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Chest pain in daily practice: occurrence, causes and management

The TOPIC study

*François Verdon[a], Lilli Herzig[a], Bernard Burnand[b], Thomas Bischoff[a], Alain Pécoud[c], Michel Junod[a], Nicole Mühlemann[a], Bernard Favrat[c] for GMIRG**

[a] Institute of General Medicine, University of Lausanne
[b] Institute of Social and Preventive Medicine, and
[c] Department of ambulatory care and community medicine, Hospices-CHUV and University of Lausanne, Switzerland
* GMIRG: General Medicine Institute Research Group

Summary

Questions under study: We assessed the occurrence and aetiology of chest pain in primary care practice. These features differ between primary and emergency care settings, where most previous studies have been performed.

Methods: 59 GPs in western Switzerland recorded all consecutive cases presenting with chest pain. Clinical characteristics, laboratory tests and other investigations as well as the diagnoses remaining after 12 months of follow-up were systematically registered.

Results: Among 24,620 patients examined during a total duration of 300 weeks of observation, 672 (2.7%) presented with chest pain (52% female, mean age 55 ± 19(SD)). Most cases, 442 (1.8%), presented new symptoms and in 356 (1.4%) it was the reason for consulting. Over 40 ailments were diagnosed: musculoskeletal chest pain (including chest wall syndrome) (49%), cardiovascular (16%), psychogenic (11%), respiratory (10%), digestive (8%), miscellaneous (2%) and without diagnosis (3%). The three most prevalent diseases were: chest wall syndrome (43%), coronary artery disease (12%) and anxiety (7%). Unstable angina (6), myocardial infarction (4) and pulmonary embolism (2) were uncommon (1.8%). Potentially serious conditions including cardiac, respiratory and neoplasic diseases accounted for 20% of cases. A large number of laboratory tests (42%), referral to a specialist (16%) or hospitalisation (5%) were performed. Twenty-five patients died during follow-up, of which twelve were for a reason directly associated with thoracic pain [cancer (7) and cardiac causes (5)].

Conclusions: Thoracic pain was present in 2.7% of primary care consultations. Chest wall syndrome pain was the main aetiology. Cardiovascular emergencies were uncommon. However chest pain deserves full consideration because of the occurrence of potentially serious conditions.

Key words: chest pain; epidemiology; primary care

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Introduction

Chest pain is a common symptom in primary care, as about 1.5% of the population visit a general practitioner (GP) for such reason over a one-year period [1]. Effectively, 1–2% of encounters with a GP are motivated by chest pain [1–5]. Chest pain is usually considered as potentially indicating a serious condition until proved otherwise. However, because current knowledge is essentially derived form emergency room studies [6, 7], additional information is needed about the origin of chest pain in primary care practice. Indeed, over 50% of chest pain cases in primary care receive no proper diagnosis [8, 9]. Although missing an acute coronary syndrome or a pulmonary embolism may have fatal consequences, merely ruling out potentially dangerous entities without achieving a diagnosis is not sufficient. Patients with non life-threatening symptoms may present severe or disturbing symptoms and suffer from important functional impairment [2, 10–14]. This is even more important in primary care, where the proportion of chest pain linked with a potentially fatal or serious condition is much lower than in the emergency room. Furthermore it is also essential to investigate chest pain in the absence of a plausible organic cause.

An improved knowledge of the current occurrence of various diagnoses in patients presenting with chest pain in primary care may lead to a better a priori "pre-test" probability of one diagnosis in the framework of a differential diagnosis in similar patients. Our study was thus aimed at estimating the prevalence of chest pain in primary care practice, either as the primary or as an ancillary symptom, and at describing the diagnoses achieved, potential emergency situations and the one-year follow-up of these cases.

