Focus

Direct access echocardiography as a heart failure disease management tool

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KEY POINTS

- Heart failure is an important chronic condition that is very suitable for a disease management approach
- Direct access echocardiography can be an important component of a primary care-led disease management approach to heart failure
- Overseas research suggests that direct access echocardiography can improve the management of heart failure, although randomised controlled trial evidence is still awaited
- An evaluation of the effectiveness of direct access echocardiography and disease management should be undertaken in the New Zealand setting

Introduction

The disease management approach to patient care "seeks to coordinate resources across the health-care delivery system".[1] Patients are viewed as experiencing the clinical course of a disease rather than participating in a series of disjointed encounters with different parts of the health-care system.[1] Critical components of a disease management system include: good information on service utilisation, guidelines to promote more cost-effective service delivery, and the closer integration of health-care providers in primary and secondary care.[2] Disease management programmes were first established in the US during the mid-1990s by commercial companies who sold their programmes to health maintenance companies and hospitals.[3] These programmes have benefited from developments in evidence-based clinical management, outcomes research, population-based care, and team approaches to service delivery.[4] Many of the features of disease management programmes, including the use of audit, guidelines and practitioner education, are included in quality improvement initiatives, and early evaluations of these programmes have reported that they can improve patient outcomes and reduce costs.[1]

Recently, Independent Practitioner Associations (IPAs) in New Zealand have started developing a disease management approach to patient care.[5] New population-based perspectives and budget-holding contracts have enabled IPAs to consider how resources could be better coordinated within primary care and across the interface between primary and secondary care.[5,6] IPA interest in this approach seems to be driven by their wish to improve patient outcomes within their fixed budgets, and an expectation that benefits might also accrue for the primary care team from the development of new roles, additional clinical skills, and closer relationships with secondary care providers.[7]

Many disease management programmes have focused on the area of cardiovascular

disease, and heart failure in particular.[1] Heart failure is a condition well suited to a disease management approach because it has significant public health importance, is well endowed with research evidence and information about local practice patterns, and there is a need to improve readily measurable patient outcomes related to the condition.[1] Furthermore, because heart failure is largely managed in primary care with significant input from secondary care services,[8] there is a recognised need for integrated guidelines to assist with the management of the condition using a team approach.[9]

Transthoracic echocardiography has become a widely used tool in cardiology for the assessment of cardiac anatomy and function.[10] Recent attention has focused on access for GPs to directly refer patients for echocardiography without the need for a prior specialist consultation, as an important intervention to improve service delivery at the primary-secondary care interface.[11] The provision of direct access echocardiography (DAE) has attracted considerable debate in the UK, where it has been available in some areas for nearly a decade.[11] This review examines the published literature related to this debate and considers the introduction of the service as part of a disease management programme in New Zealand.

Background

Heart failure is common in the adult population. In the UK, the prevalence of heart failure in the community is between 10 and 15 per 1000 people (or about 3 per cent of the adult population).[12,13] Reliable estimates of the prevalence and incidence of heart failure in New Zealand are not available, but they are believed to be similar to other Western countries where about 1 per cent of the total population is affected.[8]

Heart failure is associated with considerable mortality and morbidity in Western countries, especially among the elderly.[14]

In New Zealand during 1996 heart failure (defined by item 428 of the ICD-9 classification system) accounted for 1.7 per cent of all deaths and 1.3 per cent of all admissions to public hospitals.15 There is also evidence that the rate of hospital admission is steadily increasing in Western countries, especially New Zealand.[16]

GP management of heart failure

Most patients with heart failure are managed by their GP.[17] Two UK-based studies have found that GPs with an average list size of 2000 patients will have approximately 20 patients with heart failure.[18,19] These patients will visit the GP about 45 to 50 times per year, attend the outpatient clinic approximately eight times per year and have about four admissions to hospital annually.[18,19]

Signs and symptoms, electrocardio-graphy and chest x-rays are generally unreliable diagnostic tools for the assessment of heart failure; only about half of clinically diagnosed heart failure cases are confirmed by echocardiography to have significant systolic cardiac dysfunction.[20] Echocardiography is now generally recommended for the routine evaluation of heart failure in primary care in both the UK[21] and New Zealand.[8] However, while UK-based GPs frequently investigate patients with heart failure by means of electrocardiography and chest radiology, they less commonly employ echo-cardiography – only approximately one-third of patients with heart failure receive this investigation in primary care.[12,17,22]

Importance of identifying left ventricular dysfunction

Large randomised controlled trials have clearly found that for patients with mild, moderate or severe left ventricular dysfunction, ACE inhibitors significantly reduce morbidity and mortality.[23,24] The effectiveness of ACE inhibitor therapy for heart failure has also been demonstrated in primary care settings.[25] A New Zealand review of the economic benefits of extending ACE inhibitor treatment to all eligible patients not yet receiving the medication according to the inclusion criteria of the SOLVD trial found that sub-stantial savings in discounted health sector costs (1993 $NZ6,517,000) would be accrued.[16]

Problems with heart failure management

TABLE 1. STUDIES THAT HAVE EVALUATED DIRECT ACCESS ECHOCARDIOGRAPHY FOR HEART FAILURE

Author	Location	Sample (patient number referred by GPs)	Percentage (number) of patients with significant left ventricular dysfunction	
DAVIE (1997)	UNITED KINGDO	259	16	(41)
SIM (1998)	CARDIFF, WALES	200	25	(22)
FRANCIS (1995)	UNITED KINGDO	259	18	(41)
TYBULEWICZ† 1996)	LONDON	22	32	(7)
DAVIE (1998)	EDINBURGH, SC	534	18	(96)
MURPHY (1996)	UNITED KINGDO	250	20	(49)
‡WHEELDON (1993)	UNITED KINGDO	78	41	(32)
*CANTLEY (1999)	SCOTLAND	39	64	(25)

