Consensus Paper

Cerebrovascular Diseases

Cerebrovasc Dis 2007;23:229–241
DOI: 10.1159/000097646

Published online: November 30, 2006

Helsingborg Declaration 2006 on European Stroke Strategies

T. Kjellström B. Norrving A. Shatchkute

Contents

KARGER

Basel • Freiburg • Paris • London • New York •
Bangalore • Bangkok • Singapore • Tokyo • Sydney

Consensus Paper

Cerebrovascular Diseases

Cerebrovasc Dis 2007;23:229–241

Published online: November 30, 2006

Helsingborg Declaration 2006 on European Stroke Strategies

T. Kjellström[a] B. Norrving[b] A. Shatchkute[c]

[a]Department of Medicine, Helsingborg Hospital, Helsingborg, and [b]Department of Neurology, Lund University Hospital, Lund, Sweden; [c]WHO Regional Office for Europe, Copenhagen, Denmark

Key Words

Cerebrovascular accident, prevention and control, therapy, rehabilitation · Treatment outcome · Quality assurance, health care · Strategic planning · Treaties · Europe

Abstract

The Second Consensus Conference on Stroke Management took place from 22 to 24 March 2006 in Helsingborg, Sweden. The meeting was arranged by the International Stroke Society, endorsed by the European Stroke Council and International Stroke Society, and co-sponsored by the WHO Regional Office for Europe. It was arranged in collaboration with the European Region of the World Confederation for Physical Therapy and the European Association of Neuroscience Nurses. The patients' organization Stroke Alliance for Europe also participated. The meeting adopted the Helsingborg Declaration 2006 on European Stroke Strategies, a statement of the overall aims and goals of five aspects of stroke management (organization of stroke services, management of acute stroke, prevention, rehabilitation, evaluation of stroke outcome and quality assessment) to be achieved by 2015.

Introduction

Background

Stroke is one of the leading causes of death and disability in Europe. As the population in Europe ages, the burden of the disease on society will increase.

In November 1995, a Pan-European Consensus Meeting on Stroke Management was held in Helsingborg, Sweden, to examine the latest evidence-based knowledge in the management of stroke, and set targets for 2005. The Meeting was arranged by the World Health Organization (WHO) Regional Office for Europe and the European Stroke Council, in collaboration with the European Federation of Neurological Societies, the International Stroke Society, the World Confederation for Physical Therapy, European Region, and the World Federation of Occupational Therapists. The resulting Helsingborg Declaration on Stroke Management was published in the *Journal of Internal Medicine* in 1996.[1]

The Helsingborg Declaration 2006

On 22–24 March 2006, a second Consensus Conference was held in Helsingborg to update the evidence and set new targets. This Conference was arranged by the International Society of Internal Medicine, endorsed by the

[1] Aboderin I, Venables G, Asplund K: Stroke management in Europe. J Intern Med 1996;240:173–180.

KARGER

Fax +41 61 306 12 34
E-Mail karger@karger.ch
www.karger.com

1015–9770/07/0233–0229$23.50/0

Accessible online at:
www.karger.com/ced

Aushra Shatchkute
WHO Regional Office for Europe
Scherfigsvej 8
DK–2100 Copenhagen Ø (Denmark)
Tel. +45 39 171 386, Fax +45 39 171 818, E-Mail ash@euro.who.int

European Stroke Council and International Stroke Society, and co-sponsored by the WHO Regional Office for Europe. It was arranged in collaboration with the European Region of the World Confederation for Physical Therapy and the European Association of Neuroscience Nurses. The patients' organization Stroke Alliance for Europe also participated.

Five main aspects of stroke management were covered:

- organization of stroke services
- management of acute stroke
- prevention
- rehabilitation after stroke
- evaluation of stroke outcome and quality assessment.

At the final plenary session, the participants adopted the Helsingborg Declaration 2006 on European Stroke Strategies, a statement of the overall aims and goals of stroke management to be achieved by 2015.

Organization of Stroke Services

Goal for 2015

All patients in Europe with stroke will have access to a continuum of care from organized stroke units in the acute phase to appropriate rehabilitation and secondary prevention measures.