Methods

This prospective observational study on the occurrence of chest pain in primary care practice (TOPIC – Thoracic Pain in Community) was performed in western, French-speaking Switzerland, where 58 general practitioners (GP) consecutively included every patient, aged over 16, presenting with thoracic pain during a five-week period between March and June 2001. Five residents of an academic primary care outpatient department also participated (counted globally as one additional GP). All consecutive eligible patients presenting with chest pain as the main or an ancillary symptom were included. Phone only consultations were not excluded. The presence of chest pain was ascertained according to the usual practice of every GP in a pragmatic approach. The practices were located both in urban and non-urban areas. However most of them were located relatively close to an emergency centre. All participating primary care physicians were trained to handle, at least initially, emergency cases. Participating GPs had an average experience in private practices of 12 years (range 1 to 24).

An initial form was filled in to record general patient characteristics and the type, characteristics and location of chest pain. Chest pain was either already known or a new symptom. An initial plausible aetiology, or early diagnosis, was noted. The suspected diagnosis was then noted after each step, as were detailed history and physical examination, level of anxiety expressed by patients and physicians, cardiovascular and thromboembolic risk factors, laboratory results made in emergency, comorbidities, medication and treatment decision at the end of the initial or index encounter. Decisions to refer the patient to an emergency centre or to a specialist and to order tests were recorded. GPs decided the best possible work-up for their patient based on their own experience; we did not send or indicate any recommendation to be followed.

The questionnaire included 58 items for history including precise description of pain, provoking factors, duration, evolution, intensity, quality, modification with position, ancillary symptoms and open text to describe the chest pain as well as precise localisation on an anatomical map. Physical signs included 22 items in five anatomical systems: general signs, cardiovascular, respiratory, abdominal, neurological and psychiatric. The diagnosis retained at three and 12 months, possibly revised, further investigations treatments, hospitalisations and death were recorded.

Follow-up questionnaires were filled in after three and twelve months and the patient was contacted. All final one-year diagnoses were reviewed independently by a group of clinicians (FV, BF, LH, MJ) and discussed in case of incoherence. A precise final diagnosis was retained (for example metastasis or chest wall syndrome, and not only chest wall pain), derived from additional information collected during follow-up through case evolution, additional diagnostic or therapeutic testing, referral to specialists and hospitalisation. All completed forms were sent to the study coordination centre. We performed data entry checks, double data entry, and post entry checks. In addition, to ensure good data quality, before the launch of the study, participating GPs participated in a half-day training session to be introduced to the study and to learn how to fill in the questionnaires.

The diagnoses retained after 12 months of follow-up were grouped in six clusters: musculoskeletal chest pain, cardiovascular, psychogenic, respiratory, digestive and miscellaneous. "Cardiovascular emergencies" included pulmonary embolism, unstable angina and myocardial infarction. We defined coronary heart disease, arrhythmia with circulatory instability, pulmonary embolism, pneumonia and pleurisy, acute asthma, acute infection (cholecystitis and pyelonephritis) and neoplasm as "potentially serious conditions". We compared results of the TOPIC study with the results of similar studies reported in the literature and found using Medline and a manual search in the literature of the authors on thoracic pain in primary care [1, 4, 5, 15, 16]. In addition, we also compared studies performed in both the ambulatory and emergency care settings in similar regions (Switzerland and Belgium) [17–20].

As this is a descriptive study, we refrained from using statistical tests in the absence of a priori hypotheses.

Results

The occurrence of chest pain was determined among 24,620 GP-patient encounters taking place over a total of 300 consultation weeks. Chest pain was recorded in 672 cases (52.4% women), mean age 55 years (±19, SD), which corresponds to an occurrence rate of 2.7% (95%CI 2.5 to 2.9). Ninety percent of the patients (606) were already known to their GPs. We achieved 100% and 96% follow-up, at three and 12 months, respectively.

The participating physicians retained over 40 different diagnostic entities. In most cases (94%) they specified a strong probability of their diagnoses. No aetiological diagnosis was retained after one year in 21 patients (3.1%). The following diagnostic aetiologies were retained in 651 patients after 12 months: musculoskeletal chest pain (49%), cardiovascular (16%), psychogenic (11%), respiratory (10%), digestive (8%) and miscellaneous (2%) (table 1). Chest wall syndrome (CWS) was the most common diagnosis encountered. Among cardiac causes, an ischaemic disease was most frequently diagnosed. Among psychogenic causes, 2% were related to acute anxiety or panic attacks and 3% to somatisation. Bronchitis, bron-

Table 1

Proposed aetiologies of chest pain in 672 patients presenting with chest pain to a primary care practice.

