

Organizational Issues In Stroke Treatment – The Swiss Paradigm: Stroke Centers

G K Matis, S Yella, O I Chrysou, T A Birbilis

Citation

G K Matis, S Yella, O I Chrysou, T A Birbilis. *Organizational Issues In Stroke Treatment – The Swiss Paradigm: Stroke Centers*. The Internet Journal of Neurosurgery. 2013 Volume 9 Number 1.

Abstract

Stroke is one of the leading causes of death in the developed countries, and the third most common cause of death in Switzerland. Due to its dramatic impact on the patients' life and the increasing costs that the health system must bear, a rapid diagnostic and therapeutic plan is needed so that disability is minimized and death is avoided. Herein the authors bring forth the recently published guidelines of the Swiss Stroke Society concerning the establishment of stroke centers. Emphasis is placed on the differences exhibited in the guidelines among stroke units and stroke centers. The minimum number of available beds, the minimum number of stroke patients treated (per year) and the minimum number of endovascular procedures performed (per year) seem to be some of the crucial distinctive features. It is believed that the adoption of these requirements by stroke specialists and health policy makers would lead to improved chances of survival, disability reduction, and declining length of the hospital stay.

INTRODUCTION

Stroke is one of the leading causes of death in the developed countries. In the United States, approximately 730,000 people experience a stroke per year. [1] In the same country, the number of disabled stroke survivors exceeds 3,000,000, and the costs of stroke have been estimated to be \$30 billion annually. [1] The global annual number of deaths due to stroke reaches 5.54 million. [2]

Stroke is the third most common cause of death in Switzerland. [3] Each year about 9,000 Swiss people suffer a clinical first time stroke, [4] and 5,000 suffer a transient ischemic attack. [2-4] In 2004, the age-standardized hospital discharge rate from stroke was 133.7/100,000 (107.3/100,000 for women, and 167.2/100,000 for men). [3] The scope of this article is to present the current developments in stroke care management in the Swiss health system and, more specifically, to illustrate the guidelines for establishing Stroke Centers (SC) as these have been recently (2012) proposed by the Swiss Stroke Society. [5] These guidelines could be applicable not only in the developed but also in the developing countries worldwide.

STROKE CENTERS

According to the Swiss Stroke Society, a distinction is to be made between Stroke Units (SU) and Stroke Centers (SC). [5] A SU is effective for all grades and all age groups of

patients with stroke. It is equipped with monitored and non-monitored treatment beds. On the other hand, a SC comprises a SU and extends the concept of SU to specific structural, neuroradiological and neurosurgical services. The following section is devoted to SC organization.

The Swiss guidelines concerning Stroke Centers [5] Stroke centers should fulfill all the criteria set for SU. Moreover, there are some additional requirements that should be also considered. These are divided into 7 domains:

- 1) Personnel:
 - a. Medical:
 - i. Neurologist exclusively for stroke patients (24-hours).
 - ii. During the night, the Neurologist could also care for other neurological patients, if they are in close proximity, so that he/she is available at any time for stroke patients in the SC.
 - iii. Radiologist with expertise in diagnostic and invasive Neuroradiology or equivalent training.
 - iv. Neurosurgeon for surgical intervention in cases of increased intracranial pressure.
 - 2) Diagnostic modalities:
 - a. Brain magnetic resonance imaging (MRI), including MR arteriography on a 24/7 basis (24/7).
 - b. Cerebral angiography ensured within the Institution (24/7).
 - 3) Monitoring:
 - a. Invasive blood pressure, intracranial pressure monitoring,

electroencephalography (in monitored beds) (24/7).

4) Specific acute treatment:

- a. Emergency neurosurgical and interventional neuroradiological interventions by Neurosurgeons and Radiologists with additional qualification in diagnostic and invasive Neuroradiology or equivalent expertise (in the same Institution within 90 minutes) (24/7).
- b. Carotid revascularization (endarterectomy or stenting) by qualified surgeons (neuro- or vascular surgeons) or invasive Neuroradiologists within 24 hours as indicated.

5) Infrastructure:

- a. Minimum total number of beds: 12.
 - b. Minimum number of monitored beds for acute stroke patients in a certain locally defined unit: 6.
 - c. Non monitored beds for acute stroke patients in a certain locally defined unit: 6.
 - d. Minimum number of admissions or evaluations of acute stroke patients per year: 400.
 - e. Minimum number of acute thrombolyses or endovascular treatments per year: 50.
 - f. Minimum number of acute endovascular interventions per year: 20.
 - g. Outpatient stroke consultation conducted within the Institution by a Neurologist with proven expertise in stroke treatment.
- 6) Processes and quality assurance:
- a. Treatment of childhood brain strokes (up to age 16) in collaboration with a pediatric hospital center.
- 7) Training and research:
- a. Clinical stroke research - research team.

CONCLUSION

The Swiss SC organization could serve as a paradigm for establishing a more efficient national stroke care system. The minimum number of available beds, the minimum

number of stroke patients treated (per year) and the minimum number of endovascular procedures performed (per year) seem to be crucial features in discriminating a SC from a SU. It is believed that the adoption of the aforementioned requirements by stroke specialists and health policy makers would lead to improved chances of survival, disability reduction, and declining length of the hospital stay.

ACKNOWLEDGMENTS

The first author would like to express his greatest gratitude to Professor Antonios Valavanis, Director of the Department of Neuroradiology of the University Hospital of Zurich, for providing the opportunity to join the International Visiting Fellowship Program in Interventional Neuroradiology and benefit from his inspiring clinical, teaching and research guidance.

References

1. Stuart M, Ryser C, Levitt A, Beer S, Kesselring J, Chard S, Weinrich M. Stroke rehabilitation in Switzerland versus the United States: a preliminary comparison. *Neurorehabil Neural Repair* 2005;19:139-47.
2. Gostynski M, Engelter S, Papa S, Ajdacic-Gross V, Gutzwiller F, Lyrer P. Incidence of first-ever ischemic stroke in the Canton Basle-City, Switzerland: a population-based study 2002/2003. *J Neurol* 2006;253:86-91.
3. Meyer K, Simmet A, Arnold M, Mattle H, Nedeltchev K. Stroke events, and case fatalities in Switzerland based on hospital statistics and cause of death statistics. *Swiss Med Wkly* 2009;139:65-9.
4. Geschwindner HM, Rettke H, van den Heuvel WJ, Halfens RJ, Dassen T. Rehabilitation in acute stroke patients in German-speaking Switzerland. *Swiss Med Wkly* 2007;137:205-11.
5. Lyrer P, Michel P, Arnold M, Hungerbühler H, Gralla J, Humm A, Fandino J, Fischer U, Gasche Y, Kägi G, Liesch M, Lövblad KO, Luft A, Müller F, Nedeltchev K, Renaud S, Städler C, Bassetti C, Sztajzel R, Weder B, Wetzel S, Engelter S. Stroke Units und Stroke Centers in der Schweiz: Richtlinien und Anforderungsprofil. *Schweiz Med Forum* 2012;12:918-22.

Author Information

Georgios K. Matis

Department of Neurosurgery, Medical School, Democritus University of Thrace
Alexandroupolis, Greece
gkmatis@yahoo.gr

Susmitha Yella

Department of Neurosurgery, Medical School, Democritus University of Thrace
Alexandroupolis, Greece

Olga I. Chrysou

Department of Neurosurgery, Medical School, Democritus University of Thrace
Alexandroupolis, Greece

Theodossios A. Birbilis

Department of Neurosurgery, Medical School, Democritus University of Thrace
Alexandroupolis, Greece