Application of NHG guidelines in patients referred for stable chest pain syndromes

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Purpose. Guidelines of the Dutch Association of General Practitioners (NHG) dictate the evaluation, treatment, and referral process of patients with stable chest pain syndromes (CPS). Adherence to this guideline was assessed in a consecutive group of patients referred to our hospital.

Methods. We retrospectively studied the records of 296 subjects referred to our outpatient department in 2007 for evaluation of stable CPS. Referral letters were checked for completeness (past and present history, mentioning of risk factors for cardiovascular disease, physical examination, listing of medication) and used to judge adherence to the guideline. In a subset of patients, additional information regarding the referral process was gathered by telephone interview.

Results. The referral letter was complete in only 67 patients (23%); items most often not reported were physical examination (63%) and cardiovascular risk factors (62%). Judging from the referral letter, 23 patients (8%) were evaluated in accordance with the NHG guideline prior to their referral. In patients in whom the final diagnosis of angina pectoris was made by the cardiologist, this was 20%. Seventy-nine patients were contacted by telephone after their work-up by the cardiologist; 36 of them (44%) reported being referred at their first visit to their primary physician, while 14 (18%) were referred at their own request.

Conclusion. Prior to referral, only a minority of patients with stable CPS were evaluated and treated in accordance with NHG guidelines. Furthermore, their referral letter was often incomplete. (Neth Heart J 2010;18:178-82.)

Keywords: Chest Pain; Practice Guidelines as Topic; Netherlands; Research; Guideline Adherence

Chest pain is a frequent reason for seeking medical attention. In primary care medicine, ischaemic heart disease is the underlying mechanism in 8 to 16% of these patients.¹⁻³ To support general practitioners (GPs) in their approach to patients with stable chest pain syndromes, the Dutch Association of General Practitioners or (in Dutch) the Nederlands Huisartsen Genootschap (NHG) has published an evidence-based guideline on angina pectoris (AP).⁴ However, guidelines only have limited impact on (changing) a physician's routine practice.^{5,6} Studies in other countries have shown that the medical care of patients with stable angina is often suboptimal⁷⁻¹¹ and it seems legitimate to assume that the situation is not different in the Netherlands. A Dutch study, for example, showed that only 51% of patients with AP diagnosed by GPs were prescribed aspirin.¹² Yet, as far as we know, adherence to the NHG guideline 'Stable Angina Pectoris' has never been more extensively studied. We therefore conducted a retrospective survey in a selected group of patients, i.e. those who were referred to our outpatient department for the evaluation of stable chest pain symptoms.

Patients & Methods

Patients

All patients who were newly referred by their GP to our cardiology outpatient department in the year 2007 for analysis of chest pain were identified. Characteristics of the patients, including cardiovascular risk factors, were derived from the referral letter and the charts of the cardiologist. Hypercholesterolaemia was deemed present when the patient

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took a lipid-lowering agent or if the total cholesterol level exceeded 5.0 mmol/l. The family history was considered positive if this was mentioned as positive in the cardiologist's notes. For our analyses, we divided the patients into three categories: 1) the total population referred for analysis of chest pain, 2) the subgroup in which the cardiologist confirmed the presence of AP, and 3) the subgroup with chest pain that was eventually diagnosed otherwise. The reason for this subdivision was our assumption that in patients in whom the diagnosis of AP had *not* been made, the application of guidelines may have been different due to either doctor-related factors (e.g. uncertainties in the interpretation of patient data) or patient-related factors (e.g. reassurance of the patient or insistence on referral despite a correct non-cardiac diagnosis by the GP).

Quality of referral letter

The referral letters were checked against the standard published by the NHG.¹³ We considered the referral letter as complete when it contained the history (with description of the actual complaint), cardiovascular risk factors (at least two out of five – smoking, diabetes, hypertension, hypercholesterolaemia, family history – mentioned), the past medical history, the physical examination (at least two components mentioned out of the following four: blood pressure, pulse rate, auscultation of the heart, auscultation of the lungs) and current drug treatment.

Adherence to guideline

Adherence to the guideline was judged on information provided in the referral letter. Presence and extent of the following items were registered: history, cardiovascular risk factors, physical examination, investigations performed (laboratory results, resting ECG and exercise testing) and treatment (e.g. the use of antianginal therapy and/or aspirin). The duration of pharmacological therapy prior to referral was determined from the history or from the medication list. For all patients, the electronic data system of the hospital was checked for any additional blood testing ordered by the GP while not being mentioned in the referral letter.