Chest pain cluster	n	%	Groups	Specific diagnosis	n	%
Musculoskeletal chest pain	327	48.7	Chest Wall Syndrome and referred pain	Chest Wall Syndrome	287	42.7
				Referred pain originating in the back	7	1.0
			Non CWS	Trauma	26	3.9
				without rib fracture 19		
				with rib fracture 7		
				Costal metastases	7	1.0
Cardiovascular	108	16.1	Ischaemic Heart Disease	Myocardial infarction	4	0.6
				Unstable angina	6	0.9
				Acute angina	75	11.2
			Non Ischaemic HD	Pulmonary embolism	2	0.3
				Arrythmia	10	1.5
				Acute hypertension	5	0.7
				Cardiomyopathies	4	0.6
				Aortic stenosis	1	
				Mitral prolapse	1	
Psychogenic	77	11.5	Anxious	Anxious state	32	4.8
				Acute anxiety, panic attack	17	2.5
				Anxio-depressive state	6	0.9
			Non anxious	Somatisation	22	3.3
Respiratory	69	10.3	Infection	Acute bronchitis	37	5.5
				Pleurisies and pneumonias	17	2.5
				Pulmonary abscess	1	
			Non infectious	Asthma and BPCO	10	1.5
				Lung cancer	4	0.6
Digestive	55	8.2	Peptic affections	Oesophagitis	42	6.3
				Gastritis & ulcers	5	0.7
			Non-peptic affections	Oesophageal spasm	5	0.7
				Oesophageal cancer	1	
				Pancreatic cancer	1	
				Acute cholecystitis	1	
Miscellaneous	15	2.2		Mastitis and mastalgia	5	0.7
				Irradiated shoulder pain	3	
				Sarcoidosis	2	
				Herpes zoster	2	
				Skin infection	1	
				Chest wall keloid	1	
				Acute pyelonephritis	1	
Without diagnosis	21	3.1				
Total	672	100			651	

chopneumonia and oesophagitis were the most common respiratory and digestive diseases encountered. There were 13 cancer cases; seven costal or thoracic wall metastases, four lung cancers and two cancers of the oesophagus and of the pancreas, which were notable because of related diagnostic difficulties and their poor prognosis.

Cardiovascular cases needing emergency interventions were less frequent than generally suspected (12 patients), including ten acute ischaemic heart syndromes (four myocardial infarctions and six unstable anginas). One case of myocardial infarction, which occurred in a patient followed for ischaemic heart disease, was wrongly diagnosed as an oesophagitis, initially. In fact, the follow-up ECG showed signs of a recent inferior infarction, which was confirmed by a cardiologist. The heart function declined rapidly and the patient died of ischaemic heart disease a few weeks later, while additional cardiologic tests were being performed. Two cases of pulmonary embolism were diagnosed and hospitalised. In addition, in three patients who were hospitalised for suspected pulmonary embolism, the diagnosis was finally excluded. D-Dimers tests were negative in 18 additional patients. Potentially dangerous conditions (134 patients, 20% of cases) included cardiovascular emergency (12), stable coronary heart disease (75), arrhythmia with circulatory instability (4), various non ischaemic heart diseases (5), pneumonia and pleurisy (17), acute asthma (5), acute infection (pulmonary abcess, cholecystitis and pyelonephritis) (3) and miscellaneous neoplasms (13) (table 1).