Basic Requirements

It is highly recommended that:

- health professionals and the public are made more aware of the signs and symptoms of stroke through continuing education;
- organized services are set up to provide care for patients with stroke both in the community and in hospitals treating stroke patients;
- local requirements and resources are assessed so that care may be provided in stroke units with dedicated beds and multidisciplinary teams;
- a system is established to incorporate new research achievements into stroke care;
- hospitals that can provide acute stroke care are identified and transport routes to them established; patients should only be taken to hospitals without organized stroke care when they need resuscitation and/or intensive care;
- the precise structure of these services is adapted to meet local requirements and resources;
- a formal programme to certify stroke centres is introduced to raise the quality of stroke care and to ensure compliance with evidence-based and consensus-based national standards;
- reimbursement incentives are developed together with patient advocates, professional organizations and funders, to encourage certified or well-functioning stroke services;
- an individual responsible for the coordination of stroke services is nominated for each geographical area or population served;
- within every hospital, a single department be made responsible for managing stroke services including stroke unit care; this department would also be responsible for professional education;
- each region has written guidelines for a continuum of care, each hospital treating stroke patients has evidence-based clinical protocols, and evidence-based national guidelines are made available;
- each hospital treating stroke patients initiates a continuous quality improvement process, and each region evaluates the success of the continuum of care.

Acute Care

Stroke is a time-sensitive medical emergency and all patients should be evaluated as soon as possible in hospitals that can provide acute stroke care and are equipped with adequate imaging facilities such as computed tomography (CT) or magnetic resonance imaging (MRI).

Streamlined multidisciplinary stroke care starts from the emergency call centre, which identifies a potential stroke patient. The interval between the event and the emergency medical services being called should be monitored. The emergency call centre should dispatch an ambulance, staffed by persons trained in identifying stroke patients, to transport the patient quickly to the nearest hospital with appropriate resources for acute stroke management.

Stroke management begins in the pre-hospital setting. Initial stabilization addressing the 'ABCs' (airway, breathing, circulation) ensures that the patient's vital functions are assessed and secured.

The medical history will determine if the patient is a candidate for thrombolysis and his/her transfer to a hospital where this is available.

Emergency medical services should send a pre-notification to the emergency room/stroke unit of the admitting hospital to ensure rapid evaluation.

After rapid evaluation in the emergency room to determine the type of stroke (ischaemic or haemorrhagic)

and further stabilization of vital functions, the patient should be transferred to the stroke unit for organized multidisciplinary stroke care.

Although resources vary between countries, all countries need to strive to assure the development and provision of the essential infrastructure and human resources (multidisciplinary teams, stroke units and imaging facilities).

Stroke Units

The stroke unit is the backbone of integrated stroke services/chain of care because there is sufficient evidence that the health outcomes of patients managed in dedicated stroke units are better than those of patients managed in general medical wards.

The minimum criteria for a stroke unit include the following:

- dedicated beds for stroke patients;
- a dedicated team consisting of a stroke physician, trained nurses, physiotherapists and speech and occupational therapists;
- 24-hour availability of immediate imaging (CT or MRI) in case this has not been done in the emergency room (it may not be possible to meet this criterion in all stroke units in all countries owing to economic constraints);
- the availability of written clinical protocols and guidelines for diagnostic procedures, acute treatment, monitoring to prevent complications and secondary prevention;
- the possibility of starting immediate mobilization of the patient after the vital functions have been stabilized and ensuring his/her access to early rehabilitation;
- weekly multidisciplinary team meetings with the patient;
- continuing staff education;
- continuing education for patients/families/carers.

A stroke unit with dedicated beds offers an organized approach to inpatient care through multidisciplinary care by a dedicated stroke team.

Written clinical protocols, updated every 12 months, should be part of the care in a well-organized stroke unit that includes general supportive care, evaluation of stroke etiology, specific secondary prevention of stroke and early rehabilitation by a multidisciplinary stroke team.

All stroke patients should have their rehabilitation needs assessed by a multidisciplinary stroke rehabilitation team with medical, nursing, physiotherapy, occupational therapy and speech therapy skills as well as with psychological expertise, if necessary. Rehabilitation should be started during the first few days in a stroke unit or on a ward with dedicated stroke beds. The aims and methods of the rehabilitation programme should be tailored to the patient and should be modified according to his/her recovery.

If a radiologist is not always available in-house, telemedicine technology should be made available to ensure real-time on-line consultation to enhance dedicated stroke care.

Stroke units should be certified by a national or international certification process, to ensure compliance with evidence-based and consensus-based national standards.

Home care in the acute phase has not been shown to provide the same quality of care as a hospital with a stroke unit and should only be considered when hospital resources are not available or are inappropriate or inadequate.

