
A 'same day' direct-access chest pain clinic: improved management and reduced hospitalization

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Summary

The aims of the Chest Pain Clinic were: to establish rapid-access, 'same-day', referral and attendance without a waiting list; to provide a diagnosis, treatment and follow-up plan for each patient; and to optimize the use of hospitalization for appropriate patients. Prospective data were collected from 1001 consecutive General Practitioner referrals to the Chest Pain Clinic over a 22-month period. Hospital admissions were reduced from an estimated 268 to 145 patients. Without a Chest Pain Clinic service, 213 (21%) would have been admitted inappropriately, and 89 (9%) with unstable angina or myocardial infarction would potentially have been managed in the community. A firm diagnosis was provided in

92% of cases (919 patients) with 42% (418) diagnosed as having ischaemic heart disease. The provision of a Chest Pain Clinic reduces the hospitalization of patients with benign non-cardiac chest pain whilst facilitating the identification of those patients with acute coronary syndromes requiring in-patient care. The Chest Pain Clinic service has a higher diagnostic yield for ischaemic heart disease than open access exercise electrocardiography, provides the General Practitioner with a firm clinical diagnosis in over 90% of cases, and identifies those patients requiring further treatment and invasive investigation.

Introduction

The clinical presentation of chest pain is a major problem for primary health care professionals, and is the commonest medical reason for a patient attending the Accident and Emergency Department. Ascertaining the aetiology of the chest pain is essential not only for the future management and investigation of the patient, but also for health-care resources to be used appropriately and efficiently. The distinction between cardiac and non-cardiac chest pain can be subtle, leading in some series,^{1,2} to between 2 and 12% of patients being inappropriately discharged from hospital and more than 25% being admitted to hospital with benign non-cardiac chest pain.³ From the General Practitioner's perspective, Accident and Emergency attendances or short-term hospitalizations with an unhelpful diagnosis such as 'chest pain—myocardial infarction excluded', do not provide a clear diagnosis or treatment plan.

The accurate identification of patients with ischaemic heart disease is important, because 30% of patients presenting with recent-onset angina have a significant cardiac event within 1–2 years⁴ and many of these patients may benefit from coronary revascularisation.⁵ Open-access exercise electrocardiography has been advocated as a useful method of confirming suspected ischaemic heart disease in patients in the community.^{6,7} However, even with the provision of an open-access service, 80% of General Practitioners do not feel sufficiently confident to interpret the results of an exercise test,⁸ and less than half of patients with a positive exercise test are subsequently referred for a cardiology opinion.⁶ Moreover, such an approach does not allow for false-negative results and may be inappropriately reassuring. The provision of a rapid-access cardiology opinion rather than open-access exercise electrocardiography may be more appropriate.^{9–11}

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The Royal Infirmary in Edinburgh serves a population of over 400 000 and approximately 5000 patients each year present with chest pain to the Accident and Emergency Department. In a 16 week audit³ of 1253 consecutive patients with chest pain attending the department, approximately 75% were admitted to the medical wards, of whom 25% had a final diagnosis of non-cardiac chest pain, most of whom could have been managed in the community. Moreover, there was evidence of underinvestigation and poor risk stratification of patient with ischaemic heart disease.

As a consequence of this audit, a 'same day' Chest Pain Clinic was made available to General Practitioners in the Lothian Region with the aims of facilitating rapid access to a specialist cardiological opinion, reducing unnecessary admissions with non-cardiac chest pain and providing a firm diagnosis and treatment plan in the majority of patients. We here report the impact of the introduction of this rapid-access Chest Pain Clinic service.

Methods

Chest Pain Clinic

The Chest Pain Clinic of the Royal Infirmary opened on 4 September 1995, and is a dedicated facility comprising of an exercise treadmill, consultation room, reception area and full resuscitation facilities. The clinic is staffed by existing Consultant Cardiologists, Specialist Registrars and a newly-appointed, dedicated part-time Clinical Associate. General Practitioners within the Lothian Region were invited to refer patients (without age restriction) with suspected cardiac chest pain of acute or recent onset. Referrals were made during the morning, via a faxed referral letter, and patients were seen in the Chest Pain Clinic on the same afternoon. The General Practitioners were asked to provide, on a proforma, an initial diagnosis and an indication of their preferred management of the patient if the Chest Pain Clinic service was unavailable. General Practitioners were instructed to refer patients directly for hospital admission if they suspected myocardial infarction or unstable angina. Waiting times for urgent new patient cardiac referrals are approximately 4–6 weeks in the Lothian Region.

All patients had a resting electrocardiogram performed on arrival at the Chest Pain Clinic. Following consultation and documentation of the history and clinical examination, patients underwent exercise testing in the clinic, were admitted to the Royal Infirmary, or were referred for non-cardiac investigations such as endoscopy. On the same afternoon, the General Practitioner was then faxed a proforma

detailing the diagnosis, a treatment plan, a list of investigations pending and the arrangements for further follow-up.