Clinical presentation and diagnosis

Thoracic pain was the main complaint in 355 (53%) patients. The distribution of diagnostic categories was similar in patients presenting with pain as the main or a secondary complaint. In 442 patients (66%), a new type of thoracic pain occurred or a new diagnosis was made. Chest wall pain was seen more frequently in these cases (54%) than in patients in whom thoracic pain was already known (38%). Ten of the 12 cardiovascular emergency cases were new diagnoses. Thoracic pain led to an emergency consultation by the GP in 197 patients (29%). Respiratory conditions accounted for 21% of the emergency consultations *vs* 6% of the routine encounters. A diagnostic hypothesis was rapidly formulated within the first minutes of the initial encounter in 472 patients (70%) and considered as correct after a one year follow-up in 363 (54%). After the index encounter 654 patients (97%) received a diagnosis. In addition, 17.5% of the diagnoses retained at the end of the index encounter were modified after the one year follow-up.

Tests, referrals and hospitalisations

Tests were ordered in 202 patients (30%) during the initial encounter (ECG 144, chest x-ray 82, laboratory 49) (table 2). Additional tests were ordered during follow-up. Finally, 284 patients (42%) received a test. One hundred and ten patients were referred to a specialist, most often a cardiologist (79 cases). Frequency of testing and referral (49%) varied according to type of diagnosis, from 42% in patients with musculoskeletal pain to 59% in patients with a pain of cardiac origin and 76% in cases without a diagnosis. Up to three months of follow-up, 30 patients were hospitalised, most often patients who were diagnosed with a cardiovascular disease. At one year, 53 cases had been referred to the hospital, 42 of which for a reason in relation to the initial thoracic pain.

Table 2

Paraclinic tests, referral to specialists and hospitalisation up to three months of follow-up.

Diagnosis type	n	Total patients with tests or specialist n (%)	Paraclinical tests emergency n (%)	Paraclinical tests deferred n (%)	Specialist referal[1] and specialised tests[2] n (%)	Hospitalisations n (%)
Musculoskeletal	327	137 (42)	86 (26)	75 (23)	35 (11)	3 (1)
Cardiocirculatory	108	64 (59)	37 (34)	34 (31)	37 (34)	20 (19)
Psychogenic	77	33 (43)	21 (27)	14 (18)	12 (16)	0
Respiratory	69	40 (58)	31 (45)	20 (29)	7 (10)	2 (3)
Digestive	55	31 (56)	16 (29)	18 (33)	16 (29)	3 (6)
Without diagnosis	21	16 (76)	8 (38)	10 (48)	7 (33)	2 (10)
Miscellaneous	15	5 (33)	3 (20)	4 (27)	1 (7)	0
Total	672	326 (49)	202 (30)	175 (26)	115 (17)	30 (5)

[1] 129 specialised consultations for 110 patients: cardiologist 79; gastroenterologist 28; pneumologist 10; rheumatologist 8; psychiatrist 2; neurologist 2

[2] Ergometry and echo stress test 51; coronaro-/scintigraphy 18; cardiac echography 15; Holter 5; gastroscopy 25; thoracic scan 9; pHmetry, bronchoscopy, electromyography, bone scintigraphy 1

Follow-up

Most patients (564, 84%) had a new appointment with their physicians during the 12 months following the index consultation, corresponding to the usual follow-up – unlinked to the study. In 29% of these consultations, the motive was thoracic pain. Indeed, in 47% patients a new thoracic pain episode occurred, most often due to the same cause as the index consultation. This was especially the case in patients with a cardiovascular disease, who had a 70% recurrence rate. Moreover, in 30 cases, such diagnoses were often associated with a poor evolution at one year, in relation to chest pain and linked to coronary heart disease. Twenty-five patients died during the one-year follow-up, of whom 12 for a reason directly associated with thoracic pain. Causes of death included cancer in seven patients, and ischaemic heart disease in five of these patients; 11 died of unrelated causes and, in two patients, the actual cause was unknown.