Neurosurgery, vascular surgery, interventional neuroradiology and cardiology services are part of a comprehensive stroke centre but are not required for a primary stroke unit.

Rehabilitation

All members of the multidisciplinary team need to be aware of the essential features of rehabilitation after stroke and understand the key activities of the other team members so as to support these activities when required.

Rehabilitation is most effective when it is started very early after stroke onset. It should be continued as long as objective improvement continues.

Once a patient has been discharged from a stroke unit, rehabilitation should be continued in rehabilitation hospitals, outpatient rehabilitation clinics or at home by a mobile rehabilitation team, as appropriate.

Family members/carers should be taught the basic principles of rehabilitation.

After the active rehabilitation programme is completed, a continuum of care should be available for a smooth translation to the community health services.

A community liaison stroke team is recommended.

To achieve optimal adaptation, patients with permanent impairments should receive medical and community support as well as professional help to adapt and cope with the activities of daily living.

Continuity in rehabilitation and medical care after discharge from hospital is essential. Responsibility for this should rest either with the community health services or with the stroke unit.

After recovery, stroke patients often deteriorate from the level of independence they had achieved in the activities of daily living. Community health services should follow stroke patients to detect such deterioration and organize further rehabilitation as necessary.

If outpatient rehabilitation is not sufficient to prevent further deterioration, an in-hospital rehabilitation programme should be considered and arranged as appropriate to prevent the need for chronic institutional care.

Assessment of the functions of the patient should be carried out by a multidisciplinary team, if one is available.

The dignity and privacy of stroke patients should be respected at all times.

Collaboration between Professionals and Lay People

There is a need for broad-based collaboration between health professionals and lay people locally and nationally to promote education on stroke for the general public, stroke patients and their families, health professionals and health policy-makers.

There is evidence that health education improves the chances of preventing a stroke, leads to declining incidence of stroke and reduces delays from stroke onset to delivery of acute care, including thrombolysis.

The key messages for the public should include how to prevent and control the risk factors for stroke and recognize its symptoms, as well as a strong positive message that it is possible to prevent stroke and to recover from it.

All those with an interest in stroke management – patients and their families, doctors, nurses, hospitals, insurance companies, governmental and nongovernmental agencies – bear a responsibility for improving stroke care. A dual approach down from national organizations and up from the grassroots is required to accomplish the mission of reducing the human and economic burden of stroke.

The burden of stroke will be reduced if the public and health professionals work together to improve stroke care.

Stroke units or teams should provide leadership in establishing self-help groups for patients and their carers.

The formation of local associations of stroke patients and their carers should be encouraged.

Research and Development Priorities

The research and development priorities include:

- cost-effectiveness of different types of stroke service;
- long-term outcomes achieved with different models of stroke service;
- adherence to secondary prevention;
- identification of barriers to the implementation of evidence-based stroke care;
- development of better ways to deliver continuing stroke education to the general public, professionals and decision-makers;
- development of guidelines for the delivery of stroke care, including pre-hospital stroke care;
- development of telemedicine systems for management of stroke;
- development of the concept of primary and comprehensive stroke centres that optimize the use of multidisciplinary teams to improve the outcome for acute stroke patients.

When appropriate, patients could be encouraged to consider taking part in well-planned and executed controlled randomized trials for the prevention of stroke and for acute care and rehabilitation after it, as long as they are fully informed about possible side-effects and/or risk-related events.

Increased funding for research is needed for the rapid development of more effective therapies to prevent stroke and to treat and rehabilitate stroke patients.

Management of Acute Stroke

Goals for 2015

The goals for management of acute stroke by 2015 are that:

- more than 85% of stroke patients survive the first month after stroke;
- more than 70% of survivors are independent in their activities of daily living by three months after the onset of stroke;
- all patients with acute stroke who are potentially eligible for acute specific treatment are transferred to hospitals where there is the technical capacity and expertise to administer such treatment.

Awareness

Stroke must be regarded and treated as a medical emergency.

Both the general public and health professionals should be kept continuously aware of the significance of symptoms and signs of stroke to ensure early recognition and rapid referral of patients for evaluation and treatment.

Diagnosis

Clinical assessment to establish the diagnosis of stroke must take place immediately after admission.

All patients presenting with a symptom suggesting stroke require immediate brain imaging to distinguish between intracranial haemorrhage and cerebral ischemia and to identify diagnoses other than stroke. In urgent situations, imaging may precede emergency room assessment.