Data collection

All information was collected from the referral letters and faxed proformas between 4 September 1995 and 18 July 1997. The General Practitioner's provisional diagnosis, and the management of the patient if the Chest Pain Clinic service was unavailable, were recorded. To account for referrals where the General Practitioner failed to specify the default management of the patient (32%), an estimated total figure was calculated in proportion (pro-rata) to the fully recorded cases. The Chest Pain Clinic diagnosis, investigations, initial treatment and patient follow-up were also documented.

Results

Over the 22-month period, 1001 patients were referred: 540 men and 461 women, mean age 56 ± 12 years, 78% of whom presented with recent-onset chest pain for the first time. Investigations used in the clinic were: electrocardiogram (1001), exercise tolerance test (610), chest x-ray (107), echocardiogram (159) and serum cholesterol estimation (117). At the discretion of the clinic physician, 96 patients were referred for cardiac catheterization, of whom 22 were found to have trivial disease or normal coronary arteries.

The referral and clinic diagnoses are shown in Table 1. In 92% of patients a positive diagnosis was made in the clinic regarding the aetiology of the chest pain. The General Practitioner's provisional

Table 1 Referral and chest pain clinic diagnoses

	Referral diagnosis		Clinic diagnosis	
	Number	%	Number	%
Myocardial infarction	8	3	27	3
Unstable angina	47	16	117	12
Stable angina	112	38	274	27
Chest pain—not otherwise specified	102	35	82	8
Non-cardiac chest pain	11	4	257	26
Cardiological problem—no chest pain	12	4	70	7
Musculoskeletal chest pain	—	—	114	11
Gastrointestinal chest pain	—	—	58	6
Pericarditis	—	—	2	—

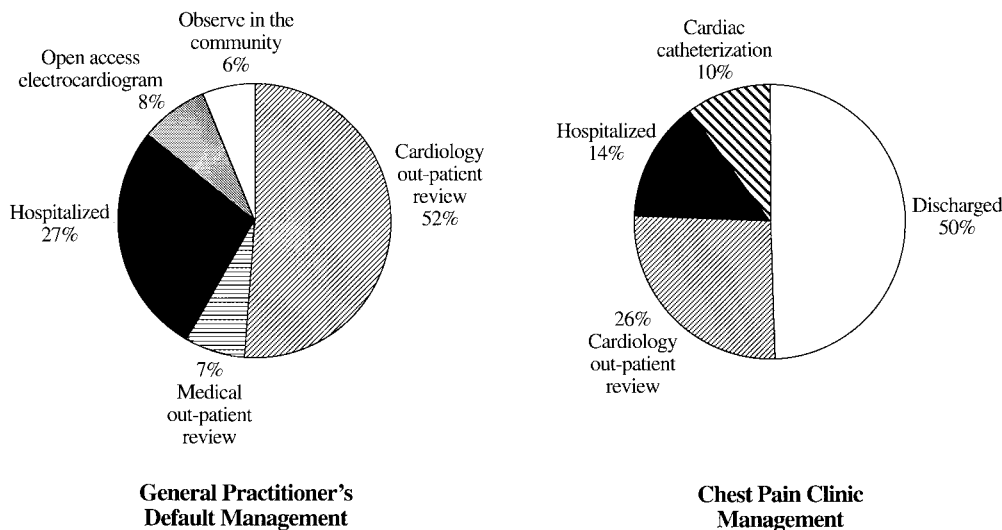


Figure 1. Patient management in the presence or absence of the provision of the Chest Pain Clinic service.

referral diagnosis was unambiguously stated in only 292 cases and, of these, the diagnosis was concordant with that ascribed by the clinic physician in 93 cases (32%). Of the 167 patients referred with a diagnosis of ischaemic cardiac chest pain, 99 (59%) were considered by the clinic physician to have ischaemic heart disease.

The default and actual management of patients is shown in Figure 1. The potential impact of the Chest Pain Clinic on hospitalization of patients with chest pain is shown in Table 2. The intended admissions of 268 (27%; pro-rata) were reduced to 145 (14%) over the 22-month period. However, concordance as to which patients should be admitted was poor, with only 55 (pro-rata) patients being identified by both the General Practitioner and the clinic physician as requiring hospitalization. The estimated total reduction in potential admissions attributable to the Chest Pain Clinic would be 123 over the 22-month period.

In six (9 pro-rata) of the 27 patients classified in the clinic as having an acute myocardial infarction,

and in 31 (46 pro-rata) of the 117 with unstable angina, the patients would have been hospitalized by their General Practitioner, and attendance at the Chest Pain Clinic only delayed their admission. However, 21 (18 pro-rata) patients with a myocardial infarction and 86 (71 pro-rata) patients with unstable angina would potentially have been managed in the community, during the acute phase of their illness. Of the 27 patients with an acute myocardial infarction, six were admitted to the coronary care unit and received thrombolytic therapy.

The documented treatments initiated at the Chest Pain Clinic for the 274 patients with stable angina were: aspirin (212), beta blocker (209), calcium antagonist (86), nitrate (59) and lipid-lowering therapy (7).

