Organización de la Unidad de Stroke Fija y Móvil

Dr Bleise Carlos
80's

Elective evaluation
Prevention of medical complications
Recurrent stroke prevention: Anticoagulation
Strategy: Rehabilitation, social exclusion

year 2000 (1996)

Stroke = Medical emergency
Concept of reperfusion
Stroke Interruption
Early discharge
Strategy: Social integration

Change of mentality...
“Time is Brain”

- *1.8 Million* neurons are lost per minute during a large vessel occlusion

- *Ischemic brain will age 3.6 years* for every hour a large vessel stroke goes untreated

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**Table 1. Time-to-treat impact on stroke outcomes**

<table>
<thead>
<tr>
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<th>Neurons lost*</th>
<th>Synapses lost</th>
<th>Accelerated aging</th>
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<tr>
<td>Per stroke</td>
<td>1.2 billion</td>
<td>8.3 trillion</td>
<td>36 yr</td>
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<tr>
<td>Per hour</td>
<td>120 million</td>
<td>830 billion</td>
<td>3.6 yr</td>
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<tr>
<td>Per minute</td>
<td>1.9 million</td>
<td>14 billion</td>
<td>3.1 wk</td>
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<tr>
<td>Per second</td>
<td>32,000</td>
<td>230 million</td>
<td>8.7 hr</td>
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*Average human brain has 130 billion neurons.*

*Stroke 2006; 37: 263–266*
Of the patients who come to hospital with stroke less 10% are treated in US and less than 3% in the RA

THERE ARE TREATMENTS AVAILABLE:

What do we need..............?
Arrive ON TIME........!!!

Emergency system

Certified Stroke Unit

There are trained personnel
And treatments
STROKE UNIT (SU)

Characteristics of Stroke Treatment Systems

Emergency Medical Services
- Trained dispatchers, high priority triage
- Paramedics trained to recognize stroke
- Transport patients to the nearest hospital capable of treating acute stroke
- Notification before arrival

Primary Stroke Center
- Initial capacity to provide acute care
- Ability to use r-TPA and other acute therapies in an efficient and safe way
- They can admit their patients to stroke units

Comprehensive Stroke Center
- Ability to provide care for complex cases
- Advanced treatments (i.e. coils, stents, etc.)
- Specialists trained in key areas (vascular neurology, Interventional Neuroradiology, neuro critical care, neurosurgery, Vascular)

Dr Viñuela
Multidisciplinary Team

Vascular Neurology
Neurosurgeon
Neuroradiologist
Neurointensivist
Cardiology
Vascular surgeon
Neurology

Neurofisiology
ICU
Hematology
Angiosuite
Neuropsicology
Psicology
Anesthesiology

Stroke Unit
Multidisciplinary Team

Vascular Neurology
Neurosurgeon
Neuroradiologist
Neurointensivist
Cardiology
Vascular surgeon
Neurology

Stroke Team

Neurofisiology
ICU
Hematology
Angiosuite
Neuropsicology
Psicology
Anesthesiology
Clínica La Sagrada Familia
<table>
<thead>
<tr>
<th><strong>ENERI STROKE CENTER</strong></th>
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<tr>
<td><strong>Vascular Neurology</strong></td>
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<tr>
<td>Dr. J. Vila</td>
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<td>Dr. Cirio J.</td>
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<td>Dra. A. Franco</td>
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<td>Dr. J. Fridman</td>
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<td>Dra. A. Luraschi</td>
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<td>Dra. M. Di Egidio</td>
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<td>Dra. Ciardi Celina</td>
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<td>Dr. Mariano Buezas</td>
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<td><strong>Neurology</strong></td>
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<td>Dra. R. Ceratto</td>
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<td>Dr. A. Ferrario</td>
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<td>Dr. J. Lundquist</td>
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<td>Dr. E. Scrivano</td>
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<td>Dr. R. Nella Castro</td>
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<td>Dr. Jorge Chudyk</td>
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<td>Dr. C. Ingingo</td>
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<td><strong>Neuro Images</strong></td>
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<td>Dr. C. Ingino</td>
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<td>Dr. P. Lylyk</td>
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<td>Dr. D. Osvaldo</td>
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<td>Dr. R. Lamura</td>
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<td>Dr. M. Ferreira</td>
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<td>Dr. Lisandro Carnero</td>
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<td><strong>Neuro Critical Care</strong></td>
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<td>Dr. M. Wilches</td>
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<td>Dr. L. Trunzo</td>
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<td>Dr. J. Cirio</td>
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<td><strong>Hemodinamia</strong></td>
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<td>Dr. A. Cherro</td>
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<td>Dr. M. Halac</td>
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<td>Dra. A. Muro</td>
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<td>Dr. A. Patiño</td>
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<td>Dr. N. Herschuck</td>
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<td>Dr. E. Cerletti</td>
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<td><strong>Fellows</strong></td>
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<td>Dr. Felix Falcón</td>
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<td>Dr. Cristobal Silva</td>
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<td>Dr. Cristobal Salgado</td>
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<td>Dr. Omar Pichard</td>
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<td>Dr. Germán Castillo</td>
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<td><strong>Technicians</strong></td>
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<td>Lic. Carlos Maryszczyn</td>
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<td>Tr. J. Castagno</td>
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<td>Tr. Fabián Cañete</td>
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<td>Tr. R. D. Agosto</td>
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Neurología