Magnetic resonance imaging is useful in patients with small stroke or posterior circulation stroke and in detecting salvageable brain at risk of infarction.

Ultrasound and other non-invasive tests should be available for the diagnosis of carotid, vertebral artery and intracranial artery stenosis and occlusion. Invasive angiography is indicated only in selected patients with subarachnoid haemorrhage, intracerebral haemorrhage or cerebral ischemia.

There is no role for emergency cerebrospinal fluid studies except for patients with signs and symptoms of subarachnoid haemorrhage, who do not show blood on CT.

Basic Care

Skilled basic care in a stroke unit reduces the risk of complications and second stroke.

Treatment in a stroke unit should be made accessible to all stroke patients in need of it.

Neurological impairment and consciousness level should be monitored at regular intervals in the first 48 h after the onset of stroke.

Acute care, including management of blood pressure, should be carried out according to international and national guidelines. Systolic blood pressure should be kept below 185 mm Hg and serum glucose at less than 150 mg/dl (8.3 mmol/l).

Rehabilitation should start as soon as possible and should be made available to patients of all age groups.

In patients with ischaemic stroke or transient ischaemic attack (TIA) and who cannot be treated with thrombolysis, anti-thrombotic treatment should start as soon as possible.

Specific Drug Treatment

Thrombolysis with recombinant tissue plasminogen activator (rtPA, or alteplase) is currently approved worldwide for the treatment of acute ischaemic stroke in a three-hour time window. Thrombolytic therapy should only be given if the diagnosis is established by a physician who has expertise in the diagnosis of stroke, and a CT scan or MRI of the brain is assessed by physicians with expertise in reading imaging studies.

Because the use of thrombolytic drugs carries a risk of intracerebral bleeding, the risks and potential benefits of these drugs should, whenever possible, be discussed with the patient and carer before treatment is initiated.

The benefit of intra-arterial thrombolytic treatment or mechanical recanalization has not been compared to that of the early intravenous thrombolysis but may be used in specific situations such as acute basilar occlusion.

Surgical Treatment

Space-occupying infarction or large haemorrhage in the cerebellum may require urgent decompressive surgery and ventricular drainage. Evacuation of supratentorial spontaneous hypertensive haemorrhages does not improve mortality and the quality of survival in the majority of patients.

Decompressive surgery in acute space-occupying hemispheric infarction reduces mortality. Randomized trials are ongoing to evaluate whether the quality of survival is also affected by the intervention.

Early surgery for an aneurysm prevents re-bleeding. Early coiling of arterial aneurysms after subarachnoid haemorrhage also prevents re-bleeding and seems to be safer and less invasive, especially for posterior circulation aneurysms.

Management of Complications after Acute Stroke

To reduce the risk of deep vein thrombosis and pulmonary embolism in immobilized patients, patients should be mobilized early, if possible, and given compressive stockings. Selected patients who are bedridden should receive low molecular weight heparin.

All patients suffering from depression should have access to specialized evaluation and appropriate treatment.

Appropriate medical treatment of symptomatic epilepsy is necessary.

Pulmonary and urinary infection should be treated adequately by early mobilization, prevention of aspiration, prevention of urinary tract infection and administration of antibiotic therapy, if necessary.

Swallowing needs to be assessed to identify dysphagia and prevent risk of aspiration.

Evidence-Based Therapy

Evidence-based therapies should be made available to all stroke patients.

Clotting drugs to prevent the spread of bleeding and non-pharmacological reperfusion procedures that are

not yet approved should only be given to patients within clinical trial protocols.

When appropriate, patients might be asked to consider participating in clinical trials as long as they are fully informed about possible side effects and/or related risks.

Research and Development Priorities

The research and development priorities include:

- an increase in the number of stroke patients offered thrombolysis;
- identification of factors which may delay or facilitate broad implementation of thrombolytic therapy;
- administration of new thrombolytic drugs and systemic thrombolysis beyond a three-hour window for treatment;
- development of new, safer and more widely applicable reperfusion;
- identification of biomarkers of response and haemorrhagic risk after thrombolysis to increase the risk–benefit ratio;
- investigation of the benefit of intra-arterial approaches integrated with intravenous thrombolysis;
- development of new therapies for ischaemic stroke such as neuroprotectants and other drugs and hypothermia;
- further development of recombinant factor 7 for acute haemorrhagic stroke;
- evaluation of surgical interventions in acute ischaemic and haemorrhagic stroke;
- evaluation of interventional neuroradiological procedures in acute stroke;
- development of new strategies to select patients for specific therapies;
- prospective evaluation of basic care elements such as blood pressure control, blood glucose management and body temperature management.