The NHG guideline advises the GP to refer patients with suspected AP to a cardiologist when they have an intermediate risk profile and are unable to perform an exercise test, have an inadequate response to antianginal therapy (with at least two antianginal drugs), have high-risk findings on exercise testing, and/or have concomitant heart failure. For each individual patient, we tried to assess whether referral was based on any of these criteria. In the case of inconsistencies in acquired data, judgments were based on the record made by the cardiologist.

Telephone interview

To gather further insight into the referral process, 158 consecutive patients in which the analysis by the cardiologist had been completed were contacted for a telephone interview. The patients were questioned on the diagnostic and therapeutic interventions that had been performed prior to referral. Physical examination was only specified in either 'performed' or 'not performed' (or unknown if the patient did not recall the item). Thus, no details regarding the extent of this examination were asked. If the GP had prescribed drugs this was listed as either 'cardiac' medication or 'other'. The number of contacts with the GP prior to referral and any wish of the patient for referral were also recorded.

Statistical analysis

The analysed data in numbers were determined for the total population and the two defined subpopulations. The χ^2 test was used to test differences in proportions. The student's t-test was used to test differences in continuous variables (e.g. age) and expressed in a 95% confidence interval. Statistical significance was set with a value of $p < 0.05$.

Results

Characteristics of the patients

We identified a total of 308 patients who had been electively referred to our outpatient department for the evaluation of chest pain. The referral letter was available for analysis in 296 patients. Patients were referred by 127 different GPs, with a maximum of eight referrals per physician. Figure 1 shows which patients were included in our survey and which subpopulations were made subsequently with data obtained up to May 2008. The clinical characteristics of the study population, with a subdivision according to final diagnosis, are shown in table 1.

Completeness of referral letter

Out of the 296 referral letters, 67 (23%) were complete according to our predefined criteria. In the other 229 (77%) letters one or more items were missing. Physical examination was not mentioned in 49% of the 229 (i.e. in 63% of all 296 letters), no cardiovascular risk factors in 48%, no past medical history in 36% and no medication list in 30% of the letters. A more detailed description of the patient's complaint in terms other than just 'chest pain' was missing in 11% of all referral letters.

Diagnostic and therapeutic interventions

From the referral letters, all diagnostic interventions ordered by the GPs are shown in table 2. In 184 patients (62%) no apparent further diagnostic testing (apart from the physical examination) had been performed. While in 16% of the patients laboratory results were mentioned in the referral letter,

Figure 1. Flow chart of patients referred to our outpatient department for evaluation of chest pain in 2007; subdivided in subpopulations we analysed.

we could trace results in another 9% in the electronic data system of the hospital, making a total of 25%. While the frequency of performed laboratory investigations was slightly higher in patients with eventually proven angina than in patients diagnosed otherwise (38 vs. 21%), the number of resting ECGs and exercise tests performed was compa-

table (7 vs. 8%). The use of antianginal drugs and aspirin and the time period that this medication was taken prior to referral are presented in table 3. In 48% of the patients with confirmed angina, the GP had not started any medication at all. In another 24% of patients, medication had been prescribed but the patient was referred to the cardiologist without evaluating the effects of the drugs. Considering all the applicable criteria for referral as stated in the NHG guideline, only 23 patients out of 296 (8%) met these completely. In the subpopulation of patients with proven angina, the referral criteria had been used correctly in 20% (16 patients out of 80).

Telephone interview

A total of 158 consecutive patients were approached (once only) for a telephone interview; 80 patients were reached and willing to cooperate. Due to internal inconsistencies one interview was excluded from analysis. Of the remaining 79 patients (mean age 61 years) 33% were male. Angina had been diagnosed by the cardiologist in 24 patients (30%), which is similar to the entire study population (27%). Prior to referral, 36 patients (46%) had visited their GP only once. Of these, three patients (8%) admitted having insisted on referral at the first visit. A total of 14 patients (17%) had asked for referral to a cardiologist at some point. While the physical examination was only mentioned in 51% of referral letters, 80% of the interviewed patients declared that their GP had performed some sort of physical examination. Table 2 compares the information gained from the referral letter with that from the telephone interviews. Overall, the referral letter seems to underreport the actions of the GP. With regard to medication, 16 patients (20%) reported that cardiovascular drugs were started by the GP, with a scheduled follow-up visit in 25%. This contrasts with the referral letters, which re-

Table 1. Clinical characteristics of total population subdivided in subpopulations with proven stable angina and diagnosed otherwise.