NO

ESPERA

SI
Tratamiento endovascular en sala de hemodinamia
Equipo de Neuro Intervencionismo
Angiosuite - MRI
UNIDAD DE TRATAMIENTO INTEGRAL DEL ACV
2D PERfusion

PRE

POST

STENT VISUALIZATION
Timeline

- CSF: 9:47
- MR: 10:09  22 min
- DSA: 11:02  75 min
- Reperfusion: 11:25  98 min
  TICI IIB

NIHSS: 15  →  NIHSS 02.30 hs: 10  →  24 hs: 3
6 MIL MESES
¡GRACIAS!
Stroke is an Emergency
Traditional Concept

New Concept
Will ultra early treatment make patients better?

Of 302 patients treated within 90 minutes of onset with tPA vs placebo in the NINDS study, only 2 were randomized within 60 minutes of onset, and 41 were randomized between 60-80 minutes. The rest were randomized between 81-90 minutes after onset.

AJFurlan
Strokemobile 1986
MOBILE X-RAY APPARATUS

THE HOME AMBULANCE UNIT

The general practitioner would undoubtedly welcome more help from radiology if he could get it. His difficulty until recently was that unless he could send his patient to a department or consulting room equipped with permanent apparatus he had to dispense with X-ray help altogether. During the last few years the "portable" diagnostic outfit has partly filled the breach. The manufacturers who first designed this set deserve the highest credit, for it really represents a marvellous achievement to pack into containers not larger than a pair of suitcases a tube and transformer, which are not only ray-proof and shock-proof, but also take very good radiographs. Nevertheless, pace its makers, the portability has definite limitations. It will take a great many of the usual radiograms with reasonably short exposures, and is perfectly effective when the exposure is no object, but in work that requires very short exposures and high power the radiologist feels the need of a set with considerably more reserve. It is unreasonable to expect even the best of portable sets to take a chest at 2 metres in a fraction of a second. Moreover, the portable set has to be worked off the house current, and the ordinary main supply has several grave defects, chief among which are its lamentable fluctuations. An X-ray transformer makes a heavy demand on the supply, and when it is put on the main in a country district the voltage is apt to waver considerably. Moreover, in urban practice changes occur through the varying demands of other users. When a set is working on the same substation as an electric lift, or, a fortiori, as a factory or workshop employing electric power intermittently, the radiologist is never certain what his voltage is going to be, and only the best of stabilizers can make him moderately secure. This objection applies not only to a portable set but also to the permanent installation, unless this is very carefully protected. The "ward" set mounted on a trolley has more power, but not all that is desired, and it is also at risk if power is lost completely.

