Family Practice 2010; **27**:359–362
doi:10.1093/fampra/cmq019
Advance Access published on 19 April 2010

Identification of patients with asymptomatic left ventricular dysfunction: 'real practice' results in primary care

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Received 2 June 2009; Revised 22 February 2010; Accepted 15 March 2010.

Aims. Asymptomatic systolic left ventricular dysfunction (ASLVD) fulfills the essential criteria to screen for a disease. In Italy, echocardiography screening has been suggested for high-risk patients, albeit not tested in 'real practice'.

Objective. We evaluated the feasibility and the results of such a strategy in primary care.

Methods and results. Seventy Italian GPs first identified all their 50- to 74-year-old patients with coronary heart disease and/or hypertension and/or diabetes mellitus and/or renal damage, then randomly selected 1405 individuals (one-tenth). In this group, 217 (15%) hypertensive and diabetic patients had no end organ damage evaluation, could not be classified as high/non-high-risk and had no prescription for echocardiogram; 390 individuals [27.7%; 95% confidence interval (CI) 25.4–30%) resulted as high risk. A recent echocardiogram was already available in 129 (33.1%) patients, 122 (31.3%) underwent echocardiography and 139 (35.6%) did not comply with this prescription. Non-compliance and difficult access to echocardiography were the main reasons not to undergo the prescribed echocardiogram. Among the 261 evaluable subjects, 26 (10.8%; 95% CI 7–14.6%) had a $\leqslant$50% and 10 (4.0%; 95% CI 1.6–6.4%) a $\leqslant$40% left ventricular ejection fraction. Only 5 out of 26 ASLVD cases where detected by echocardiograms performed for pure screening purposes.

Conclusion. Only a third of high-risk patients may benefit from screening, with a modest gain over current practice in terms of new ASLVD diagnoses.

Keywords. Left ventricular dysfunction, primary care, screening.

Introduction

Symptomatic heart failure is preceded by a somewhat prolonged asymptomatic stage in many patients. Asymptomatic systolic left ventricular dysfunction (ASLVD) is common[1] and associated with increased mortality, can be easily identified by non-invasive techniques[2] and the treatment is effective and non-expensive,[3] thus fulfilling the criteria for screening for a disease.[4] It is probably not possible to screen all the patients at high risk for heart failure, i.e. Stage A subjects[5] (individuals with hypertension, atherosclerotic disease, diabetes, obesity, metabolic syndrome or exposed to cardiotoxic drugs) because such a strategy would require examining an enormous number of individuals with the likelihood of detecting a relatively small number of patients who would develop systolic dysfunction. Recently, all the Italian Scientific Societies approved a consensus document[6] that proposes an echocardiographic assessment of the asymptomatic left ventricular (LV) dysfunction for individuals at higher risk of developing symptomatic heart failure (HF): subjects with (i) family history of cardiomyopathy; (ii) renal failure; (iii) hypertension and/or diabetes mellitus with target organ damage; (iv) coronary heart disease; (v) severe–moderate asymptomatic valvular disease and (vi) chemotherapy and radiation therapy. As far as we know, such a strategy has not been tested in real practice yet. Before another screening task is proposed to busy GPs, it is necessary to estimate the burden, the obstacles and the results of this strategy in everyday clinical practice. We report the results of implementing this ASLVD screening strategy in usual Italian primary care.

Methods

The authors asked 134 members of the Italian College of General Practitioners, previously involved in other cardiovascular researches, to implement the ASLVD

