9.
- Spodick DH, Flessas AP, Johnson MM. Association of acute respiratory symptoms with onset of acute myocardial infarction: prospective investigation of 150 consecutive patients and matched control patients. Am J Cardiol 1984; 53: 481-2.
- Kannel WB, Abbot, RD. Incidence and prognosis of unrecognised myocardial infarction. N Engl J Med 1984; 311: 1144-7.
- Shapira I, Isakov A, Burke M, Almag C. Cardiac rupture in patients with acute myocardial infarction. Chest 1987; 92: 219-23.
- Oliva PB, Hammill SC, Edwards WD. Cardiac rupture, a clinically predictable complication of acute myocardial infarction: report of 70 cases with clinicopathologic correlations. J Am Coll Cardiol 1993; 22: 720-6.
- Mann JM, Roberts WC. Rupture of the left ventricular free wall during acute myocardial infarction: analysis of 138 necropsy patients and comparison with 50 necropsy patients with acute myocardial infarction with out rupture. Am J Cardiol 1998; 62: 847-59.