CARDIOVASCULAR DISEASES IN EUROPE

Euro Heart Survey and National Registries of Cardiovascular Diseases and Patient Management 2004

Dedicated to improve the quality of life of the European population by reducing the impact of cardiovascular disease
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Introduction .................................................................................................................. ................................ 2
Euro Heart Survey Programme .................................................................................................................... 4
Cardiovascular Mortality in Europe............................................................................................................... 5
Euro Heart Survey on Acute Coronary Syndromes .................................................................................. .... 6
German Registries of Myocardial Infarction ................................................................................................. 9
Spanish Registries of Acute Coronary Syndromes .................................................................................... 10
Swedish Registry for Cardiac Intensive Care ................................................................................................. 11
Euro Heart Survey on Stable Angina Pectoris ............................................................................................... 12
Euro Heart Survey on Diabetes and the Heart ............................................................................................. 13
Euro Heart Survey on Coronary Revascularisation ................................................................................ 14
Coronary Revascularisation in Europe ....................................................................................................... 16
SHAKESPEARE – International PCI Registry ............................................................................................ 17
Euro Heart Survey on Heart Failure ........................................................................................................... 18
Euro Heart Survey on Valvular Heart Disease ........................................................................................... 20
Euro Heart Survey on Adult Congenital Heart Disease ............................................................................ 22
Pacemakers and Implantable Cardioverter Defibrillators .......................................................................... 23
Euro Heart Survey on Atrial Fibrillation .................................................................................................... 24
Trends in Management and Outcome of AMI Patients in Israel 1992-2002 ................................................. 26
Concluding Remarks ................................................................................................................................. 28
Contributors to the Euro Heart Survey Programme .................................................................................. 30
Contributors to other European Surveys and Registries of ..................................................................... 33
Euro Heart Survey Sponsors ....................................................................................................................... 34
Cardiovascular disease is the major cause of death and disability in the Western world. The European Society of Cardiology (ESC) is dedicated to improve health in Europe by reducing the impact of diseases of the heart and blood vessels. Therefore the ESC supports research in this area. Additionally, the ESC has developed a series of guidelines and education programmes to improve quality of care, including prevention, diagnosis and patient management. The ESC has launched the Euro Heart Survey Programme to monitor routine clinical practice. These efforts can be summarised as a cycle of quality improvement.

European, national and local education programmes have been developed to inform physicians about guidelines for patient management. Such education programmes are a crucial part of continuing medical education (CME).

Surveys and registries of clinical practice such as the Euro Heart Survey programme close the circle. The Euro Heart Survey programme has been launched by the ESC in order to evaluate:
- to which extent clinical practice corresponds with existing guidelines
- the applicability of evidence based medicine
- the outcome of different strategies for patient management.

Currently, participation in surveys and registries is largely voluntary, but we envisage that systematic surveys and registries will evolve to become a mandatory part of quality assurance programmes, which may be requested by national health authorities in the near or more distant future.

The conduct of national and international registries and surveys would be greatly facilitated by systematic data collection in clinical practice. Therefore the ESC, in cooperation with the European Union, initiated development of Cardiology Audit and Registration Data Standards (CARDS). Data standards have been developed for three priority areas: acute coronary care, interventional cardiology and clinical electrophysiology. Other topics will be addressed in the coming years.

This third ESC report on Cardiovascular Diseases in Europe, presents some highlights from the Euro Heart Surveys, as well as other European cardiovascular surveys and registries over the last five years.

Guidelines for the practice of cardiology and cardiovascular medicine are established by European experts appointed by the ESC, often in collaboration with other international professional organisations. Most guidelines are developed at the European level, and subsequently adopted by the National Societies of Cardiology and related organisations throughout Europe. Guidelines are regularly updated, to include new findings from clinical studies and basic research.
Salient findings in this report are:

- There is still a significant variation in the burden of cardiovascular diseases across the ESC member countries, with low mortality in Southern and Western Europe, and high mortality in Eastern Europe.
- Clinical practice varies significantly among hospitals in Europe, both with regard to patient characteristics and the application of diagnostic and therapeutic measures.
- A significant and appropriate increase in the use of medication, percutaneous coronary procedures, pacemakers, and Implantable Cardioverter Defibrillator systems (ICD) was observed. In contrast, the total volume of cardiac surgery procedures stabilised, and the duration of hospitalisation was gradually reduced.
- The adherence to guidelines for prevention and management of cardiovascular disease did improve, and was associated with improved patient outcome. Yet, in many hospitals these guidelines have only partly been implemented and the adherence to guidelines should be further improved.