The unit can be assembled and ready for work within seven or eight minutes of arriving at the patient's home. The most remarkable feature is the amplitude and steadiness of the supply. The generator is driven by the engine of the van, which develops 44 brake h.p. at 2,400 revolutions. The output is controlled by a voltage regulator, which automatically interposes and withdraws resistances in the field circuit. This device cuts down fluctuation to within 1 per cent., and the remaining error is smoothed out by a milliamper-second relay on the control trolley. Steadiness is helped by the use of an unusually high frequency—90 cycles, as against the ordinary 50 of the National Grid—and as the iron and copper losses of the transformer are so low it can be made comparatively small. The tube, a metalix, which is self-rectified, normally works at 90 kV, and can, if required, pass a radiographic current of 100 mA—a genuine 100 mA as Mr. H. T. Ferrier, the council's radiographer, demonstrated. The result is that for ordinary pictures it will work comfortably on exposures of one-thirtieth to one-thousandth of a second.
"Mobile Stroke Unit" for Hyperacute Stroke Treatment
Klaus Fassbender, Silke Walter, Yang Liu, Frank Muehlhauser, Andreas Ragoschke,
Sandra Kuehl and Orell Mielke
Stroke 2003;34;e44; originally published online May 15, 2003;
DOI: 10.1161/01.STR.0000075573.22885.3B
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ARGENTINA
<table>
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<th>Tomógrafo Portátil</th>
<th>Laboratorio</th>
<th>Personal</th>
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**Unidad Móvil de Rescate Cerebral**
Tomógrafo Portátil CereTom

- Unidades de Terapia Intensiva.
- Quirófanos convencionales.
- Salas de urgencias.
- Salas de internación general.

- TC de 8 canales.
- Angio TC
- Perfusión cerebral
Personal

- Neurólogos/neurocirujanos experimentados en el manejo del ACV
- Enfermero con experiencia en manejo de pacientes neurológicos.
- Técnico radiólogo para el manejo de la unidad y del equipo de tomografía.

Laboratorio

- Hemograma
- INR
- Glucemia

Doppler

TELEMEDICINA
Ambulance car connection

Direct device connection

GSM Router HSDPA

IOGlobe Secure Connector

Internet
Transmission of clinical and radiological data in real time between the MSU and the hospital.
Nuevas posibilidades médicas

• Acceso rápido al diagnóstico de ACV isquémico o hemorrágico.

• Tratamiento pre hospitalario del ACV isquémico.

• Inicio de la terapia "puente" con IV-IA.
Nuevas posibilidades médicas

• Diagnóstico de otras lesiones neurológicas (trauma, HSA, HSD, etc).

• Triage específico para cada centro hospitalario (unidad primaria vs terciaria).
MSU around the world
Diagnosis and treatment of patients with stroke in a mobile stroke unit versus in hospital: a randomised controlled trial

Silke Walter MD a, Panagiotis Kostopoulos MD a, Prof Anton Haass MD a, Isabel Keller MD a, Martin Lesmeister a, Thomas Schlechtriemen MD b, Christian Roth MD b, Panagiotis Papanagiotou MD b, Prof Iris Grunwald MD c, Helmut Schumacher PhD d, Stephan Helwig a, Julio Viera b, Heiko Körner b, Maria Alexandrou b, Umut Yilmaz MD b, Karin Ziegler MD b, Kathrin Schmidt MD b, Rainer Dabew b, Darius Kubulus MD c, Yang Liu MD a, Prof Thomas Volk MD c, Kai Kronfeld MD e, Christian Ruckes PhD g, Thomas Bertsch MD h, Prof Wolfgang Reith MD b, Prof Klaus Fassbender MD a

Safe and Precise

Walter et al., Lancet Neurol 2012
Prospective, randomized study with >7000 patients, from 2010, Berlin, Germany

Portable CT + IV TPA vs standard treatment

Decreased time alert-treatment of 77 to 52 minutes.

Increase % in treated patients within the 90´ (58% with MSU vs 37% without)

Increased use of TPA in the golden hour from 4,9 to 31%

No increase of ICH or mortality in 7 days
CONCLUSIONS AND RELEVANCE  The use of STEMO increases the percentage of patients receiving thrombolysis within the golden hour. Golden hour thrombolysis entails no risk to the patients' safety and is associated with better short-term outcomes.
Conclusiones

Aumento en el % de tratamientos (de 3% a 27%)

Reducción en el tiempo (entre 25-40 minutos)

Mas pacientes tratados en la golden hour
	TIEMPO ES CEREBRO

UNIDAD DE RESCATE CEREBRAL

Estos beneficios se obtiene en forma segura y costo efectiva.
LET'S TAKE CARE OF IT!