STROKE MANAGEMENT MODEL IN THE INNSBRUCK NEUROINTENSIVE CARE UNIT

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The study of cerebrovascular diseases has a long tradition in Europe. "Apoplexy" or "Stroke" was recognized as a clinical syndrome even before the time of Hippokrates.

Epidemiology

Stroke is the most common life-threatening neurologic disease and is the third leading course of death in Europe.

Annual stroke death rates of European countries (data based on recent WHO-statistics)

Hungary	218/100.000/year
Scotland	186
Austria	182
Italy	137
Norway	133
France	130
Sweden	109
Switzerland	107
The Netherlands	86

A comparison of the data obtained by the WHO-registers reveal moderate differences in the overall stroke incidence between countries, the **MEAN INCIDENCE RATE** for Europe 200/100.000/year being about 200/100.000/year. On the basis of these figures it is estimated that the **ANNUAL NUMBER OF STROKES** in Europe approaches 1 Million occurring in Europe approaches 1 Million.

According of these official modality statistics, the European rates for cerebrovascular disease rose gradually over the

period from 1930 to 1950, being interrupted in some countries during the second world war. After reaching a peak about 1960, however, the **CVD-DEATH RATES** have been falling steadely for the past 20 years.

It has been suggested that the devirging trends in the mortality from ischemic and hemorrhagic strokes may be the result of changes in hospital admission, diagnostic ability and therapeutic approaches.

Differential diagnosis

Each patient suffering from a cerebrovascular disease must be accepted as an EMERGENCY-PATIENT !!!
Following the preclinical care using all modern intensive care facilities (e.g. emergency doctor, Helicopter-transport) an immediate clinical neurological examination and a specific neuroradiological investigation is necessary to establish the exact diagnosis:

Differential diagnosis of Stroke

- Ischemic stroke
  - White infarction
  - Secundary hemorrhagic infarction
- Intracerebral hemorrhage
- Subarachnoid hemorrhage
- Sinus venous thrombosis

Further neurological diseases possiblypresenting as "Stroke"

- Encephalitis (e.g. Herpex simplex Encephalitis)
- Intracerebral tumour (especially metastasis)

Traumatic hematoma
- Acute subdural hematoma
- Chronic subdural hematoma
- Epidural hematoma

Hypoglycemia

Ischemic Stroke

Subtypes of ischemic stroke

1. Territoreal infarction (due to intracranial artery occlusion)
2. Borderline infarction (due to extracranial artery disease and/or cardiovascular disease
3. Lacunar infarction (due to microvascular disease)

Underlying pathology of the ischemic stroke

Cardiac diseases leading to cardio emobolic stroke

Extracranial artery diseases
- arteriosclerosis (carotid bifurcation)
- traumatic arterial dissection
- inflammation of extracranial arteries (e.g.Moya-Moya disease)

Intracranial artery diseases
- arteriosclerosis
- intracranial vasculitis (e.g. Arteriitis temporalis)

Microvascular disease
- Hypertensive arteriosclerosis (M.Binswanger)
- Metabolic induced vasculopathy (Diabetes mellitus)

Ischemic Stroke Management at the Innsbruck Neurological Intensive Care Unit

Thrombolyses therapy in patients suffering from acute A.cerebri media infarction or acute Basilaris thrombosis respectively

Mediainfarction:
Time interval: less than 6 hours
Drug used: rtPA
Administration route: systemic
Maximal dose: 100 mg

Comment: We are now participating the multicenter trial "TTATTS" to look forward to find the optimal recommended dose of rtPA.

Basilaris artery thrombosis:
Time interval: less than 2 hours in comatous patients or less than 8 hours in non-comatous patients.
Drug used: Streptokinase or Urokinase
Administration route: local by an intraarterial catheter
Maximal dose: 1,5 Million units

General Stroke Therapy Modalities

* **Early artificial ventilation in order to possibly counteract the development of brain edema (hyperventilation therapy)**

* **Additionally osmotic therapy using hyperosmotic drugs (Mannit)**
* **Hemodynamic therapy, that means artificially raising the cerebral perfusion pressure using hypervolemia and/or catecholamines (Dopamin, Dobutrex, Noradrenalin)**

Hemodilution therapy

Hydroxyethyl starch (HES) is used in patients arriving within 6 hours following stroke but the lysis therapy is not possible for any reason.

INTRACEREBRAL HEMORRHAGE

A distribution of sites, of hemorrhage drawn 100 cases of ICH from the Neuro-Intensive-Care Unit Innsbruck, during the recent 4 years:

34 lobar
24 thalamic
20 cerebellar
7 pontine
6 caudate
5 putamino-thalamic

Etiology of intracerebral hemorrhage

arterial hypertension
vascular malformation (AVM, aneurysm)
amyloidangiopathy
venous angioma
coagulopathy

Therapeutic strategies:
The effort to remove intracerebral blood by craniotomy is avoided in most cases of supratentorial hemorrhages.
The injury caused by the neurosurgical procedure and the following complications most propably lead to a more worse outcome than conservative therapy.

In patients suffering from extremly large hemorrhages causing severe intracranial hypertension, in patients suffering lobar hematomas as well as in patients suffering from intracerebellar hemorrhage neurosurgical intervention must be considerd. Especially in patients suffering from cerebellar hemorrhages with a diameter more than 3 cm and leading to ascending tentorial and/or descending foraminal herniation as well as to hydrocephalus due to stenosis of the aqueduct, immediate craniotomy is necesscary.