Quality assurance in medicine is a continuous process and involves many different components. The ESC will continue to promote research, guideline development, education and a critical review of the practice of cardiology and cardiovascular medicine through surveys and registries. This report is an illustration of this ongoing process.

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The European Society of Cardiology launched the Euro Heart Survey programme in 1998. Since then a series of surveys have been completed:

1999 Secondary prevention of coronary artery disease
2000 Heart failure
   - Acute coronary syndromes
2001 Valvular heart disease
2002 Coronary revascularisation
2003 Stable angina pectoris
   - Diabetes and the heart
2004 Adult congenital heart disease
   - Atrial fibrillation

A second survey on acute coronary syndromes is ongoing, while surveys are being planned on acute heart failure, cardiac arrhythmias and indications for the application of internal cardioverter defibrillator therapy.

Most ESC member countries are currently participating in the survey programme. In fact, the participation in the programme evolved from 47 hospitals and 15 countries participating in 1999 to 182 hospitals and 35 countries participating in the 2004 survey on atrial fibrillation.

In order to achieve a better representation of the practice of cardiology throughout Europe, the number of sites has been increased, while the number of patients enrolled at each site has decreased. In the coming years participation of additional hospitals and countries will be further facilitated with online (web based) data entry and standardised patient record forms. Thus the Euro Heart Survey Programme will offer a benchmarking service for quality assurance for all the participating hospitals.
Cardiovascular disease is the main cause of death in most countries in Europe. Unfortunately, major differences remain in cardiovascular mortality rates between different countries with high mortality figures in Eastern Europe, and relatively low mortality figures in Northern, Western and Southern Europe. Central and Eastern European countries have a cardiovascular mortality rate ranging from 5 per 1,000 inhabitants (Poland) to 9 per 1,000 inhabitants (Bulgaria and Ukraine). This represents a two to three fold increased risk compared with France, Iceland, Italy, Spain, and The Netherlands, countries with the lowest mortality rates due to cardiovascular diseases (< 3 per 1,000 inhabitants).

Trends of age and gender standardised cardiovascular mortality during the 1980-2002 period show a similar pattern to all cause mortality: down sloping curves in the Nordic, Western and Southern region (except Greece), but stable, or up sloping curves in Central and Eastern European countries (e.g., Bulgaria, Romania, Ukraine).

It should be noted, however, that while standardised mortality rates continue to decline, the crude, non-standardised mortality rates remain approximately stable (e.g., Italy, Spain, The Netherlands) or even increase (e.g., Bulgaria, Greece, Romania, Ukraine). Hence, the total burden of cardiovascular disease remains high, due to the ageing of the population.

Data Source:
WHO mortality database
The Euro Heart Survey on Acute Coronary Syndromes (ACS) was designed to delineate the characteristics, treatments and outcome of ACS patients in Europe, and to compare adherence to current guidelines. During 2000-2001, 10,484 consecutive patients with a discharge diagnosis of ACS were enrolled in 103 hospitals from 25 countries. Although guidelines strongly recommend reperfusion therapy in all patients with ST-elevated myocardial infarction, 44% of patients did not receive this therapy. The most important reason for not providing reperfusion therapy was late arrival at the hospital. The majority of patients receiving reperfusion therapy were treated with fibrinolytic therapy (65%), while 35% received primary percutaneous coronary intervention (PCI).

A large variation in application of reperfusion therapy was observed between hospitals and countries, ranging from 8% to 89%. Also the percentage of primary PCI among patients with acute myocardial infarction that received reperfusion therapy varied across hospitals and countries, with a range from 0% to 84%.

In the majority of patients who received reperfusion therapy, the time interval between symptom onset and reperfusion therapy exceeded the recommended 30 minutes. In about half of patients, it took more than 30 minutes after hospital arrival before thrombolytic therapy was started, while in about 60% of those referred for primary PCI the treatment delay in hospital was more than the recommended 90 minutes. Mean time from emergency room to start of fibrinolytic therapy varied among hospitals from 25 to 90 minutes.
According to the guidelines, antiplatelet therapy was prescribed in the large majority of ACS patients. Although recommended by guidelines, beta-blocker therapy was prescribed less often and varied from 43% to 91% of ACS patients. Similarly, ACE-inhibitors were prescribed in only 24% up to 82% of patients, while most patients with coronary artery disease do benefit from such therapy.