	Total population	Subpopulation proven angina	Subpopulation other diagnosis
Male (%)	48 (143/296)	55 (44/80)	46 (91/198)
Mean age (SD)	57.2 (13.1)	64.4 (11.9)*	54.9 (12.8)*
Risk factors			
– Smoking (%)	31 (79/254)	30 (20/67)	32 (56/175)
– Hypertension (%)	40 (98/244)	64 (43/67)†	29 (48/164)†
– Hypercholesterolaemia (%)	50 (113/226)	71 (42/59)*	42 (67/160)*
– Diabetes mellitus (%)	13 (30/233)	23 (15/66)§	8 (13/161)§
– Positive family history (%)	48 (141/246)	55 (33/60)	58 (99/172)

% (n/n) * 95% CI (6.27-12.8), † p<0.0001, ‡ p<0.0001, § 0.02. Significant differences between subpopulations are in bold.

Table 2. Adherence to diagnostic recommendations from the guideline (in %); subdivided in total population, subpopulation with proven angina, subpopulation with other diagnoses and interviewed population.

	Total population* (n=296)	Subpopulation proven angina* (n=80)	Subpopulation other diagnosis* (n=198)	Interviewed population (n=79)
Physical examination	51	54	50	80
Laboratory results	25†	38†	21†	43
Resting ECG	18	20	17	24
Bicycle test	7	8	7	10

* Data from the referral letter, †data from the referral letter and the electronic record system were combined.

ported that 28% of patients were started on cardiac medication prior to referral with follow-up reports in only 9%.

Discussion

The guideline 'Stable Angina Pectoris',⁴ endorsed by the Dutch societies of both GPs and cardiologists, supports GPs in their workup of patients with stable chest pain syndromes, including indications for referral. Our survey demonstrated that in 296 patients with chest pain, only 8% of the referrals to our outpatient department were in accordance with these guidelines. Even in the subpopulation of patients in whom the cardiologist confirmed the diagnosis of AP this did not exceed 20%.

We also showed that the diagnostic process prior to referral is suboptimal. Of the tests advised by the NHG guideline, the referral letter mentioned a physical examination in only 51% of patients, blood testing in 25%, a resting ECG in 18% and a bicycle test in 7% (whereas, in our area, GPs have open access to exercise testing). In the subpopulation of patients with proven angina only the percentage of blood testing was slightly higher (38%). The finding that GPs make suboptimal use of diagnostic tests is consistent with that of another Dutch survey.¹⁴

With regard to therapeutic actions, 28% of patients were taking either aspirin, an antianginal drug, or a combination of these at the time of referral. When antianginal drugs were started, in more than half of the cases this was done without assessing the effects in a subsequent contact with the patient. In the subpopulation of confirmed angina, at least 48% of the patients were not started on any therapy at all.

We primarily used the referral letter as the basis for our analyses. Reports have shown that this letter often lacks essential information.¹⁵⁻¹⁷ Indeed, using our criteria only 23% of all letters proved to be complete, with physical examination (in 49%) and cardiovascular risk factors (48%) most frequently missing. If these figures reflect an underreporting of the actions actually performed by the GP, conclusions as to what extent the guideline was followed may be flawed. That this is not the case may be inferred from the fact that we were able to find additional lab results in only 9% of the patients on top of the 16% that had lab testing mentioned in their referral letter. Furthermore, we compared parts of the referral letter with telephone interviews in 79 patients and found no difference for the number of ECGs and bicycle tests reported. Only physical

Table 3. Prescription of antianginal drugs and aspirin at time of referral to cardiologist (in %).

Type of drug	Total population (n=296)	Subpopulation proven angina (n=80)	Subpopulation other diagnoses (n=198)
2 antianginal drugs + aspirin	3	12	-
1 antianginal drug + aspirin*	6	14	3
1 antianginal drug + aspirin†	14	24	10
Nitrate or aspirin only	5	2	7
No medication	72	48	80

* Long duration: effectiveness of drug therapy followed up by primary care physician as judged from referral letter, †short duration: immediate referral after start of therapy.

examinations and blood testing were more often reported by the patients than noted in the referral letter, but still less than would be expected from the guideline.