screening according to the strategy proposed by the Italian Consensus Document,[4] i.e. echocardiography for the patients with at least one of the following: coronary heart disease (CHD), hypertension with target organ damage, diabetes mellitus with target organ damage, renal disease, family history of cardiomyopathy, chemotherapy or radiotherapy and asymptomatic but relevant valvular heart disease. Since the first four patient groups include almost all the subjects who should undergo the screening procedure, for simplicity's sake, we examined only these patients. The GPs were asked to identify, by means of a computerized query procedure, all their patients aged 50–74 years with at least one of the following: CHD, hypertension, diabetes mellitus, chronic kidney disease (defined as estimated glomerular filtration rate <60 ml/min/1.73 m^2 according to the Cockroft and Gault formula[7] or blood creatinine level >1.5 mg/dl); individuals with heart failure were excluded. From this list, they randomly selected 10% of the patients by means of a computerized procedure selecting every 10th subject. Patients with CHD or renal disease were immediately included, while hypertensives and diabetics were included only if target organ damage was recorded as left ventricular hypertrophy (electrocardiogram diagnosis), left bundle branch block, microalbuminuria, macroalbuminuria and diagnosis of peripheral arterial disease. Although an age limit was not recommended by the Consensus paper, we considered the age range 50–74 years better suited to the clinical practice: ASLVD is very unlikely at a younger age and most ASLVDs become symptomatic in people aged ⩾75 years.[4] The choice to examine only a random sample was agreed upon by the participants because it was not possible to do an echocardiography for hundreds of patients in a relatively short period of time. It was considered unethical to repeat an echocardiogram in patients who had recently undergone this test; therefore, we decided to report LV function of the echocardiograms available within the last 2 years from the index date (the date of identification of the patient as a high-risk subject). The study started in December 2006 and ended in May 2008; in this period, the participant GPs received three pieces of feedback information about the personal and the whole group results: the number of evaluated patients, the number of high-risk subjects with and without echocardiography and the number of identified ASLVDs.

Results

Seventy GPs, caring for 87 351 patients, agreed to participate. They identified 14 050 subjects with at least one of the following: CHD, renal disease, hypertension, diabetes mellitus and then randomly selected 1405 patients (one-tenth). The characteristics of these patients are summarized in Table 1.

TABLE 1 *Characteristics of study population*

	Total	% of sampled patients
Sampled patients	1405	—
Mean age (years)	63.5	—
Diabetes	336	23.9
Albuminuria	63	4.5
Peripheral artery disease	36	2.6
Albuminuria NA	63	4.5
Hypertension	1255	89.3
LVH	175	12.5
LBB	29	2.1
ECG NA	276	19.6
Coronary artery disease	160	11.4
Angina	35	2.5
MI	54	3.8
Myocardial revascularization	55	3.9
Instrumental diagnosis	16	1.1
Chronic renal insufficiency	56	4.0
Dialysis	5	0.4
Kidney function NA	74	5.3

NA, not available; LVH, left ventricular hypertrophy; LBB, left bundle branch block; ECG, electrocardiogram.

The data needed to evaluate the target organ damage were already recorded in 1039 (74%) patients, while 366 (26%) needed further evaluation.

During the study period, 149 more subjects had this data available; the total number of hypertensive and/or diabetic patients evaluable for the presence of target organ damage was then 899 (77% of the hypertensive and/or diabetic group). Overall, 390 [27.7%; 95% confidence interval (CI) 25.4–30.0%] high-risk patients (i.e. CHD subjects, patients with renal disease, hypertensives and diabetics with target organ damage) were identified; 129 (33.1% of the high-risk group) had already had an echocardiogram in the previous 2 years and 122 (31.3% of the high-risk group) underwent this test after their GP's prescription; for 139 (35.6% of the high-risk group), it was not possible to obtain an echocardiogram (Fig. 1), the main reasons being patient non-compliance and difficulties in accessing echocardiography.

Twenty-six echocardiograms (10.4%; 95% CI 7.0–14.6%) showed a left ventricular ejection fraction (LVEF) ⩽50%, of these 10 (4.0%; CI 1.6–6.4%) showed a LVEF ⩽40%.

Five out of the 122f echocardiograms prescribed during the screening procedure showed a LVEF <50%.

The study results are summarized in Figure 1.