General features of Innsbruck Neuro-Intensive-Care-Unit

Neurologic monitoring devices

* **intracranial pressure and cerebral perfusion pressure by epidural catheter**
* **EEG-Monitoring**
* **Evoced potentials**
* **Transcranial Doppler sonography**

General monitoring devices:

* **Cardiovascular state**
* **Hemodynamic parameters (arterial blood pressure, central venous pressure, pulmonary capillary wedge pressure)**
* **Clinical monitoring (Innsbruck Coma Score)**
* **Neuro-CT, MRI, MRA, cerebral Angiography, SPECT, Duplex- and Doppler Sonography**

Earliest **NEUROREHABILITATION**, that means to start the rehabilitation procedure just during the acute phase (moderate physical examinations, even with patients on artificial ventilation) is necessary to grain optimal therapeutic success. A team of Physico-, Ergo- and Logotherapeuts train our patients with special equipment established in our intensive care unit.

The rehabilitation approach involves a multidisziplinary team, comprising the patient, the family, therapists, nurses, social workers, and doctors. Team members assess the patient`s disease, terms of impairments, disabilities, and handicaps, together with the burden on the family and local services. Priorities for treatment and goals are then defined with the patient and family, and specific therapy may then by started. None specific therapy begins with the assessments, priority and goal setting, which encourage the patient and family to begin to understand the nature of the disease and its effects. Regular team meetings are held to monitore progress towards goals, redefining them if necessary, and starting or stopping specific therapies.

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SENIOR STROKE SOCIETY CONFERENCE

Winston-Salem, North Carolina

September 12 - 15, 1992

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July 28, 1992

Dear Colleagues,

The Senior Stroke Society meeting will be at the Graylyn Conference Center from September 12 - 15, 1992. All who receive this letter have been invited and, almost all, have accepted our invitation to be present at this closed meeting of approximately 50 outstanding individuals in the field of stroke care and clinical research. Its purpose is to distill the materials presented at the World Congress of Stroke by assessing their relevance and putting together a plan for improved health care delivery in the field of stroke. One is stroke prevention by early identification in people at excess risk as exemplified by the Atherosclerosis Risk in Communities and the Cardiovascular Health Study. This ties naturally into the identification of people who have had transient ischemic attacks and how rapidly they must be evaluated and what studies are essential for the work-up of these patients. The relevance of silent cerebral infarction has to be added to the above mix.

Following this, acute therapy for evolving cerebral infarction will be a major topic. This will include what one does currently with patients who are identified with an evolving event, how rapidly must the work-up proceed, what should the work-up be and how can the deficit be minimized. Should such patients be put in identifiable units where the services of experts can be employed? Does such care make a difference in the patients outcome and, if so, how should this concept be implemented on a national and international basis?

Finally, with the increasing realization of the interaction between coronary and carotid systems, as well as the heart and the brain, in terms of neurological events, to what extent should both organs be evaluated concomitantly and what measures should be taken if an event occurs in one or the other of these two major circulatory beds?

These topics, as well as others, will be covered at this conference and all of you who are invited are requested to bring materials which are relevant to these topics for discussion at the meeting because at least half of the time will be allocated for free discussion.

In order to make the discussions lively, each topic will be chaired by a discussion leader who will introduce an essayist, a respondent and a discussant. This will be followed by open discussion in which all may participate. The conference proceedings may be published.

We look forward to an exciting conference and a unique set of social activities.

Cordially yours,

James F. Toole, M.D.
Chair, Program Committee

	TOPIC	DISCUSSION LEADER	ESSAYIST	RESPONDENT	DISCUSSER
Saturday, Sept. 12					
	DINNER - GRAYLYN CONFERENCE CENTER				
Sunday, Sept. 13					
0800-0930	TIA - Is It a Relevant Concept?	Toole	Millikan	C.M. Fisher	Furlan
0930 - 1030	Essential Studies & Rapidity of Work-up for TIA	Millikan	Biller	Fieschi	Portera-Sanchez
1030 - 1100	COFFEE BREAK				
1100 - 1200	Antiplatelet Agents	Easton	Brust	Ross Russell	
1200 - 1430	LUNCH - SOUTH EASTERN CENTER FOR CONTEMPORARY ART				
1430 - 1600	ARIC & CHS	Toole	Heiss, Furberg	Borhani	Kurtzke
1630 - 1730	Ultrasound & MR Angiography		McKinney	Ackerman	Aichner, Bryan
1830	DINNER - REYNOLDA HOUSE				
Monday, Sept. 14					
0800 - 0900	Silent Cerebral Infarction/Lacunes	Meyer	Brott	Howard	Simard, Mohr, Futrell
	Acute Therapy for Arterial & Venous Ischemia				
0900 - 1000	Thrombolysis		del Zoppo	Molinari	Brust
1000 - 1030	COFFEE BREAK				
1030 - 1145	Neuronal Protection Hemorheology Red Cells Leukocytes		Mohr Lechner	Welch Gotoh del Zoppo	Lowenthal
1200 - 1430	LUNCH & TOUR - BOWMAN GRAY MEDICAL - BAPTIST HOSPITAL				
1430 - 1600	Blood Pressure Regulation Glucose Regulation	Ross Russell	Furlan Murros	Moody Futrell	Shinohara
1600 - 1630	COFFEE BREAK				
1630 - 1730	Edema	Moossy	De Reuck	Chopra	
	Diaschisis - Epiphenomenon or Clinical Entity?	Moossy	Meyer	Portera-Sanchez	
1830	DINNER & TOUR OF OLD SALEM				
Tuesday, Sept. 15					
0800 - 1000	Critical Care & Rehabilitation Units Utility, Construct., Case Select., Behavioral Effects	Toole	Babikian McDowell	Fields	Mohr Gerstenbrand
1000 - 1100	Cardiopulmonary	Lechner	Troost	Walker	
OPEN DISCUSSION FOR FUTURE MEETINGS		Toole			

Speaker: 15 - 20 minutes; **Respondent:** 5 - 10 minutes; **Discusser:** 5 - 10 minutes