In addition, lipid-lowering therapy was being prescribed in 60% on average, ranging from less than 20% to 70% of patients with an acute coronary syndrome (page 8).

Mortality rates in ACS patients varied, both for ACS patients with and without ST elevation. Part of this variation may be related to patient selection in participating hospitals. For example, some hospitals may not have included all consecutive patients in the survey. Yet, similar findings were reported by the Swedish registry (page 11). Thirty-day mortality was highest in patients with an undetermined ECG at admission (13%), and in patients with Q-wave myocardial infarction as discharge diagnosis (11%). These mortality figures are considerably higher than those in recent clinical trials in similar patient populations. Patients in clinical trials in fact often represent a low risk subset of the total population of patients.

The Euro Heart Survey on Acute Coronary Syndromes II is currently ongoing.
Euro Heart Survey
Acute Coronary Syndromes

Publications:
Since 1994 several prospective multicenter registries on acute myocardial infarction (MITRA 1+2, MIR 1+2, ACOS) have been conducted in Germany to document patient characteristics, acute treatment as well as hospital and long-term outcome in clinical practice.

To close the circle between existing guidelines and clinical practice all registries used regular benchmarking reports to give feedback to the participating centers for quality control. The patient characteristics of the consecutive patients with myocardial infarction did not change between 1994 and 2002. However, the administration of acute reperfusion therapy for ST-elevation myocardial infarction improved from 49% to 72% of all consecutive patients. In addition, the acute adjunctive therapy with antiplatelet drugs, beta-blockers, ACE-inhibitors and statins significantly improved within the years.

Associated with the improvement of acute treatment of ST-elevation myocardial infarction in clinical practice according to existing guidelines, a significant reduction of hospital mortality from initially 16.2% in 1994 to 9.9% in 2002 was observed.

Data Source:
MITRA-Plus; MI Research Institute Ludwigshafen, Germany
Spanish Registries of Acute Coronary Syndromes

The data presented are from two Spanish registries: DESCARTES and PRIAMHO II. DESCARTES (Descripción del Estado de los Síndromes Coronarios Agudos en un Registro Temporal Español) is a nation-wide prospective register of 2,017 consecutive non ST-elevated ACS patients, enrolled during 2002 in 55 randomly selected hospitals. PRIAMHO II (The Proyecto de Registro de IAM Hospitales) includes 6,221 consecutive patients from 58 hospitals with a Coronary Care Unit in 2000.

Both studies show a significant variation in diagnostic and therapeutic procedures among participating hospitals. A typical example is the application of cardiac troponin measurements. Cardiac troponin measurements are the gold standard for the detection of myocardial necrosis (evidence of myocardial infarction), and these measures were applied in 85% of patients on average. However, there were hospitals in which cardiac troponin was measured in only 10% of patients, whereas other hospitals applied the measurement in all patients. Another example is the application of percutaneous coronary intervention (PCI) in ACS patients without ST elevation, which varied from 5% to 55%. In patients with ST segment elevation myocardial infarction, the application of fibrinolytic therapy ranged from 10% to 60%, while primary PCI was performed in 0% to 30% of patients.

Publications:
The purpose of RIKS-HIA, the Register of Information and Knowledge about Swedish Heart Intensive care Admissions, is to improve acute coronary care through continuous information about need of care, therapy and results of therapy and changes within a hospital as well as in comparison with other hospitals. In 2002 there were 70 participating hospitals, which covered 95% of all patients admitted to a coronary care unit in Sweden.

Data with regard to myocardial infarction show a similar situation as observed in Spain: a large variability exists in baseline characteristics, patient management and outcome between the participating sites. For example, the interval between patient arrival in the hospital and the initiation of fibrinolytic therapy varied from 20 minutes in some hospitals to more than 1 hour in others. Again 30-day mortality varied from less than 5% to about 15%. Interestingly, the type of hospital and the number of patients treated seems to be importantly associated with differences in patient management. Outcome was better in larger hospitals, with invasive facilities, treating a high number of patients.