Discussion

ASLVD has an estimated prevalence of 3% to 6% and is at least as common in the community as systolic left ventricular heart failure.[1] The prognosis of the ASLVD subjects is worse than that of the general

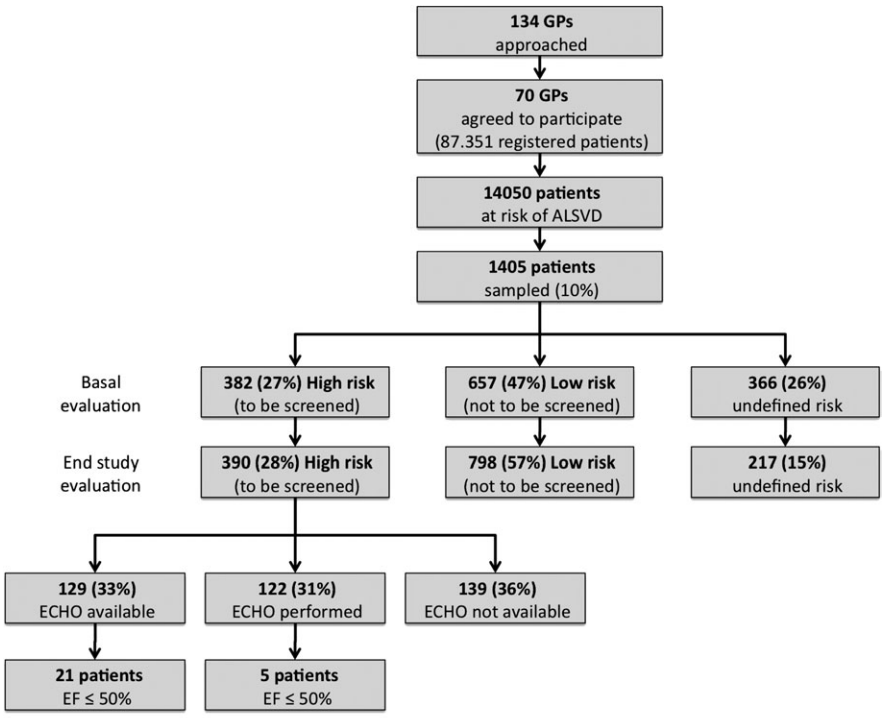

FIGURE 1 *Flow chart of patients' evaluation. High risk: patients with CHD or renal damage and patients with hypertension and/or diabetics with evidence of target organ damage. Low risk: patients with hypertension or diabetes but without organ damage. Undefined risk: patients lacking data needed to define the risk profile*

population: according to Hobbs *et al.*,[8] the 5-year survival rate of the general population was 93% compared with 69% of those with ASLVD. Heart failure symptoms can be prevented or delayed and mortality can be reduced by angiotensin-converting enzyme inhibitors and beta-blockers, which are strongly indicated in all the patients with ASLSD.[9] It is therefore important to recognize and appropriately treat these patients before they develop heart failure symptoms.

We tested a screening strategy recently proposed by the Italian Consensus paper,[6] focusing on the patients who represent both the overwhelming majority of the high-risk subjects and the typical patients cared for by GPs, i.e. CHD subjects, patients with renal disease, hypertensives and diabetics with target organ damage.

We found that ~28% of the patients aged 50–74 years could be identified as high-risk subjects. Approximately a third of these individuals had already been evaluated by an echocardiogram in the previous 2 years; another third underwent echocardiography during the 1-year observation period, while it was not possible to evaluate the LV function in the remaining subject for whom the screening was indicated. About 10% of the screened subjects had ASLVD (LVEF <50%) but only five of them where identified as a consequence of the screening program.

