ORIGINAL ARTICLE

Health care resources for stroke patients in Spain, 2010: Analysis of a national survey by the Cerebrovascular Diseases Study Group


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KEYWORDS
Stroke; Stroke thrombolysis; Stroke unit; Facilities survey

Recursos asistenciales en ictus en España 2010: análisis de una encuesta nacional del Grupo de Estudio de Enfermedades Cerebrovasculares

PALABRAS CLAVE
Ictus; Unidades de ictus; Trombólisis; Encuesta recursos

Abstract
Introduction: Stroke is currently a major social health problem. For this reason, the Spanish Ministry of Health approved the Stroke National Strategy (SNS) in 2008 to improve the prevention, treatment and rehabilitation of stroke patients. This plan intends to guarantee 24-h, 365-days neurological assistance in the whole country by the end of 2010. Our aim was to analyze the situation of stroke assistance in Spain in 2009.

Material and methods: A committee of neurologists practicing in the different autonomous communities (AC), and who had not participated in the preparation of the SNS, was created. A national survey was performed including the number of stroke units (SU) and their characteristics (monitoring, 24-h/7-day on-call neurology service, nursing staff ratio and the use of protocols), bed ratio of SU/100,000 people, availability of intravenous thrombolysis therapy, neurovascular intervention (NI) and telemedicine.

Results: We included data from 145 hospitals. There are 39 SUs in Spain, unevenly distributed. The ratio between SU bed/number of people/AC varied from 1/75,000 to 1/1,037,000 inhabitants; Navarra and Cantabria met the goal. Intravenous thrombolysis therapy is used in 80 hospitals; the number of treatments per AC was between 7 and 536 in 2008. NI was performed in 63% of the AC, with a total of 28 qualified hospitals (although only 1 hospital performed it 24 h, 7 days a week in 2009). There were 3 hospitals offering clinical telemedicine services.

Conclusions: Assistance for stroke patients has improved in Spain compared to previous years, but there are still some important differences between the AC that must be eliminated to achieve the objectives of the SNS.

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Introduction

Strokes currently constitute the second cause of death and the
first cause of dependency in Spain. They give rise to a
considerable burden on individuals and on relatives, as well
as major social costs.1 Health care for stroke patients has
changed with the emergence of stroke units (SUs), as these
have demonstrated their efficacy in reducing mortality, the
neurological sequelae and the need for institutionalization
in various randomized clinical trials and in meta-analyses.2,3
SUs prevent 1 death in every 33 patients treated and 1 insti-
tutionalization for every 20 patients.2 This beneficial effect
of the SUs is independent of age, gender, aetiological sub-
type and severity of the stroke.4 Intravenous thrombolysis is
the second therapeutic measure capable of improving
the patient’s functional prognosis.5–6 However, in order to
be administered safely, this technique requires neurologists
trained in handling acute stroke patients; this guarantees
its safe use and appropriate indication.6,7 It has been sugges-
ted that the process should be subject to audits, so it has
to have systems in place to record all care activities and the
best place to do this in SUs.8,9

The Grupo de Estudio de Enfermedades Cerebrovascu-
lares (Cerebrovascular Disease Study Group, GEECV) of the
Sociedad Española de Neurología (Spanish Neurology Soci-
ety, SEN) has issued some recommendations about how to
organize a stroke care system.8–12 The Plan de atención sanitar-
ia al ictus (Stroke Care Plan, PASI) and its subse-
tuent updates established certain levels of stroke care in the
light of the available resources, dividing the hospitals into 3
levels.11,12 In this way, we have hospitals with stroke teams,
hospitals with SUs and stroke reference hospitals.10,11 The
PASI document was the basis used by the Ministry of Health
and Social Policy to draw up the National Health System’s
Stroke Strategy (SS),13 which was signed by all the Regional
Governments and is currently in the development phase. The
SS was drawn up as a consensus document striving to make
stroke care in Spain the best possible, regardless of where
the patient lives and the time of day the stroke occurs, and
so ensure the right to fair treatment in health care.

Despite the evidence that exists about the benefits of
SUs and thrombolysis, most strokes occurring in Spain do
not benefit from them, frequently because of the lack of a
well-organized stroke care system and appropriate care
resources.13–15 The goal of this paper has been to analyze
what is the situation of stroke care in Spain at the moment
the SS was approved.