The results of the RIKS-HIA registry were similar to the Euro Heart Survey (page 6-8). For example, under-treatment with reperfusion therapy was observed in 40% of patients, and the median delay time between onset of chest pain and start of fibrinolytic therapy was 2-2.5 hours on average, and until start of direct PCI 3.5 hours.

Data Source:
The Euro Heart Survey on Stable Angina Pectoris (2003) included 3,779 ambulatory patients from 36 countries, presenting to a cardiologist as an outpatient. The population consisted of patients at new presentation to a cardiologist in whom a diagnosis was made of stable angina, caused by myocardial ischaemia due to coronary disease based on clinical assessment, and who did not have unstable angina. The 197 participating hospitals were a mix of hospitals with non-invasive diagnostic facilities only (33%), with both non-invasive and invasive cardiology facilities (19%), and hospitals that had, in addition to a catheterization laboratory, cardiac surgery facilities on site (31%).

After assessment by a cardiologist, the majority of patients (81%) were taking or were prescribed on an antiplatelet agent. However, percentages of patients treated with antiplatelet drugs ranged from 44% to 100% between countries. In all, 48% were on statin treatment, 67% were receiving beta-blockers, 61% were on a nitrate, 27% were taking a calcium channel blocker, and 40% were using ACE-inhibitors. Although there remains room for further improvement, these figures compare favourably with the 1999 survey on secondary prevention.

The majority of patients (59%) were on two or more anti-anginal drugs after assessment by a cardiologist, and 13% on no anti-anginal drug. The number of anti anginal drugs per patient did not differ significantly between males and females, but did increase with age up to 70 years.
The Euro Heart Survey on Diabetes and the Heart was carried out in 2003. The survey included 4,961 patients from 110 hospitals in 25 countries. Included patients were referred to a cardiologist due to coronary artery disease out of whom 2,107 (43%) were admitted on acute basis and 2,854 (57%) had stable coronary artery disease. An oral glucose tolerance test (OGTT) was recommended by the protocol and gluco-metabolic characterization performed according to present WHO recommendations.

The survey revealed that diabetes is known to be present in about a third of patients with coronary artery disease: 29% in acute patients and 34% in patients with a stable cardiac condition. In addition, when an oral glucose tolerance test was performed in patients with acute coronary artery disease, another 15% of patients were shown to have diabetes that was not yet recognised. In patients with stable coronary artery disease the corresponding proportion was 10%. Furthermore, in both acute and stable cardiac patients, about a third had abnormal fasting glucose or impaired glucose tolerance. Thus, the majority of patients with acute or chronic coronary disease have an abnormal glucose metabolism. Since several studies have shown that such patients do have impaired outcome, systematic screening for abnormal glucose metabolism seems appropriate.

Publications:
The Euro Heart Survey on Coronary Revascularisation included consecutive patients who presented for coronary angiography and had significant coronary disease (any stenosis over 50% in diameter). In 2000-2001, over 8,000 procedures were screened and 5,767 cases were included from 132 hospitals of 31 ESC member countries.

Coronary revascularisation is recommended for patients with stable and unstable coronary disease to relieve anginal symptoms, to retard disease progression, and to prevent death or myocardial infarction. In patients presenting with evolving myocardial infarction, immediate coronary revascularisation by means of a ‘primary’ percutaneous intervention (PCI) is nowadays considered the best treatment option, as it is more effective and safer than fibrinolysis. In clinical practice, however, indications for revascularisation are determined as much by availability as by risk assessment. The percentage of invasive (PCI and CABG) and non-invasive treatment in patients with a stenose over 50% varied largely across hospitals.

In patients undergoing PCI for acute coronary syndromes, GP IIb/IIIa receptor blockers are recommended by guidelines. A large variation (from 0% to 100%) between hospitals was observed in the percentage of PCI patients in which GP IIb/IIIa blockers were prescribed.
One-year mortality and reported quality of life of patients varied. Average mortality was 4.9% and ranged from 0% to 20% between hospitals.