Comparison with other studies

We found four similar studies with which the TOPIC study could be compared [4, 5, 15, 16] (table 3 et 4), taking some differences in the methods used into account. The occurrence of chest pain in daily practice was higher in TOPIC (2.7%) than in the studies conducted in Iceland (0.7%) and Northern America (1.4%) [4]. When comparing the distribution of diagnoses between studies, TOPIC had the lowest proportion of unknown or other diagnoses; the proportion of musculoskeletal diseases corresponded to the Icelandic study and the proportion of cardiovascular disease was similar in all studies, with the exception of the ASPN survey that showed a higher figure.

In addition, we examined two sets of studies that compared series of patients in primary ambulatory and emergency care in the same regions and periods [17–20]. In western Switzerland, the occurrence of thoracic pain was 10 times higher in the emergency care series than in the TOPIC study. The proportion of cases with ischaemic heart disease or myocardial infarction was also five to six times higher in the emergency centre,

Table 3

Review of chest pain epidemiology in ambulatory setting.

Study	TOPIC		Svavarsdottir et al. [5]	MIRNET [11]	Buntinx et al. [12]	ASPN [4]
Selection	all chest pain	new+presenting pain	new+presenting pain	presenting pain	new+presenting pain	all chest pain
Sites	58 medical practices 1 academic practice		1 medical center	11 medical practices 1 academic practice	25 medical practices 4% emergency room	37 medical practices
Method	prospective observational		retrospective observ.	prospective observ.	prospective observ.	prospective observ.
Diagnostic validation	chart review specialist + hosp 28%		chart review	chart review 50%	chart review specialist+hosp 14%	chart review
Follow up	one year		3–4 year	none	≤2 month	none
Nb visits	24620		28050	n/a	n/a	71525
Nb patients	672	248	193	399	320	832
% consultations	2.7	1.0	0.68	n/a	n/a	1.4
Diagnostic class (% all patients)						
Musculoskeletal chest pain	48.7	52.0	48.9	36.2	29.0	28.7[a]
Cardiovascular	16.1	12.9	19.4	16.1	13.2	34.5
– non ischemic heart disease	3.5	5.2	1.5	3.8	4.8	
– ischemic heart disease	12.6	7.3	17.9	12.0	8.4	34.5
– myocardial infarction	0.6	1.2	2.1	<1.5[b]	0.0	2.9
– pulmonary embolism	0.3	0.5	1.6	0.0	0.0	n/a
Psychogenic	11.5	10.5	4.7	7.5	17.1	7.5
Respiratory	10.3	12.5	5.7	5.1	19.6[c]	4.3
Digestive	8.2	7.3	3.6	18.9	9.9	13.7
Miscellaneous	2.2	1.6	7.7		10.0	
Without diagnosis	3.1	3.2	9.5	16.1[d]	1.3	11.3

[a] "non-articular chest wall pain", trauma, costochondritis [b] infarction and instable angor together
[c] Study carried out through the winter [d] "non specific chest pain syndrome"

although a slight majority of these cases were not considered at high risk of a suspected, acute coronary syndrome. In addition, digestive and psychogenic causes were very rarely diagnosed in the emergency setting. Cardiovascular causes were also much more frequent in the emergency department in the Flemish studies [15]. Interestingly, a large number of non-ischaemic cardiac cases were diagnosed in the emergency room in Belgium, contrary to in Switzerland.

Discussion

This case series study allows a description of the occurrence, causes, management and evolution during up to one year in patients consulting a primary care physician in western Switzerland because of chest pain. Chest pain was present in 2.7% of the consultations. Two thirds of the cases were diagnosed as either CWS or cardiovascular diseases; the former was three times more frequent than the latter, contrasting with the diagnoses reported in an emergency centre. A typical GP encountered on average two to three cases a week. Compared to other studies, we found a higher occurrence of chest pain in primary care. Indeed, we included any patient presenting with chest pain, and our larger inclusion criteria may contribute to explaining this difference. However, the occurrence rate of new incident cases of chest pain (1%) was close to the figure observed by Svavarsdottir [5]. In addition, different criteria have been used in the studies compared, the related information was sometimes missing, and one study was retrospective.