Material and methods

A national survey was conducted between January and
June 2009, in all the Regions of Spain, except for the
self-governing cities of Ceuta and Melilla, under the
co-ordination of two representatives from each of the
respective regions, all members of the GEECV, applying the
premise that they had not taken part in the preparation of
the SS. These in turn conveyed the questionnaire to the co-
dinators of the neurology department or cerebral vascular
pathology in each hospital. Data from the National Cata-
logue of Hospitals were collected on 145 Spanish hospitals,
without including privately owned hospitals that do not see
patients registered with the National Health Service.

Note was taken of the number of SUs and the total
number of SU beds so as to calculate the ratio of SUs to pop-
ulation and SU beds to population in terms of the number
of inhabitants in each region. In order to verify whether the
SUs met the minimum resource levels essential to guaran-
tee their benefits, consideration was given to whether or not
they had: a neurologist on duty and physically present 24-
h/7 days, non-invasive multi-parameter monitoring, trained
nursing personnel with a ratio of 1 to every 4–6 beds and the
availability of their own protocols. For the corresponding SU
to be considered to have minimum resources available, they
had to meet at least 3 of the 4 criteria above, including the
sine qua non presence of a duty neurologist.

The number of hospitals with an intravenous thrombo-
lysis programme was recorded together with the number of
patients treated at each centre and in each region during
2008. Neurovascular interventionism (NVI) is an alternative
treatment for patients in whom intravenous thrombolysis
cannot be applied or where it has failed, so the survey also
reflected the number of centres with experience in NVI, as
well as the timetable in which the administration of this
treatment is available. Finally, a note was taken of the
existence of telemedicine programmes for the treatment of
acute stroke.

Results

The survey included details on 145 hospitals nationwide,
with 39 of them identified as having an SU, of which 38
met at least 3 of the 4 criteria considered essential. The
implementation of SUs is uneven across Spain as, despite
being present in almost all the regions (94%), SUs are only
located in 48% of the chief towns in each province (Table 1).
This situation is particularly striking in such large regions
as Andalusia, which has only one SU in 2 of its 8 provinces.
The same could be said for the other large region of Castile
La Mancha and for Galicia, where there is only one SU, or
in La Rioja, a small region that has no SU at all. Analyzing
the ratio of SU beds to the number of inhabitants in each
region, we find that only Cantabria and Navarre comply with
the target of having 1 SU bed per 100,000 inhabitants. Once
more, Andalusia comes off worst (with a ratio of 1 SU bed
per 1,037,500 inhabitants), as does La Rioja, which has no
SU beds.

There is an intravenous thrombolysis programme co-
dordinated by neurologists in 80 hospitals distributed across
all the regions. However, 12.5% of these hospitals do not
treat more than 5 stroke patients/year. The number of
patients treated in 2008 varied widely between regions,
from the 457 in Catalonia down to the 7 in La Rioja (Table 2).

The results show that 65% of the regions have experience
with NVI in at least one hospital. However, only 2 hospitals
had this service available 24-h/day and 365 days a year; the
rest only operate between 8:00 a.m. and 3:00 p.m.

In 2009, recourse to telemedicine was only available in 3
hospitals in Spain.
Table 1  Distribution of stroke beds and stroke units in Spain.