Quality of life was assessed with the Euroqol 5D, a standardised quality of life measure. An Euroqol score of zero indicates a situation comparable to death from a society perspective, and the best possible score is 1. After 30-days, patients who underwent CABG had the lowest Euroqol score whereas PCI patients perceived the best quality of life, which is comparable to quality of life levels of their age counterparts in the general population. The lower score after CABG reflects the prolonged recovery period after major surgery. After one year, a considerable improvement was observed in the CABG group, up to the level of the PCI group. The PCI group remained at a high Euroqol quality of life score, while quality of life of patients in the non-invasively treated group worsened.

Half of all patients, and especially those who did not undergo an invasive treatment (59%), indicated one or more problems with respect to mobility, self-care, activity, discomfort/pain, or anxiety/depression. Almost half of the medically treated patients (45%) experienced problems with respect to pain and discomfort, as compared to 30% in the PCI and CABG group.
Coronary Revascularisation

Coronary Revascularisation in Europe

Percutaneous Coronary Interventions and Coronary Artery Bypass Grafting have been developed to treat symptoms of patients with manifest coronary artery disease. To date, percutaneous coronary interventions (PCI) have a wide indication. Whereas some years ago surgery was the dominant therapeutic option, nowadays most patients are eligible for percutaneous treatment. This includes patients with multivessel coronary disease. Accordingly, increasing annual volumes of percutaneous interventions and stabilising levels of coronary surgery are observed in most European countries. Germany, The Netherlands and Sweden are illustrative examples. Currently, high annual levels of percutaneous interventions are observed in Belgium, Denmark, Germany, Iceland, Israel, and Switzerland (over 1500 PCI procedures per 1 million inhabitants). Most other Northern, Western, and Southern countries have intermediate levels, whereas the Central European countries often have annual levels below 300 PCI procedures per million inhabitants.

Data source:
National Cardiac Society Reports
Between Feb 2002 and Feb 2003, 12,400 consecutive patients undergoing a percutaneous coronary intervention (PCI) in 30 centers in France, Germany, Israel, Italy, Poland, Portugal and the UK were enrolled in the SHAKESPEARE Registry to document patient characteristics, procedural data as well as outcome in clinical practice.

Data from randomised controlled trials provide evidence that especially diabetics with acute coronary syndromes (ACS) undergoing PCI benefit from the use of GP IIb/IIIa receptor blockers (GP IIb/IIIa). Two thirds underwent PCI for ACS of whom 23% had known diabetes. Less than half of these diabetics received GP IIb/IIIa during PCI. Despite the evidence of an improved outcome in especially diabetics, the frequency of GP IIb/IIIa use during PCI for ACS was not different from that in non-diabetics in clinical practice, although diabetics had more often been identified as high risk patients by the interventional cardiologists.

Independent determinants for the use of GP IIb/IIIa during PCI for ACS in clinical practice were cardiogenic shock, multivessel PCI and male gender. Determinants against GP IIb/IIIa were age >70 years and history of stroke. Known diabetes did not influence the decision for the use of GP IIb/IIIa in clinical practice.

Source:
Gitt et al., ESC 2004, Munich (Abstract)
MI Research Institute Ludwigshafen, Germany
The Euro Heart Survey on Heart Failure was undertaken during 2000-2001 in 115 hospitals from 24 European countries. Case notes of 46,782 consecutive death or discharges (all causes) from internal medicine, geriatric, cardiology and cardiac surgery wards were reviewed. Of them, 10,701 (24%) were identified with suspected or confirmed heart failure. Heart failure was the principal reason for admission in 40% of cases. These data illustrate that known or suspected heart failure comprises a large proportion of hospital admissions.

The great majority of patients had had an ECG (95%), chest X-ray (92%), haemoglobin, electrolytes and renal function measured (>90%) as recommended in ESC guidelines. Echocardiography was, however, performed in only 66% of patients. Variation between hospitals in application of diagnostic measures was large. For example, application of echocardiography ranged between hospitals from 27% to 89% of patients.

Almost 80% of patients with heart failure due to left ventricular systolic dysfunction (LVSD) received an ACE-inhibitor as recommended by the guidelines. Among patients receiving ACE-inhibitors, however, only 29% received the dose as recommended in clinical trials, and 51% received half or more of the recommended dose. The application of ACE-inhibitors varied from 27% to 92% between participating hospitals.