Many diseases can cause chest pain. Some classical causes, such as pericarditis, aortic dissection, pneumothorax, pulmonary hypertension, mediastinal tumours were not encountered, which may reflect the low occurrence rates of such diseases. However, taking into account some differences in the way the diagnoses were grouped, it appears that the distribution of diagnoses in TOPIC was relatively similar to the distribution in studies conducted in Iceland, Michigan and Flanders. In the Northern American study ASPN [4], the different period and epidemiology of cardiovascular diseases could partly explain the higher proportion of these diagnoses than in the TOPIC cohort. In addition, a lower occurrence rate of chest pain coupled with a larger proportion of cardiovascular diagnoses could indicate a different selection of cases.

In all studies, the most frequent cause of chest pain was the CWS, a poorly understood condition [21], which often leads to anxiety and to numerous additional tests that are often inappropriate. In

Table 4

Comparison of chest pain epidemiology in two ambulatory and two related emergency settings.

Study	TOPIC	Berger A et al. [13, 14]	Buntinx et al. [12]	Knockaert et al. [15]
Selection	presenting complaint	presenting complaint	new+ presenting complaint	presenting complaint
Site	medical practices	emergency room	medical practices	emergency department
Diagnostic validation	chart review	specialist panel	chart review	chart review
	specialist+hosp 22%	presetted algorithm		
follow up	one year	none	≤2 month	none
Nb consultation	24 620	6544	–	–
Nb chest pain patients	355	939	320	578
% consultations	1.5	14.3	–	-
Diagnostic class (% all patients)				
Musculoskeletal chest pain	46.6	10.4	29.0	7.2
Cardiovascular	16.6	80	13.2	54.3
– non ischemic heart disease	4.2	1.0	4.8	28.1
– ischemic heart disease	12.1	79[a]	8.4	26.2
– myocardial infarction	1.0	5.3	0.0	9.8
– pulmonary embolism	0.3	n/a	0.0	n/a
Psychogenic	11.5	2.1	17.1	9.3
Respiratory	11.0	4.4	19.6	12.1
Digestive	9.0	0.4	9.9	2.6
Miscellaneous	2.2		10.0	10
Without diagnosis	3.1	2.4	1.3	4.5

[a] very high risk of a suspected acute coronary syndrome 13.8%; high risk 20.8%; intermediate risk 18.5%; low risk 25.9%

fact, CWS and thoracic pain deemed to be of psychogenic origin together accounted for the majority of chest pain cases in this study. One feature of these cases was the generally simple and benign follow-up, contrasting with the description found in emergency centre studies, which implicate more pervasive problems interfering with quality of life [2,10,22,23]. Patient selection, including differing consulting habits and the absence of follow-up in the emergency centres studies may explain these differences.

A further similar characteristic of the studies examining chest pain in primary care is the relatively rare occurrence of emergency cardiovascular diagnoses with chest pain as a presenting symptom. However, in the TOPIC study, the exclusion of such diagnoses, using additional tests or referring the patient to the hospital for a suspected pulmonary embolism was frequent, which indicates the assiduous attention paid by primary care physicians so as not to miss a potentially lethal condition. The one-year follow-up does not suggest that many such cases have been missed, even though no independent evaluation of cases was performed. This important contrast with emergency room studies indicates how different the underlying diagnoses in patients presenting with chest pain are. It is important for primary care clinicians to be aware of such differences in case selection and epidemiology in order to help them assess the expected results of diagnostic tests. These important differences have been described previously and updated more recently [25,26]. Nevertheless, the 15–25% occurrence rate of cardiovascular diseases in patients presenting with chest pain in primary care require careful diagnosis and management, given the potential associated risk for survival or serious complications. Indeed, many tests were used to exclude such diagnoses, but some cases were, however, diagnosed with delay. Clinical practice guidelines for chest pain have been developed and implemented in the emergency room setting, especially to detect acute coronary syndromes [18]. In general practice these guidelines are not easily applicable because immediate life threatening emergencies are relatively rare. Furthermore our study shows that potentially serious conditions relate not only to ischaemic heart disease but also to other conditions such as respiratory or oncological diseases. Therefore it seems difficult to propose simple and applicable identification algorithms for primary care.