‡INCLUDED PATIENTS IN ONE GENERAL PRACTICE RECEIVING LOOP
*INCLUDED PATIENTS WITH ATRIAL FIBRILLATION IN TWO GENERA

Heart failure can be misdiagnosed, under-investigated or treated inappropriately in general practice, and GPs have previously been shown to be unaware of the importance of echocardiography and ACE inhibitors in the management of heart failure.[26,27] Prior to the more general use of echocardiography, Remes[28] found that a false-positive diagnosis was common in primary care, especially among women. Clarke[17] concluded that echocardiography was performed in less than 30 per cent of investigated cases of heart failure in the UK, and fewer than 20 per cent of cases were actually treated with an ACE inhibitor. Similarly, Mair[12] concluded that fewer than 33% of patients with a diagnosis of heart failure actually received ACE inhibitor treatment, and often an inadequate dose was prescribed.

More recent work based in New Zealand suggests that awareness among GPs of the importance of echocardiography and ACE inhibitor therapy may have substantially increased over the last decade, eg, an audit of 100 Christchurch patients with heart

failure in 1998 found that 76 per cent were receiving ACE inhibitor treatment.[29]

Barriers to the use of echocardiography in primary care

A number of factors may still act to prevent GPs from using echocardiography in their management of patients with heart failure. An important barrier inhibiting GPs from obtaining rapid access to echo-cardiographic assessment is the requirement that the patient should first receive a consultation with a cardiologist.[30] Other potential barriers include a lack of knowledge, cost, distance and the absence of suitable equipment or appropriately trained technicians.

Effectiveness of direct access echo-cardiography

Eight published case series have assessed the effectiveness of a DAE service (Table 1). These case series have usually involved the descriptive audit of a retrospective series of patients who have received the test. The percentage of patients identified with left ventricular dysfunction by direct echocardiography ranged between 16 and 64 in these eight case series.

When the two studies which included highly selected samples[18,31] were excluded, approximately 20 per cent of patients referred to a DAE service were diagnosed with heart failure. The sensitivity of the test was improved by excluding patients who had a normal ECG,[32] or either a past history of myocardial infarction or a displaced apex beat on clinical examination.[33] However, the studies also have a number of significant limitations including: the absence of a control group, an inability to exclude selection or information bias, small sample sizes, and the lack of any assessment of whether the information from the test was correctly interpreted and acted upon, and ultimately whether patient outcomes were actually improved from the provision of the test.

Advantages and disadvantages of an open access service

The main advantage is the potential to improve the diagnosis of heart failure in primary care and facilitate appropriate treatment with ACE inhibitors, beta blockers and spironolactone. This can avoid unnecessary treatment, such as an ACE inhibitor prescription for patients with diastolic dysfunction or normal echo-cardiograms.[35] Proponents of open access echocardiography (OAE) also suggest that the service can enable the quicker identification of high-risk patients who can then be promptly referred to a tertiary centre.[35] In addition, unnecessary referrals to consultant outpatient clinics can be avoided.[35]

Concern has been expressed that the provision of OAE will overwhelm already stretched resources.[38] Referrals for echocardiography have already risen dramatically over the last two decades in most Western countries.[38-40] Opponents have also suggested that GPs will use the service indiscriminately or inappropriately.[41] These opponents have cited some results from audits of other open access services, which found that the majority of GP referrals were inappropriate – such as the review of an open access resting ECG service by Lindsay et al.[42]

Opponents caution that false positives can occur from echocardiography when normal ranges are applied to tall or to athletic individuals, and false positives in interpretation can occur, eg, failure to recognise that some minor regurgitation can normally occur about the mitral or tricuspid valves.[43] Finally, detractors comment

that open access for the assessment of some clinical conditions, eg, the assessment of a murmur, may not be sufficient[11] and a consultation with a specialist will probably still need to occur.

Conclusion

Direct access echocardiography has been assessed in relation to the management of heart failure; however, the service may be of assistance for a range of other cardiac conditions.

Echocardiography is an important investigation in the management of heart failure, and can significantly improve the prescribing of ACE inhibitors which are associated with improved outcomes for people with heart failure. However, uncertainty exists about whether DAE is a cost-effective method to assist with the coordination of primary and secondary services for people with heart failure. This uncertainty could best be alleviated by the results of large randomised controlled trials comparing direct access with consultant-based services for patients with similar risk profiles, and assessing outcomes such as quality of life, hospitalisation rates and costs. Such a trial is now under way in the Netherlands and its results are expected by mid-2000 (http://azvu.nl/ocl2/proj1.3.html).

In New Zealand a direct access service may soon be provided in Christchurch through the collaborative efforts of the Pegasus Medical Group and Canterbury Health as part of a heart failure disease management programme. This programme has been developed because of growing support among both cardiologists and GPs for improved access to echocardiography, and disease management has provided this opportunity. The service will be introduced with a locally developed education programme to assist GPs to identify appropriate patients for the test. GPs will receive clinically relevant reports soon after each referral along with comparative feedback on their referral patterns. In addition to this service, a number of other community based initiatives to assist with the management of mild to moderate acute exacerbations of heart failure will also be introduced as part of a systematic, primary care-based, disease management programme. An evaluation of these initiatives would be important in order to determine the effectiveness of both a DAE service and a disease management programme in the New Zealand setting.

Acknowledgement and disclaimer

Funding for a review of DEA was obtained from the Pegasus Medical Group. The opinions presented in this review are those of the authors.

References available on request.