Beta-blocker therapy were prescribed in only 49% of patients with heart failure due to LVSD. Among patients receiving beta-blockers, 4% received the dose as recommended in clinical trials, and 16% half or more of the recommended dose. Application
of beta-blocker therapy varied between hospitals from 3% to 89%.

Current guidelines are mainly based on clinical trials in heart failure patients with LVSD. Almost half (46%) of the enrolled heart failure patients, however, did not have left ventricular systolic dysfunction. Evidence to support treatment of this large group of heart failure patients is still very limited.

Large differences were observed in patient outcomes between hospitals; 30-day mortality varied from 5% to 37%. In all, 13% of patients died and 27% were readmitted within 12 weeks. These data illustrate the continuing high mortality and morbidity among heart failure patients.

The Euro Heart Survey on Heart Failure II will start in the second half of 2004.

Publications:


The Euro Heart Survey on Valvular Heart Disease (VHD) was conducted in 2001. In 92 centres from 25 countries, 5,001 adult patients were included with moderate to severe native VHD, infective endocarditis, or previous valve intervention. Enrolled patients were hospitalised in medical (43%) or surgical (19%) cardiology departments, or visited the outpatient clinic (38%).

In the field of VHD exists a lack of large clinical trials providing a high level of evidence, and as a consequence the guidelines are usually not based on a ranked strength of evidence. The aim of the Euro Heart Survey on Valvular Heart Disease was to compare, whenever possible, the management of VHD with available guidelines and to try to define the rationale for decisions.

Aetiology was predominantly degenerative for aortic stenosis and rheumatic for mitral stenosis. Valve repair was the treatment of choice in about half of patients with mitral regurgitation, while autografts and mechanical prostheses were equally used in aortic stenosis.

The application of mechanical prostheses as compared to bioprostheses in patients operated on for aortic stenosis varied largely by age, as appropriate. Mechanical prostheses were predominantly applied in young patients, whereas in elderly patients a bioprosthesis was the preferred treatment.

Overall the indications for interventions in the asymptomatic patient were in agreement with guidelines in the majority of patients (66%-79%), and among the different single native valve disease patients. On the other hand, however, two thirds of patients with severe valve disease and severe symptoms were not operated on.
The reasons for not advising intervention were either cardiac, extra-cardiac or both. However, the multifactorial nature of the decision process in such patients and the absence of precise recommendations in the field of VHD explains the wide variability of advice given and makes it difficult to make meaningful comparisons with guidelines.

A total of 169 patients had acute infective endocarditis. Of them, 55% underwent valve replacement during the survey, which is slightly better than the most recent surveys, but remains probably too low when compared with current recommendations.

Antibiotic prophylaxis was inadequately applied in patients with infective endocarditis, since half of the patients did not receive prophylaxis during a procedure at risk. Variation in antibiotic prophylaxis was observed between hospitals, but in most hospitals such medication was prescribed in less than 40% of patients.

Furthermore, education on use of antibiotic prophylaxis should be improved. Only 30% to 50% of patients were followed by dentists, and 50% to 70% received education. The same findings were observed with regard to the application of management of anti-coagulant therapy since only 22% of the patients received education, with large variation between hospitals from 5% to 80% of patients.

Publications:
In the past decades, prognosis and life expectancy of patients with congenital heart disease have dramatically improved, mainly as a result of improved surgical techniques. Increasing numbers of these patients are now reaching adulthood, which has led to a new population of patients consisting of adults with a surgically corrected heart defect. The Euro Heart Survey on Adult Congenital Heart Disease was conducted in 2003 and 2004. In 79 centres (47 specialised; 32 non-specialised) from 26 countries, 4,168 patients with adult congenital heart disease were included.

The survey focused on 8 selected defects: Atrial Septal Defect (22%), Ventricular Septal Defect (VSD) (15%), Tetralogy of Fallot (20%), Aortic Coarctation (13%), Transposition of Great Arteries (9%), Marfan Syndrome (7%), Fontan Circulation (5%), and Cyanotic defect (9%).

Guidelines showed to be reasonably applied in clinical practice, with variation per type of defect and with a closer adherence for interventions than for diagnostic work-up. For example, according to guidelines, all patients aged 40 years or older should have a coronary angiography before undergoing a cardiac operation, while, on the other hand, angiography is not indicated in patients younger than 40 years of age. The data showed that in 575 patients operated on during follow up, angiography was under-used in 92 and over-used in 55 patients.