We achieved a very low rate of cases left undiagnosed or with an uncertain diagnosis, whereas uncertainty is usually considered a specific feature of primary care. However, due to the lack of external review, we do not know how often the correct diagnosis may have been missed.

Indeed, the main limitation of this study is that the treating physicians directly reported the diagnoses, without an independent evaluation by an adjudicator or a panel. However, 191 patients (28%) – probably the most difficult cases – were referred to the hospital or to a specialist. Furthermore, the previous knowledge of most patients by their GPs could have facilitated the diagnosis. Moreover, given the one-year follow-up obtained in most cases, and the actual change in diagnoses due to subsequent history, additional tests or referrals made in 19% of cases [29], we believe that the large majority of diagnoses can be considered reliable, but we cannot exclude some diagnostic errors. In particular, otherwise silent ischaemic heart disease might have been overlooked. On the other hand, it is also possible that a history of benign CWS could have triggered additional investigations, allowing an asymptomatic coronary heart disease to be discovered and wrongly considered responsible for the index chest pain. Among some other limitations is the fact that as the participating GPs had an interest in collaborating in this project and were not randomly selected, they may thus not be representative of all primary care physicians. Moreover, it was not possible to check if all eligible patients were actually included by the GPs.

In conclusion, the occurrence rate of chest pain in primary care is relatively high. A diagnosis was established, most often rapidly, in most cases. The variety of diagnoses was relatively important. The most frequent diagnosis was chest wall syndrome. Nevertheless, given that the risk of occurrence of a serious event such as an acute ischaemic syndrome or a pulmonary embolism was not negligible, additional investigations were often conducted to rule out the possibility of such events. In fact, only a few cases needed emergency care. Further studies should be conducted to measure the occurrence rate and nature of chest pain in primary care, based on representative samples of the population at risk and using stricter criteria to validate the diagnoses established by the primary care physicians.

Correspondence:
Dr. Bernard Favrat
Department of Ambulatory care and Community Medicine
University of Lausanne
Rue du Bugnon 44
CH-1005 Lausanne
Switzerland
E-Mail: bernard.favrat@hospvd.ch