Discussion

To date, this is the largest study of a rapid-access Chest Pain Clinic service in the United Kingdom^{4,6,7,11-13} and the first to estimate its impact on the hospitalization and diagnosis of patients with recent onset chest pain. The provision of the Chest Pain Clinic service in Edinburgh caused a reduction of 213 potential admissions with non-cardiac chest pain, and a concurrent increase in hospitalization of 89 patients with unrecognized unstable angina and myocardial infarction who would have otherwise been managed in the community. Following clinic attendance, >40% of patients were diagnosed as having ischaemic heart disease and >90% were given a firm clinical diagnosis and treatment plan.

In the current study, 144 (14%) patients were found to have either unstable angina or an acute myocardial infarction and were admitted to the Royal Infirmary. The frequency of direct admission from

Table 2 Hospitalization of patients with chest pain

Chest pain clinic	Admission to hospital	Out-patient review	Total
<i>GP intended management</i>			
Admission to hospital	55 (40)	213 (142)	268 (182)
Out-patient review	90 (66)	643 (428)	733 (494)
Total	145	856	1001

General Practitioner's intended management compared with the clinic management of patients with chest pain. Pro-rata figures are shown, with the documented cases in parentheses.

the clinic is in agreement with previous series: 8–26%.^{11–13} However, in the majority of these patients (up to 9% of all patients referred), the diagnosis was unrecognized and the default management inappropriate. In contrast, 213 patients (21%) were spared unnecessary hospitalization and 431 patients (43%) were given reassurance that their chest pain was not attributable to ischaemic heart disease. Indeed, using the resources available, the clinic cardiologist was able to provide a firm diagnosis in >90% of patients on the day of their clinic attendance. Lipid-lowering therapy was initiated in only a few patients with a diagnosis of stable angina, because serum cholesterol concentrations were not available during the clinic consultation, but would be forwarded to the General Practitioner with a recommendation for treatment as appropriate.

General Practitioners must, for the most part, rely upon a clinical history and examination alone to discern whether a patient has an acute coronary syndrome, stable angina, or benign non-cardiac chest pain. Many General Practitioners do not have access to, or have confidence in interpreting, an exercise electrocardiogram,⁸ and the resting electrocardiogram is normal in almost half of patients presenting with ischaemic heart disease.¹¹ The majority of patients with recent-onset angina are managed on nitrate therapy alone in the community⁸ and, despite national guidelines,¹⁴ few are referred for a specialist cardiological opinion.^{15,16}

In addition to specialist experience, the clinic staff have at their disposal a range of electrophysiological, radiological and biochemical investigations to assist in the diagnosis and risk stratification of patients with chest pain and ischaemic heart disease. Our observations that the General Practitioner's provisional diagnosis had diminished sensitivity and specificity in comparison to the final clinic diagnosis as the reference standard, is therefore not surprising. Even when the General Practitioner is confident at interpreting an exercise electrocardiogram result, it leaves a large proportion of patients without a diagnosis or management plan. The provision of a firm diagnosis and reassurance reduces the potential anxiety, morbidity and reattendance of patients with recent onset non-cardiac chest pain and permits the discontinuation of inappropriate anti-anginal medication. Of course, the clinic diagnosis may be incorrect and relies partly on tests, such as exercise testing, which have significant false-positive and -negative rates, as exemplified by the 22 patients undergoing cardiac catheterization who were found to have trivial disease or normal coronary arteries.

McClements and colleagues⁶ found that only 18% of patients referred to an open-access exercise electrocardiography service had a positive exercise test. Moreover, less than half of those with a positive

exercise test were subsequently referred for a cardiology opinion. In contrast, a rapid-access Chest Pain Clinic service has the potential to provide a firm clinical diagnosis and management plan for the majority of patients referred. The current study demonstrated a much higher diagnostic yield with the chest pain of a large proportion of patients (42%) being attributed to ischaemic heart disease. Indeed, in those patients with stable angina, more than a third underwent coronary angiography within the following 4–6 weeks. Our experience would, therefore, suggest that the provision of a Chest Pain Clinic service not only provides a firm diagnosis of non-cardiac chest pain with less equivocation, but also more readily identifies those patients with ischaemic cardiac pain. In patients with ischaemic heart disease, the Chest Pain Clinic facilitates the initiation of appropriate drug therapy, and identifies those patients who are at risk of future coronary events. Such patients may also benefit from more aggressive therapy including intravenous heparin and nitrates, and, where appropriate, coronary angiography.

In conclusion, the provision of a Chest Pain Clinic reduces the hospitalization of patients with benign non-cardiac chest pain whilst facilitating the identification of those patients with acute coronary syndromes requiring in-patient care. A specialist cardiology opinion combined with the resources of a Chest Pain Clinic service would appear to have a higher diagnostic yield for ischaemic heart disease than open-access exercise electrocardiography, provides the General Practitioner with a firm clinical diagnosis in over 90% of cases, and identifies those patients requiring further invasive investigations.

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