In patients with VSD, numbers of under-treatment and over-treatment were relatively low, illustrating reasonable adherence to guidelines.
The application of pacemakers varies largely across the ESC member countries, ranging from about 200 to over 800 per million inhabitants per year. Major differences are apparent even between countries with similar economies. These differences have been known for several years, but are still largely unexplained.

In most countries the use of pacemakers is gradually increasing. This may be due to the ageing of the population, to the introduction of special pacemaker systems for treatment of tachyarrhythmia’s and to the treatment of selected groups of patients with heart failure. The highest use of pacemakers is currently reported in Austria, Belgium, France, and Germany.

Implantable Cardioverter Defibrillators (ICD) have been introduced for treatment of patients with a previous cardiac arrest. More recently, ICDs have been recommended for other groups of patients who are at high risk for the development of life threatening ventricular arrhythmias. This has led to a rapid increase in the use of these devices in recent years and a further increase is expected in the coming years. Currently the highest use of ICDs is reported in Germany, which is about twice as high as in other Western European countries.

Data Source:
Registry European Heart Rhythm Association
The Euro Heart Survey on Atrial Fibrillation was conducted in 2004, and some preliminary results are presented in this report. In 182 centres from 35 countries, data were collected on characteristics, management and outcome of 5,330 patients. The population comprised consecutive in- and out-patients with atrial fibrillation. Patients were enrolled only if an ECG diagnosis of atrial fibrillation was made. The qualifying episode of atrial fibrillation should have occurred within the last year.

Atrial fibrillation is a disorder with high prevalence figures in the elderly. Atrial fibrillation is often secondary to coronary artery disease, heart failure, or valvular heart disease, but it can also occur as a primary condition. Patients with paroxysmal atrial fibrillation most often have no other cardiovascular disease (20%), while the relatively old group of patients with permanent atrial fibrillation is less often free from other cardiovascular diseases (7%).

Since patients with atrial fibrillation have an increased risk for stroke, anticoagulation therapy is recommended by guidelines. Yet, the survey revealed that a significant proportion of patients did not receive such therapy. Anticoagulation therapy in patients with atrial fibrillation varied largely between hospitals from 8% to 100% of patients. Additional analysis of these data is required to verify this observation, and to assess which proportion of patients is under-treated.
As expected, anticoagulation therapy was prescribed predominantly in patients with persistent (79%) or permanent (76%) atrial fibrillation, whereas such therapy was less often prescribed in patients with a first episode of atrial fibrillation (53%) or paroxysmal atrial fibrillation (50%).

Since cardiac function is impaired in patients with atrial fibrillation, which limits exercise tolerance, cardioversion is often attempted to return to normal sinus rhythm. Such cardioversion may be achieved by antiarrhythmic drugs (pharmacological conversion) or by electric shock. The latter procedure is used particularly in patients with persistent atrial fibrillation (36%), while pharmacological conversion is most often applied in patients with first detected (39%) or paroxysmal atrial fibrillation (33%).
ACSIS is a biannual survey that has been conducted since 1992 in all 25 cardiac departments operating in Israel. The surveys are performed over a two-month period, and include all patients with a diagnosis of acute coronary syndrome (acute myocardial infarction or unstable angina pectoris).

The goals of ACSIS include examination of trends over time in the management of patients with acute myocardial infarction hospitalized in cardiac departments in Israel, and evaluation of the impact of management on clinical outcome and mortality in acute myocardial infarction patients.

The data presented here describe the characteristics of the patients, management modalities, and their outcome over the last decade (1992-2002).

Table 1 shows the demographic characteristics of the patients surveyed during the different time periods, as well as the prevalence of cardiovascular risk factors.

Throughout the decade, the proportion of male and female patients remained similar, with approximately three quarters of patients being men and one quarter, women.