The characteristics of our patients are very similar, albeit not equal, to those reported in other studies, which tested a screening strategy. Baker *et al.*[10] examined 482 general medicine patients ⩾60 years of age with hypertension, diabetes, coronary artery disease or previous myocardial infarction (MI) but no history of HF or reduced LVEF: a total of 7.9% of patients had LVEF ⩽45%. In a study involving 16 English general practices, 1062 patients (66% response rate) with previous MI, angina, hypertension or diabetes were examined and in 22% of cases, LVEF was ⩽50%; according to the authors, heart failure symptoms were present in half of these patients, thus reducing the prevalence of true ASLVD to ~11%.[11]

The estimated prevalence of ASLVD in our study is in keeping with all the previously mentioned studies,[1,10,11] when the different LVEF cut-off are taken in account. It must be noticed that our data cannot provide pure epidemiological information and that further specific studies will be needed to establish the real

ASLVD prevalence in Italy. Furthermore, our study preliminarily examined only the feasibility and the potential usefulness of the screening strategy proposed by the Italian Scientific Societies. Screening programs are a health care intervention and should be tested in randomized controlled trials to ensure improved survival before implementation. Other larger and specific studies will be needed before ASLVD screening can be proposed for widespread use in primary care. Our results show that not all high-risk individuals could be screened. Identification of all high-risk subjects was incomplete. At baseline, 26% of the diabetics and hypertensive patients could not be correctly stratified because of the incomplete recording of the data needed to assess the target organ damage; at the end of the 1-year observation period, the risk profile of 15% of eligible patients was still undefined. In about one-third of the patients, the prescribed echocardiogram was not obtained, due to difficult access to echocardiography—in some parts of Italy—and non-compliance of patients with their doctor's prescription. Another third of the patients had already undergone echocardiography in the previous 2 years, the main reason being the evaluation of electrocardiographic diagnosis of left ventricular hypertrophy and/or having suffered a previous MI (data not shown). The majority of ASLVD cases where identified in this group and were already known, while only five ASLVD cases where detected in the remaining 122 subjects who performed an echocardiogram for screening purposes only.

In conclusion, our data show that about a third of high-risk patients may be screened and that this additional echocardiographic evaluation provides only a modest gain over current practice in terms of new ASLVD diagnoses. Further studies are needed before such a screening procedure can be implemented in primary care.

Acknowledgements

The GPs who took part in the study: Mauro Alba, Paolo Antonini, Vincenzo Autiero, Giorgio Barisone, Massimo Battistelli, Maria Grazia Bonesi, Giuliano Bovicelli, Pierclaudio Brasesco, Annamaria Campedelli, Francesco Campo, Gigi Canciani, Mario Casarola, Gaetano Cavicchi, Amedeo Circosta, GDA, Antonio De Bari, Mario Domenico Dell'Orco, Carmelo Di Gregorio, Antonino Di Guardo, Annarita Di Paolo, Giovanni Digiacomo, Giuliano Ermini, Rosario Falanga, AF, Antonio Fioravanti, Emanuele Fiorini, Marzio Fiumana, Fabrizio Gangi, Bruno Glaviano, Lorenzo Gola, Stefano Granzotto, Dario Grisillo, Bruno Guillaro, Gabriella Ianiro, Cherubino Inguscio, Antonio Corrado Leone, Luciano Lippa, Maria Pia Lora, Lorenzo Lupi, Gianluca Mannari, Fedele Marulli, Dino Massignani, Enzo Mazzola, Francesco Mazzoleni, Francesco Mingione, Raffaele Mocciaro, Francesco Mundo, Andrea Muscolo, Italo Paolini, Piero Paradisi, Domenico Pasculli, Salvatore Pasqualetto, Guido Pastacaldi, Renzo Pegoraro, Mario Arnaldo Perugini, Gaetano Piccinocchi, Roberto Piva, Filippo Pizzicaroli, Luigi Prati, Annalisa Rainer, Stefano Rolih, Giuseppe Rubicini, Marcello Salera, Antonio Scala, Pietro Speziali, Andrea Stimamiglio, Carlo Stramegna, Antonella Toselli, Emanuele Visentini and Lucio Zinni.

Declaration

Funding: none.
Ethical approval: none.
Conflict of interest: none.

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