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REVIEW ARTICLE

Neurological patient care in Emergency Departments. A review of the current situation in Spain

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Abstract
Introduction: We are currently seeing many changes in urgent neurological care, in the context of the progressive development of the speciality and of the increasing population and care demand.
Sources: Medline and documentation obtained from the Spanish Society of Neurology (SEN) were employed as main data sources to review papers on the matter published in our country. We found articles describing neurological care in Emergency Departments (ED) of different Spanish hospitals, review articles, and others with neurological care organisational approaches.
Development: Stroke, headache and epilepsy were the most common disorders seen in ED. Up to 10-15%of medical emergencies were neurological. Their frequency increased with age and has been increasing over the last decade. The presence of a neurologist 24hours a day, everyday, led to a significant reduction in hospital admissions and in length of stay, as well as other parameters of quality of care. Stroke has motivated many specific works that associate the presence of a neurologist in ED with an improvement in prognosis, quality of care and the overall cost of stroke. The SEN has repeatedly expressed its concern about urgent neurological care provided to patients, and it promotes a greater generalization of on-call neurologists in hospitals in our country.
Conclusions: Urgent neurological disease is common, complex, and in many cases, potentially serious. The role of the neurologist in the ED is important for its optimum management. On-call neurologists, still absent in many Spanish hospitals, can improve both the quality of care and its efficiency.

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PALABRAS CLAVE
Urgencias;
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Atención al paciente neurológico en los Servicios de Urgencias. Revisión de la situación actual en España

Resumen
Introducción: Asistimos a múltiples cambios en la asistencia neurológica urgente, en el contexto del progresivo desarrollo de la especialidad y del aumento de la población y de la demanda sanitaria.
Fuentes: Empleamos Medline y documentación de la Sociedad Española de neurología (SEN) como principales fuentes de datos para revisar trabajos publicados al respecto en nuestro país. Encontramos artículos que describen la atención neurológica en urgencias de diferentes hospitales españoles, artículos de revisión, y otros con planteamientos de organización asistencial neurológica.
Desarrollo: Ictus, cefalea y epilepsia son las patologías más frecuentes en urgencias. Hasta el 10-15%de las urgencias médicas son neurológicas. Su frecuencia aumenta con la edad y se ve incrementada a lo largo de la última década. La figura del neurólogo de guardia conlleva una reducción significativa de ingresos hospitalarios y de la estancia media, entre otros parámetros de calidad asistencial. El ictus ha motivado múltiples trabajos específicos, que relacionan la presencia del neurólogo 24 horas con mejoras en el pronóstico, la calidad asistencial y el coste global del ictus. La SEN ha expresado reiteradamente su preocupación por la atención urgente al paciente neurológico y aboga por una mayor generalización de las guardias de neurología en nuestro país.
Conclusiones: La patología neurológica urgente es frecuente, compleja y en muchos casos potencialmente grave. El papel del neurólogo en urgencias es relevante para un manejo óptimo de la misma. La figura del neurólogo de guardia, ausente aún en muchos hospitales españoles, puede mejorar tanto la calidad asistencial como la eficiencia

Introduction

Neurological patient care in our emergency departments attracts growing interest in our country. Both the diagnostic and therapeutic advances we see in the different neurological diseases and population factors such as an ageing population and an increase in care demand have contributed to this throughout the development of the speciality.

In Spain neurology has been an independent speciality apart from other neurosciences for only about 50 years. It was in 1970 when it became a hospital speciality, at the same time as neuroimaging techniques and scientific advances extended and a greater number of Resident Medical Intern posts were created. The international awareness that occurred in subsequent years (1990 was established as the "brain decade" in the USA) on the impact of neurological diseases (20% of health problems in the market economies, according to the World Health Organization [WHO][1]) contributed to its peak.

During the last decade, at the start of the new century, the role of the hospital neurologist has become irrefutable in our environment. Progressive super-specialisation, the complexity of neurological diseases, their diagnoses and treatments, plus the appearance of a narrow therapeutic window in prevalent pathologies such as stroke mean that urgent neurological care represents is most relevant in caring for neurological patients, not only from point of view of quality but also of its efficiency.

The aim of this work was to review the situation of neurological patient care in emergency departments (ED) in our country, from articles that have been published over the last few years.

Material and methods

A search was carried out on *Medline* –limited to the last 15 years- using the following keywords: neurology, emergency departments, Spain, hospital, on-call neurologist, on-call neurology shifts. Another data source was the Spanish Society of Neurology, through its documents, annual meetings, surveys and published reports.[2,3] Finally, the search was widened outside the scientific environment, using *Google* and press reports from the Spanish Foundation of Neurological Diseases (FEEN, the Spanish acronym).[4]

We found 10 published works on the topic, the majority of them (8 out of 10) from after 2005. Nine of these were original and described the situation in EDs in different hospitals in our country[5-13] and one of them presented a comprehensive review of the topic.[14] We also found some articles on specific pathologies in ED such as stroke[15-18] and headache.[19] Some articles focused on general neurological care in our country included the study of aspects of neurological emergencies.[3,20-22]

The articles and references considered as contributing information and/or interesting points of view in the context of this review were selected, at the author's discretion.