Prevention

Goals for 2015

The goals for prevention of stroke by 2015 are that:

- stroke mortality is reduced by at least 20% from the level of 2005;
- all countries aim to reduce the major risk factors for stroke in their populations, most importantly hypertension and smoking;
- all patients who have suffered a TIA or stroke receive appropriate secondary preventive measures.

Basic Requirements

Primary Prevention

Community-based action to prevent, detect and manage the major risk factors and the determinants of chronic diseases should be available. For stroke, the 'big five' are hypertension, smoking, lack of physical exercise, atrial fibrillation and diabetes.

Health services should include programmes to identify persons at high risk for stroke and other types of vascular disease and initiate appropriate preventive measures.

Secondary Prevention

All health services managing stroke patients in the acute phase should have structured programmes to initiate secondary prevention measures.

The health services responsible for the long-term management of stroke patients (usually primary health care) should have structured programmes to prevent cardiovascular events.

Patients who develop new cerebrovascular events should be considered for reinvestigation of the underlying causes, as this may lead to changes in secondary prevention.

Lifestyle Interventions

Community-based actions to encourage healthy lifestyles should be implemented, especially those aiming at no use of tobacco, a healthy diet to prevent overweight and obesity with accompanying hypertension, hypercholesterolemia and glucose impairment, and an increasing regular physical activity. European guidelines on methods to achieve this are available. Appropriate policies should be developed in all countries.

It is recommended that health services' staff apply evidence-based methods in support of a healthy lifestyle more extensively than is the case at present. This includes brief structured advice and, in smokers, nicotine replacement therapy. Such methods should be applied both in the primary and secondary prevention of stroke.

Drug Treatment

Antithrombotic Therapy

Patients with atrial fibrillation and an ischaemic stroke or TIA (secondary prevention) should be considered for treatment with oral anticoagulants as first-line therapy. If treatment with anticoagulants is contraindicated, antiplatelet therapy should be used. For patients with atrial fibrillation who have not suffered a TIA or ischaemic stroke, the choice of antithrombotic therapy (primary

prevention) should be guided by individual risk assessment. Patients and health professionals should be trained in the safe use of anticoagulants and the monitoring of treatment.

Patients with ischaemic stroke or TIA but without a cardiac source of embolism should be given antiplatelet therapy.

Drugs to Lower Blood Pressure

Stroke prevention can be improved by better detection, treatment and prevention of hypertension, according to international guidelines.

In primary stroke prevention, the use of risk scoring systems is recommended to identify individuals at high risk.

Patients who have had a TIA or stroke (ischaemic as well as haemorrhagic) are at particular risk for further vascular events. Most patients should receive drugs to lower their blood pressure to below 140/90 mm Hg (or below 130/80 mm in patients with diabetes).

Drugs to Reduce Cholesterol

In primary prevention, statins are the most powerful drugs to reduce cholesterol. They should be used in high-risk patients. In secondary prevention after a stroke, statins reduce the risk of cardiovascular events although the effect on stroke events is less clear. Further randomized trial data on this issue will appear in the near future.

Cost-Effectiveness

Scientific documentation of the effects (both beneficial and adverse) of antihypertensive drugs and cholesterol-lowering drugs is accumulating rapidly. The costs of using them may change dramatically over time, so their cost-effectiveness needs to be updated frequently. To free resources for other pressing needs in the management of stroke, cost-effectiveness should become a key issue when choosing a particular drug to prevent stroke.

Detection and Management of Carotid Stenosis

All patients with carotid territory ischaemic stroke or TIA who do not have obvious contraindications to surgery should be investigated for possible carotid stenosis without delay.

Carotid surgery should be considered in all patients with a symptomatic carotid artery stenosis of >70% (NASCET method or equivalent).

The waiting time for surgery should be known for each surgical centre. The great majority of patients should be operated on within two weeks of the qualifying symptoms, and the delay should not exceed four weeks.

Patients with TIA/ischaemic stroke and carotid artery diameter reduction of 50–69%, as well as those with an asymptomatic carotid stenosis of >60%, may be operated on in centres with a low complication rate for surgery. Algorithms for individual assessment of benefits and risk of surgery may be used for these patients.