References

1 Nilsson S, Scheike M, Engblom D, Karlsson LG, Molstad S, Akerlind I, et al. Chest pain and ischaemic heart disease in primary care. Br J Gen Pract. 2003;53:378–82.
2 Ruigómez A, García Rodríguez LA, Wallander MA, Johansson S, Jones J. Chest pain in general practice: incidence, comorbidity and mortality. Fam Pract. 2006;23:167–74.
3 MacCormick A, Fleming DM, Charlton J. Morbidity statistics from general practice; fourth national study 1991–1992. Available at: www.statistics.gov.uk/downloads/theme_health/MB5No3.pdf.
4 Rosser W, Henderson R, Wood M, Green LA. An exploratory report of chest pain in primary care. ASPN report. J Am Board Fam Pract. 1990;3:143–50.
5 Svavarsdottir AE, Jonasson MR, Gudmundsson GH, Fjeldsted K. Chest pain in family practice. Diagnosis and long-term outcome in a community setting. Can Fam Physician. 1996;42:1122–8.
6 Eken C, Ercetin Y, Ozgurel T, Kilicaslan I, Eray O. Analysis of factors affecting emergency physicians' decisions in the management of chest pain patients. Eur J Emerg Med. 2006;13:214–7.
7 Winters ME, Katzen SM. Identifying chest pain emergencies in the primary care setting. Prim Care. 2006;33(3):625–42.
8 Blacklock SM. The symptom of chest pain in family practice. J Fam Pract. 1977;4:429–33.
9 Kroenke K, Mangelsdorff AD. Common symptoms in ambulatory care: incidence, evaluation therapy and outcome. Am J Med. 1989;86:262–6.
10 Papanicolaou MN, Califf RM, Hlatky MA. Prognostic implication of angiographically normal and insignificantly narrowed coronary arteries. Am J Cardiol. 1986;58:1181–7.
11 Okene IS, Shay MJ, Alpert JS, Weiner BH, Dalen JE. Unexplained chest pain in patients with normal coronary arteriograms: a follow-up study of functional status. NEJM. 1980;303:1249–52.
12 Lau GK, Hui WM, Lam SK. Life events and daily hassles in patients with atypical chest pain. Am J Gastroenterol. 1996;91(10):2157–62.
13 Wielgosz AT, Fletcher RH, McCants CB, McKinnis RA, Haney TL, Williams RB: Unimproved chest pain in patients with minimal or no coronary disease: a behavioral phenomenon. Am Heart J. 1984;108:67–72.
14 Panju A, Farkouh ME, Sackett DL, Waterfall W, Hunt R, Fallen E, et al. Outcome of patients discharged from a coronary care unit with a diagnosis of "chest pain not yet diagnosed". CMAJ. 1996;155:552–3.
15 Buntinx F, Truyen J, Embrechts P, Moreel G, Peeters R. Chest pain: an evaluation of the initial diagnosis made by 25 Flemish general practitioners. Fam Pract. 1991;8:121–4.
16 Klinkman MS, Stevens D, Gorenflo D. Episodes of care for chest pain: a preliminary report from MIRNET. Michigan Research Network. J Fam Pract. 1994;38:345–52.
17 Berger A, Stauffer JC, Eckert, Gillis D, Schaller MD, Yersin B, Eeckhout E, Kappenberger L, Wasserfallen JB. Epidémiologie des douleurs rétrosternales aux urgences. Forum Med Suisse. 2002;Suppl8:38S.
18 Wasserfallen JB, Berger A, Eckert P, Stauffer JC, Schlaepfer J, Gillis D, et al. Impact of medical practice guidelines on the assessment of patients with acute coronary syndrome without persistent ST segment elevation. Int J Qual Health Care. 2004;16:383–9.
19 Buntinx F, Knockaert D, Bruyninckx R, de Blaey N, Aerts M, Knottnerus JA, Delooz H. Chest pain in general practice or in the hospital emergency department: is it the same? Fam Pract. 2001;18:586–9.
20 Knockaert DC, Buntinx F, Stoens N, Bruyninckx R, Delooz H. Chest pain in the emergency department: the broad spectrum of causes. Eur J Emerg Med. 2002;9:25–30.
21 Verdon F, Burnand B, Herzig L, Junod M, Pecoud A, Favrat B. Chest wall syndrome among primary care patients: a cohort study. BMC Fam Pract. 2007;8:51.
22 Okene IS, Shay MJ, Alpert JS, Weiner BH, Dalen JE. Unexplained chest pain in patients with normal coronary arteriograms: a follow-up study of functional status. NEJM. 1980;303:1249–52.
23 Wielgosz AT, Fletcher RH, McCants CB, McKinnis RA, Haney TL, Williams RB. Unimproved chest pain in patients with minimal or no coronary disease: a behavioral phenomenon. Am Heart J. 1984;108:67–72.
24 Panju A, Farkouh ME, Sackett DL, Waterfall W, Hunt R, Fallen E, et al. Outcome of patients discharged from a coronary care unit with a diagnosis of "chest pain not yet diagnosed". CMAJ. 1996;155:552–3.
25 White KL, Williams TF, Greenberg BG. The ecology of medical care. NEJM. 1961;265:885–92.
26 Green LA, Yawn BP, Lanier D, Dovey SM. The ecology of medical care revisited. NEJM. 2001;344:2021–5.
27 Junod M, Herzig L, Favrat B, Mühlemann N, Burnand B, Pelet E, Pécoud A, Verdon F for GMURG-Lausanne. Sequential steps in the diagnostic work-up of patients presenting with thoracic pain in primary care. The TOPIC study. Poster presentation WONCA EUROPE 2005 Book of abstracts Cos, September 2005.

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