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of SUs</th>
<th>No. of SU beds</th>
<th>Population in the region</th>
<th>Ratio of SU to population</th>
<th>Ratio of SU bed to population</th>
<th>Provinces with SU out of the total in the region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andaluzia</td>
<td>2</td>
<td>8</td>
<td>8,300,000</td>
<td>4,150,000</td>
<td>1,037,500</td>
<td>2/8</td>
</tr>
<tr>
<td>Aragon</td>
<td>2</td>
<td>9</td>
<td>1,275,000</td>
<td>637,500</td>
<td>141,666</td>
<td>1/3</td>
</tr>
<tr>
<td>Asturias</td>
<td>1</td>
<td>4</td>
<td>1,080,000</td>
<td>1,080,000</td>
<td>270,000</td>
<td>1/1</td>
</tr>
<tr>
<td>Balearics</td>
<td>1</td>
<td>6</td>
<td>1,070,000</td>
<td>1,070,000</td>
<td>178,333</td>
<td>1/1</td>
</tr>
<tr>
<td>Valencia</td>
<td>4</td>
<td>14</td>
<td>4,885,000</td>
<td>1,221,250</td>
<td>348,928</td>
<td>3/3</td>
</tr>
<tr>
<td>Canaries</td>
<td>3</td>
<td>12</td>
<td>1,600,000</td>
<td>533,333</td>
<td>133,333</td>
<td>2/2</td>
</tr>
<tr>
<td>Cantabria</td>
<td>1</td>
<td>6</td>
<td>580,000</td>
<td>580,000</td>
<td>96,666</td>
<td>1/1</td>
</tr>
<tr>
<td>Castile La Mancha</td>
<td>1</td>
<td>4</td>
<td>2,100,000</td>
<td>2,100,000</td>
<td>525,000</td>
<td>1/5</td>
</tr>
<tr>
<td>Castile and Leon</td>
<td>3</td>
<td>14</td>
<td>2,550,000</td>
<td>850,000</td>
<td>182,142</td>
<td>3/9</td>
</tr>
<tr>
<td>Catalonia</td>
<td>8</td>
<td>38</td>
<td>7,500,000</td>
<td>937,500</td>
<td>197,368</td>
<td>4/4</td>
</tr>
<tr>
<td>Extremadura</td>
<td>1</td>
<td>4</td>
<td>1,110,000</td>
<td>1,100,000</td>
<td>275,000</td>
<td>1/2</td>
</tr>
<tr>
<td>Galicia</td>
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<td>6</td>
<td>2,780,000</td>
<td>2,780,000</td>
<td>463,333</td>
<td>1/4</td>
</tr>
<tr>
<td>La Rioja</td>
<td>0</td>
<td>0</td>
<td>320,000</td>
<td>320,000</td>
<td>75,000</td>
<td>1/1</td>
</tr>
<tr>
<td>Madrid</td>
<td>6</td>
<td>26</td>
<td>6,050,000</td>
<td>1,008,333</td>
<td>232,692</td>
<td>1/1</td>
</tr>
<tr>
<td>Murcia</td>
<td>1</td>
<td>4</td>
<td>1,446,000</td>
<td>1,446,000</td>
<td>361,500</td>
<td>1/1</td>
</tr>
<tr>
<td>Navarre</td>
<td>2</td>
<td>8</td>
<td>600,000</td>
<td>300,000</td>
<td>75,000</td>
<td>1/1</td>
</tr>
<tr>
<td>Basque Country</td>
<td>2</td>
<td>10</td>
<td>2,150,000</td>
<td>1,075,000</td>
<td>215,000</td>
<td>2/3</td>
</tr>
</tbody>
</table>

Table 2  Number of intravenous thrombolyses performed by region.

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of IV thrombolyses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Catalonia</td>
</tr>
<tr>
<td>2</td>
<td>Madrid</td>
</tr>
<tr>
<td>3</td>
<td>Andaluzia</td>
</tr>
<tr>
<td>4</td>
<td>Castile and Leon</td>
</tr>
<tr>
<td>5</td>
<td>Basque Country</td>
</tr>
<tr>
<td>6</td>
<td>Galicia</td>
</tr>
<tr>
<td>7</td>
<td>Canaries</td>
</tr>
<tr>
<td>8</td>
<td>Navarre</td>
</tr>
<tr>
<td>9</td>
<td>Castile La Mancha</td>
</tr>
<tr>
<td>10</td>
<td>Cantabria</td>
</tr>
<tr>
<td>11</td>
<td>Valencia</td>
</tr>
<tr>
<td>12</td>
<td>Balearics</td>
</tr>
<tr>
<td>13</td>
<td>Asturias</td>
</tr>
<tr>
<td>14</td>
<td>Aragon</td>
</tr>
<tr>
<td>15</td>
<td>Extremadura</td>
</tr>
<tr>
<td>16</td>
<td>Murcia</td>
</tr>
<tr>
<td>17</td>
<td>La Rioja</td>
</tr>
</tbody>
</table>

Discussion

The approval of the SS in November 2008 constituted the formal recognition by all the Spanish Health Authorities (at both the State and regional levels) of the social and healthcare importance of cerebrovascular disease. At that time, stroke care was very uneven, with some regions where the provision of SUs was good and others where the situation was meagre. The SS approved a series of measures with which to improve overall health care for stroke patients and the different regions were urged to implement them within the term of 2 years. The goal of the GEECV in conducting this survey was to identify the real status of the neurological care of acute stroke in the first half of 2009 and so evaluate whether the targets of the SS are met in the different regions over the years to come.