Carotid stenting or other new technologies to treat carotid stenosis should not be applied routinely until they have been further evaluated in randomized controlled trials.

Research Priorities

The research and development priorities include:

- study of improvements in health associated with a reduction in risk factors as well as the clinical effects of multi-drug intervention;
- development of effective ways to reduce risk factors;
- development of a better understanding of differences in the risk factors for incidence and recurrence of different aetiological subtypes of ischaemic stroke and in intracerebral haemorrhage;
- further study of the pathophysiology and therapy in important subgroups such as stroke in the young and cerebral venous thrombosis;
- study of genetically determined risks for stroke;
- study of the most effective strategy for reducing the very high risk of major stroke in the days after a TIA or minor ischaemic stroke;
- study of the effect of long-term lowering of blood pressure and lipids in patients with stroke;
- comparison of the effectiveness of alternative antiplatelet agents, or in combination with aspirin, or aspirin alone in patients with completed stroke and TIA;
- study of the effects of different measures to prevent stroke in individuals with patent *foramen ovale*;
- study of further aspects of treatment with anticoagulants in symptomatic patients with nonvalvular atrial fibrillation (effects in very elderly patients, duration of therapy);
- study of the optimal procedures for treating carotid stenosis in different groups of patients;
- study of the relationship between nutritional state and second vascular events;
- study of the determinants of compliance;
- study of the clinical implications of cerebral microbleeds.

Rehabilitation after Stroke

Goal for 2015

The goal for rehabilitation after stroke is that three months after the onset of stroke, over 70% of the surviving patients are independent in their activities of daily living.

Basic Requirements

Following acute treatment it is essential to avoid bedrest and to mobilize patients as early as possible.

At the start of rehabilitation, every patient should have access to rehabilitation services. For maximum effectiveness, this includes the availability of a multidisciplinary stroke team.

When awake and medically stable, a patient should be assessed by a team of neurologically trained professionals using a standard check-list to identify problems. This assessment includes not only motor functions but also cognitive and emotional/behavioural domains known to be frequently affected by stroke. In addition, the patient's general health, nutritional and continence status, any concomitant diseases and special needs should be considered.

As soon as appropriate, the patient should take part in goal-planning involving all the rehabilitation professionals. It is essential to formulate goals that are achievable and include the personal and social domains.

According to a patient's needs, he/she should:

- receive relevant interventions
- be reassessed, and
- take part in goal-planning.

The Roles of Patients and Their Families

Carers are recognized as important contributors in the rehabilitation process. Rehabilitation should, therefore, be planned in close collaboration with the patient and the carers. They should take part in the rehabilitation process which is centred on the patient's own goals.

For this to be effective, patients and their carers should be provided with medical and nursing information at all levels and for all phases of rehabilitation. They should receive written education materials and support from professionals as well as lay organizations (wherever appropriate) to improve their abilities to cope with the impairment of function and their participation in the process. Thus it is essential that patients and their carers are satisfied with the information received both in hospital and outside from outpatient settings, community health services and patients' organizations.

Multidisciplinary Rehabilitation Team

To be most effective, rehabilitation requires the intervention of a multidisciplinary team consisting of a physician trained in stroke medicine, a nurse experienced and trained in stroke rehabilitation, a physiotherapist, an occupational therapist, and a speech therapist trained and experienced in stroke rehabilitation. Some patients will require the intervention of a social worker, who should also be considered part of the team. Assessment by a neuropsychologist should be available when needed. Other professionals, such as a dietitian and orthoptician, can be included as necessary.

In some settings, including smaller hospitals, conditions may dictate that one or more of the professionals fulfil more than one of these roles and multidisciplinary efforts are shared among the professional members of the team. But this should not impede or delay achievement of the overall goals as defined by the needs of the patients and their families.

Interventions

The selection of methods and techniques should be based on evidence as far as possible and follow available international or national guidelines.

Such interventions are usually specific, targeted and task-oriented. They should also be relevant to the patient, that is, in accordance with the patient's own goals, and take account of appropriate social dimensions for learning and practice.

Measures should include rehabilitation of emotional responses and behavioural skills with a special focus on social integration and restoration of cognitive abilities. Where applicable, interventions for the restoration of professional working abilities should be included as early as possible.

When medically feasible, rehabilitation should include training sessions to improve physical fitness.