The mean age of the patients also remained stable over time, although an increase in the proportion of patients over the age of 80 was noted. With respect to risk factors, the frequency of diagnoses of...
diabetes, hypertension, and hyperlipidemia increased over time. Figure 1 illustrates trends in hospital treatment over time. Substantial increases in the use of aspirin, beta-blockers, ACE inhibitors, and lipid-lowering drugs were observed throughout the decade studied. Trends in the use of reperfusion and coronary interventions are demonstrated in Figure 2. These data indicate that the use of coronary angiography, PTCA/CABG, and primary PTCA have increased steadily over a ten year period, while a decrease in the use of thrombolysis was observed between 1996 and 2002. Figure 3 shows the extent to which 7-day, 30-day, 6-month, and 1-year mortality was reduced between 1992 and 2002. For each of these endpoints substantial reductions were observed, with the most striking found for 7 and 30-day mortality. These changes probably reflect the improvement in management and medical treatment of myocardial infarction patients.

National surveys and registries are of utmost importance for the evaluation of guideline implementation in the community and their impact on patient outcome in real life practice.
Concluding Remarks

The Euro Heart Survey programme was developed to achieve three main goals.

1. To assess the adherence of guidelines for the prevention, diagnosis and management of cardiovascular disease in clinical practice in the ESC member countries.

2. To evaluate to what extent patients who are seen in the daily clinical practice of cardiology and cardiovascular medicine are appropriately represented in clinical trials, which are the main source for guideline development (evidence based medicine).

3. To assess the relation between the adherence to clinical practice guidelines and patient outcome.

The data presented in this report demonstrate that the Euro Heart Survey programme is successful. Surveys have been conducted on secondary prevention of coronary artery disease, heart failure, acute coronary syndromes, coronary revascularisation, valvular heart disease, stable angina pectoris, atrial fibrillation, diabetes and the heart and adult congenital heart disease. Surveys and registries in different countries in Europe have focused on acute coronary syndromes, coronary revascularisation and device therapy for arrhythmias (pacemakers and implantable cardioverter defibrillators).

The currently available data provide answers to the three questions raised.

1. There is a wide variation in practice among hospitals in Europe, as well as among hospitals in individual countries. Adherence to guidelines is variable and can be improved. Comparing the results of successive surveys in patients with coronary artery disease it is apparent that chronic treatment (secondary prevention) is improving over the years. Future surveys should monitor such improvement in management of coronary artery disease as well as in other fields of cardiology and cardiovascular medicine.

2. As expected, patients seen in routine clinical practice differ significantly from those selected for participation in clinical trials as they are older, more often female, have a more severe cardiac condition and more often suffer from concomitant other diseases. Specific studies of diagnostic procedures and therapy are required in these patient groups.

3. There appears to be a relation between guideline adherence and outcome: hospitals with best guideline adherence have overall best patient outcome (report in preparation).
In the coming years, the European Society of Cardiology will further improve the survey programme. For example, different surveys related to management of coronary artery disease can be coordinated. In fact there is a large overlap between surveys on acute coronary syndromes, stable angina, and coronary revascularisation. Furthermore, surveys on secondary prevention (EuroAspire) address patients previously admitted for acute coronary syndromes or previously undergoing revascularisation. Accordingly, it will be efficient to organise future surveys on secondary prevention in a coordinated fashion with the follow-up of surveys on acute coronary syndromes and revascularisation. Issues related to diabetes and hypertension can be integrated in the acute and follow-up surveys of coronary artery disease. Similarly, surveys on acute and chronic heart failure, resynchronisation therapy and the use of implantable cardioverter defibrillators may be integrated. Dedicated consistent questionnaires will be developed for these surveys, based on data standards as agreed in the CARDS project. In addition to the topics indicated above other topics may be addressed at longer intervals including valvular heart disease, adult congenital heart disease and cardiac imaging.

Improved online data collection using simplified case report forms will allow continuous registration of specific patient groups and procedures by interested hospitals. Such continuous registries have been developed in different countries, and are likely to be introduced throughout Europe in the coming years. Continuous registries offer “quality assurance” and “benchmarking” to the participating hospitals. This certainly will lead to improved quality of care, as has been demonstrated in different studies.

In the coming years, procedures for data collection and quality control will be improved, and the programme will be extended to other hospitals throughout Europe. Furthermore, we expect that the Euro Heart Survey programme will be integrated with national registries and surveys. Hospital information systems will evolve to allow online data collection in clinical practice, for reporting by the responsible physician as well as access to national and international registries survey programmes.

The Euro Heart Survey committee is grateful to all contributors to this report and in particular to the participating hospitals which provide insight into the actual practice of cardiology.
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