SUs are the best way of treating strokes as they diminish the probability of death or disability in all the sub-groups of patients, except in patients with an altered level of consciousness, and the benefit is maintained in the long term.15,16 Early neurological evaluation, monitoring and multidisciplinary teamwork entail a better prognosis in terms of mortality or dependency.17,18 Our study shows that the immense majority of the Spanish SUs are well equipped in terms of the variables for nursing ratios, monitoring, continuous care and action protocols. Nonetheless, there are only 39 SUs in Spain, irregularly distributed, with the result that are concentrated in large urban centres, especially in Madrid and Barcelona. This number is clearly insufficient to ensure excellence in health care throughout the country. Only Navarre and Cantabria meet the target of having at least 1 SU bed per 100,000 inhabitants. Particularly worrying is the situation of Andaluzia, Galicia, Castile La Mancha and La Rioja.

Intravenous thrombolysis is the treatment that has shown the greatest efficacy in acute cerebral infarction.4,5 However, its impact on stroke care is less than that provided by SUs as, due to the narrow therapeutic window, as well as other restrictions (age, certain prior treatments, possibility of haemorrhagic complications), thrombolytic treatment is only administered — in the best case scenario — to 10—15% of stroke cases, with the most common figures being only 3—5%.18—21 Our survey included data from the 80 centres administering thrombolytic treatment; however, there are only 39 SUs in Spain. It is well known that the percentage of complications with thrombolysis increases at centres performing fewer than 5 treatments a year21 and this happened in 12.5% of these hospitals in our series. The great variability in the number of treatments administered in each region is
very striking. Although the number of treatments depends quite a lot on the number of SUs in place in each region, such a great difference from one region to another (7–487 patients/year) cannot be justified just by this fact. It is up to all of us to make an effort to have as many patients as possible treated with t-PA. SUs and centres with a low number of annual treatments must analyze to what extent the problem is in the care chain (recognition of stroke symptoms by the general population, extra-hospital or intra-hospital stroke code or time to action, and the taking of decisions by the neurology).

NVI is a real alternative to IV thrombolysis when this cannot be used or has not been effective. There are a number of techniques (mechanical extraction, intra-arterial thrombolysis or angioplasty) with different indications and therapeutic windows.22–24 Our paper reveals that 65% of the regions have centres with the technical qualifications and expertise to carry out the procedure. Nonetheless, experience in this technique is based almost exclusively on patients treated in a daytime schedule. There were only 2 centres offering this therapy 24 h a day. The idea that a patient might or might not benefit from a particular treatment depending on the time of day at which the stroke presents is so unfair that we have no option but to continue working to provide this therapy to our citizens. To this end, organizational solutions must be found to adapt the technical resources in place in each geographical area.

The rechanneling treatment option is limited to patients who are far from the specialist centres and can only call on the district hospitals with professionals who are not neurologists and have no experience with this treatment. On the other hand, not all hospitals have to deal with stroke patients, as has been seen in studies conducted in different countries.21 An alternative facilitating early access to this treatment is telemedicine, which allows the number of stroke patients receiving urgent attention from specialists in neurology to be doubled, the number of thrombolytic treatments to be doubled, the time elapsing until the start of thrombolysis to be significantly reduced by about 50 min, and an increase in the number of patients treated in the 0–3 h window; moreover, this technique reduces the number of final inter-hospital transfers by a third.25,26 The expansion of this resource in our country is currently insufficient, despite the fact that there are numerous areas of Spain where the geographic conditions of insularity or hard-to-reach locations make it difficult to achieve transfer to the reference centre within the 60 min time span considered recommendable.12 So far it has only been implemented in the areas of Barcelona, the Balearic Islands and Seville, with good results in terms of safety and efficacy.27

Conclusion
The purpose of this survey was to analyze the resources available for stroke care at the national level and their regional distribution. Although the situation has improved in recent years, we have been able to document the insufficient roll-out of Stroke Units across the country. In addition, there are major geographical inequalities, as the SUs are concentrated in the large urban centres and their promo-

tion is marginal in some regions. Access to IV thrombolytic treatment is also scant and variable, as are the resources for NVI or telemedicine.

The Stroke Strategy approved by the representatives of the different regions may establish a watershed for stroke care, although it needs to be developed further and we must continue to fight for its improvement.

Conflict of interest
The authors declare that they have no conflict of interest to declare.

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References