Formal training sessions with the multidisciplinary team should be supplemented by training for carers and volunteers, as directed by health professionals.

Team-based training will in most cases be finished within the first year following stroke. Some patients may need later reassessment by a multidisciplinary team, which should be provided. Often further improvements in function and social participation can be achieved with additional rehabilitation.

Role of the Environment

Scientific evidence suggests that a positive and stimulating environment, both physically and emotionally, is likely to enhance the effects of rehabilitation.

Patients' environments should, therefore, be as personalized and home-like as possible and should enable them to carry out all relevant tasks and functions as a personalized routine. In the performance of such tasks, the dignity and privacy of the patient and his/her family should be respected as a priority in all settings.

Importance of the Continuous Chain of Care

The patient should be part of a continuous chain of care from the moment the stroke occurs.

Successful rehabilitation requires close coordination between the health and the community-based social services as part of a continuous chain of care. In some regions or settings, a stroke liaison worker or stroke liaison team might be effective in the rapid recognition of the patient's needs and for the ready availability of reassessment of his/her performance in the community.

It has become increasingly acknowledged that discharge of a patient to a rehabilitation setting in his/her home and community should be planned as early as possible. Provided rehabilitation can be carried out locally with an equal intensity, duration and skill as is offered on a rehabilitation hospital ward, the concept of early supported discharge has shown that the rehabilitation goals can be reached effectively.

Long-term follow-up is the responsibility of local services, who should also ensure easy re-entry to the rehabilitation services as necessary.

Role of Patients' Organizations

The formation of local associations of patients with stroke and their families should be encouraged because:

- they play an indispensable role in providing support, information and counselling to patients and their carers;
- they contribute to the coordination of local, regional and national efforts to promote better rehabilitation and stroke care in general and to improve social support for people with stroke;
- they encourage social recognition and necessary compensation for the caregivers.

Research Priorities

The research and development priorities include the following:

- Scientific evaluation of the effectiveness of rehabilitation techniques and strategies. Such evaluation should be based on experimental data that show the potential for recovery, including neuronal repair, regeneration and enhanced plasticity of the brain after circumscribed lesions, and aim at translating such effects into a clinical setting.
- Development of rehabilitation techniques for the neuropsychological domain. Neuropsychological functions are impaired almost as often as motor functions and include functions relating to attention, memory, semantic and non-verbal abilities that are necessary for professional and social reintegration and adaptation. Evidence from meta-analyses has shown that training of speech and other cognitive abilities can be effective and constitutes an important component of rehabilitation.
- Study of categories referring to emotional domains and dimensions of satisfaction with life and their use in outcome assessments.
- Improvement of outcome measures that focus on social functioning, satisfaction with rehabilitation services and life satisfaction.
- Development of research methodology for randomized trials of components of rehabilitation which can be easily isolated and/or combined with the testing of recovery drug interventions. The quality criteria for such randomized trials should include the criteria established and recognized for all randomized trials, including masked outcome assessment.
- Further evaluation of treatment with drugs to improve recovery;
- Further evaluation of cognitive-enhancing drugs in patients with cognitive impairment such as dementia;
- Evaluation of the cost-effectiveness of varied social settings, including the involvement of volunteers and families in rehabilitation after stroke, as well as of the effectiveness of different types of rehabilitation service in less well-resourced settings;
- Development and evaluation of interventions for family and/or carers to define the effectiveness of their roles as well as provide evidence of the need for increasing social recognition and for financial compensation.

Evaluation of Stroke Outcome and Quality Assessment

Goal for 2015

The goal of evaluation of stroke outcome and quality assessment is that all countries aim to establish a system for the routine collection of data needed to evaluate the quality of stroke management, including patient safety issues.

General Principles

For evaluation to be meaningful, the structure, process and outcomes of stroke management need to be assessed.

Quality of care is concerned with efficacy, appropriateness, accessibility, effectiveness, acceptability and efficiency.

Variations in case-mix (such as age and co-morbidity) need to be taken into account when comparisons of outcome are made over time or between services.

Quality of care can be assessed with different levels of comprehensiveness. For routine use in the long term, the number of indicators needs to be limited.

National registers should be set up to provide reliable data on the qualitative improvement of stroke care in each country.