The referral process in itself did not match the guideline either: 46% of the interviewed patients were referred after their first visit to the GP whereas the guideline states that in the absence of more 'direct' medical reasons for referral, follow-up visits are necessary to judge the effect of interventions imposed. The role of the patient in the referral process was relatively small: only 8% had insisted on referral at first contact, whereas a total of 17% of all interviewed patients had asked for referral some time during the evaluation process. Thus, other factors than pure technical ones may have driven the referral. Whether these are related to, for example, a lack of confidence of the GP regarding his own competence on this topic cannot be deduced from our study. The fact that the patients were referred by 127 different GPs with a maximum of eight patients each indicates that the described referral practice is widely applied. Of course, it should be realised that our study was performed in the referred (i.e., a selected) population only.

Conclusion

From our survey, two areas of possible improvement in the care of patients with stable chest pain syndromes can be identified. The first relates to the finding that adherence to the guideline 'Stable Angina Pectoris' in primary care medicine was very limited in patients who were electively referred to our outpatient department for evaluation of their chest pain. Our study does not, however, gain insight into the reasons for this discrepancy. The second challenge for improvement lies in the content of the referral letter that we found suboptimal in more than 75% of cases. ■

References

- 1 Buntinx F, Knockaert D, Bruyninckx R, et al. Chest pain in general practice or in hospital emergency department: is it the same? *Fam Pract.* 2001;18:586-9.
- 2 Verdon F, Burnand B, Herzig L, Junod M, Pécoud A, Favrat B. Chest wall syndrome among primary care patients: a cohort study. *BMC Fam Pract.* 2007;8:51-8.
- 3 Nilsson S, Scheike M, Engblom D, et al. Chest pain and ischaemic heart disease in primary care. *Br J Gen Pract.* 2003;53:378-82.
- 4 Rutten FH, Bohnen AM, Schreuder BP, Bouma M. NHG-standaard Stabiele Angina Pectoris. *Huisarts Wet.* 2004;47:83-95.
- 5 Feder G, Eccles M, Grol R, Griffiths C, Grimshaw J. Using clinical guidelines. *BMJ.* 1999;318:728-30.
- 6 Grol R, Grimshaw JM. From best evidence to best practice: effective implementation of change in patients' care. *Lancet.* 2003;362:1225-30.
- 7 Ruzyllo W, Ponikowski P, Wilkins A. Clinical characteristics and methods of treatment of patients with stable coronary heart disease in the primary care settings – the results of the Polish, multicentre Angina Treatment Pattern (ATP) study. *Int J Clin Pract.* 2004;58:1127-33.
- 8 Wiest FC, Bryson CL, Burman M et al. Suboptimal pharmacotherapeutic management of chronic stable angina in the primary care setting. *Am J Med.* 2004;117:234-41.
- 9 Murphy, NF, Simpson CR, MacIntyre, McAlister, FA, Chalmers J, McMurray JJV. Prevalence, incidence, primary care burden and medical treatment of angina in Scotland: age, sex and socioeconomic disparities: a population-based study. *Heart.* 2006;92:1047-54.
- 10 Filippi A, Gensini G, Bignanimi AA, Sabatini A, Mazzaglia G, Cricelli C. Management of patients with suspected angina, but without known myocardial infarction: a cross-sectional survey. *Br J Gen Pract.* 2004;54:429-33.
- 11 Stewart A, Rao J, Osho-Williams G, Fairfield M, Ahmad R. Audit of primary care angina management in Sandwell, England. *J R Soc Health.* 2002;122:112-7.
- 12 Braspenning JCC, Schiere AM, Mokkink H, van den Hoogen H, Grol RPTM. Huisartsgegevenskundig handelen volgens richtlijnen. In: Braspenning JCC, Schellevis FG, Grol RPTM (redactie). Tweede Nationale Studie naar ziekten en verrichtingen in de huisartsenpraktijk. Utrecht/Nijmegen: NIVEL/WOK 2004.
- 13 URL: <http://nhg.artsennet.nl/kenniscentrum/Artikel-Kenniscentrum/Verwijsbrief.htm>.
- 14 Grundmeijer HGLM, van Weert HCPM. Kritiek op huisartsen als zij verwijzen. *Huisarts Wet.* 1993;36:445-50.
- 15 Westerman RF, Hull FM, Bezemer PD, Gort G. A study of communication between general practitioners and specialists. *Br J Gen Pract.* 1990;40:445-9.
- 16 Grol R, Rooijackers-Lemmers, van Kaathoven L, Wollersheim H, Mokkink H. Communication at the interface: do better referral letters produce better consultant replies? *Br J Gen Pract.* 2003;53:217-9.
- 17 Engelsman C, Geertsma A. De kwaliteit van verwijzingen (Dissertation). Groningen: University of Groningen, 1994.