Core Indicators for the Assessment of Quality of Care

The core indicators for the assessment of structure, process and outcome of stroke care are:

(i) for the assessment of structure:

- availability and quality of care in a stroke unit
- availability and quality of the rest of the stroke service
- coverage by a quality assessment programme;

(ii) for the assessment of process

- proportion of patients admitted to care in a stroke unit
- proportion of patients undergoing neuroimaging within 24 h of hospital admission
- proportion of patients treated with thrombolysis
- proportion of patients on adequate secondary prevention (acetylsalicylic acid or other antithrombotics; atrial fibrillation with anticoagulants; carotid endarterectomy, if appropriate; therapy to lower blood pressure and cholesterol)
- proportion of patients given adequate advice about a healthy lifestyle
- proportion of patients with a TIA evaluated and a treatment plan implemented within 48 hours of the first symptoms;

(iii) for the assessment of outcome:

- case fatality at one and three months
- place of residence at three months
- functional status at three months measured with a validated score
- proportion of patients with bleeding complications after thrombolysis
- complication rates of carotid artery interventions;

(iv) for the assessment of stroke management at the macrolevel:

- population-based monitoring of the incidence and prevalence of stroke, stroke case fatality and disability.

Optional Indicators for the Assessment of Quality of Care

Many other indicators concerning structure, process and outcome can be used to assess the quality of care. They are not listed here but can be found in national and international quality registration programmes (Annex 1).

Annex 1

Websites of National and International Quality Registration Programmes

Joint Committee on Accreditation of Healthcare Organizations (www.jointcommission.org, accessed 28 July 2006).

Safe Implementation of Thrombolysis in Stroke (SITS) – International Stroke Thrombolysis Register (http://www.acutestroke.org/index.php?module=ContentExpress&func=display&ceid=42 &meid=7, accessed 28 July 2006).

Riks-Stroke – A National Quality Register for Acute Stroke (www.Riks-Stroke.org, accessed 28 July 2006).

Arbeitsgemeinschaft Deutscher Schlaganfall-Register (ADSR) – German Stroke Register (http://epi.klinikum.uni-muenster.de/schlaganfallregister/index.htm, accessed 28 July 2006).

United Kingdom National Sentinel Stroke Audit 2004 (www.rcplondon.ac.uk/pubs/books/strokeaudit/strokeaudit2004.pdf, accessed 28 July 2006).

United Kingdom Carotid Endarterectomy Audit (www.rcplondon.ac.uk/college/ceeu/ceeu_stroke_home.htm, accessed 28 July 2006).

Patient Survey after Stroke (http://www.nhssurveys.org/docs/Stroke_Questionnaire.pdf, accessed 6 September 2006).

STEPwise Approach to Surveillance (STEPS). Geneva, World Health Organization, 2006 (www.who.int/ncd_surveillance/steps, accessed 28 July 2006).

Annex 2

Dissemination of the Helsingborg Declaration 2006

The content is expected to be presented, accepted and disseminated by the sponsoring organizations at their meetings as well as at major international, national and regional stroke conferences and widely distributed on websites.

The Helsingborg Declaration 2006 Organizing Committee
Kjell Asplund, Sweden
Julien Bogousslavsky, Switzerland, International Stroke Society
Gudrun Boysen, Denmark
Werner Hacke, Germany, European Stroke Council
Thomas Kjellström (Chairperson), Sweden, International Society of Internal Medicine
Bo Norrving, Sweden, International Stroke Society
Aushra Shatchkute, WHO Regional Office for Europe
Bo Ågren, Sweden.

The following writing groups were established for each domain:

Organization of stroke services: Markku Kaste (Chairperson), Laszlo Cziba, Hans C Diener, Martien Limburg, Danilo Toni, Alexander Tsiskaridze

Management of acute stroke: Werner Hacke (Chairperson), Gudrun Boysen, Antoni Davalos, Nils Wahlgren

Prevention: Julien Bogousslavsky (Chairperson), Kjell Asplund, Anna Czlonkowska, Michael Hennerici, Bart Piechowski-Jozwiak, Peter Rothwell

Rehabilitation after stroke: Michael Brainin (Chairperson), Peter Langhorne, Didier Leys, Veronica Skvortsova, Michaela Trapl

Evaluation of stroke outcome and quality assessment: Cees Franke (Chairperson), Antony Rudd, Birgitta Stegmayr

The Consensus Conference received financial support from Pfizer AB, Sanofi-Aventis and Bristol Myers Squibb as well as from AstraZeneca, the Gorthon Foundation and Helsingborg City.