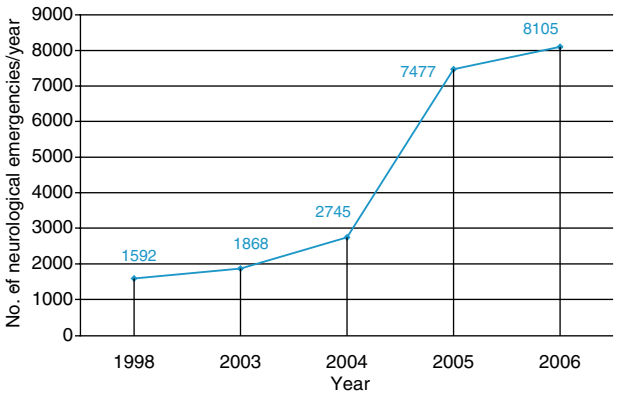

Figure 1 Published figures on neurological emergencies attended to yearly in different Spanish hospitals (2005 and 2006 correspond to the same hospital centre[6]) during the last few years.[5–13]

Development

All the articles stress the relevance of neurological care in ED. The majority describe the situation in ED areas of different tertiary Spanish hospitals. We found a lot of coincidences among them, despite the fact that the different methodologies existing do not allow for direct comparisons.

The frequency of neurological emergencies, analysed in hospitals with an on-call neurologist physically present 24 hours a day, varies between 2.6%[1] and 14% of the total emergency cases attended due to a medical pathology. This percentage increases[6] (7.5% vs 2.85%) if, apart from the patients who attend ED with neurological symptoms, we take into account urgent care given to patients already been admitted for other reasons who present an acute neurological pathology.

Some of the research sees a greater affluence of cases in the early hours in the afternoon: 38% of all emergencies during a day at the Hospital de la Princesa[5] and 49.4% at a hospital in Albacete.[11] Some authors[11] also found that a third of emergency cases occurred during the night, which would justify the need for an on-call neurologist 24 hours a day.

As years go by, we see a progressive increase in patients coming to the ED, due an overall increase in care demand. Among the possible causes for this increase are population increase -including immigration flows- , the population's greater socio-economic level, its greater age and greater associated comorbidity, and waiting lists. Limited training in the subject by Primary Care professionals contributes to this specifically in the case of neurological emergencies.[14,21] At the Hospital 12 de Octubre,[6] a 12.08% increase in urgent care consultations was found between 1999 and 2001. Subsequently, between 2000 and 2006 at the Miguel Servet de Zaragoza hospital, this increase was calculated at 10% and at 8% taking into account only the increase in ED consultations due to a neurological cause[7] (fig. 1).

The "neurological" profile of a patient who comes to the ED is generally of a patient between 50-60 years old,[5,6,14] with overall frequency increasing with age and lacking a clear gender predominance (a discreet female gender predominance[5] or homogeneous distribution by gender[6]).

Neurological diseases that are the most common cause for ED consultations are cerebrovascular diseases. In all the work reviewed -with the exception of that by Olazarán et al[13] as commented on further on- they constitute around a third of neurological diseases seen in ED, with figures that vary between 24.5%[8] and 33.5%[5] Epilepsy takes second place, representing 10%-15% of cases that go to ED.[5,6,8,11] In a study by Erro et al,[10] which analysed urgent neurological pathology in patients admitted to hospital due to other reasons, second place is taken by confusional state (21.65%), behind strokes (26.8%), and followed by epilepsy (7.21%) in third place. Headaches are the third reason for urgent consultation, with between 6%[8] and 12.75%[5] of cases, followed closely by syncopes (10.4%) in the study by Figuerola et al[5] and non-neurological disease (4.6%) by Sopelana et al.[11] In studies where reasons for urgent neurological care are classified into symptomatic categories[7,9] instead of nosological groups, "neurological focus" seems to be the most common neurological emergency (20%-30%).

The frequency distribution does not seem so homogeneous among the different series from there on: pathologies such as vertigo, cranial nerve abnormalities, movement disorders, demyelinating diseases, neoplasms in the central nervous system, confusional syndromes, dementia, non-neurological pathology and so on are each a reason for emergency consultation in less than 5% of cases, depending on the research (fig. 2).

The repercussion of the neurological figure in EDs has been analysed in various studies. In 1998, Figuerola et al[5] already confirmed that the on-call neurologist was the most frequently consulted specialist in ED after the gastroenterologist. However, the neurologist's relevance is not just quantitative. In the case of stroke, it is currently clearly demonstrated that early neurological treatment greatly influences prognosis. Sopelana et al[11] concluded in 2004 that an on-call neurologist provided greater quality care, showing in the specific case of cerebral infarct a significant reduction in the mean hospital stay (1.24 days less) and in the number of admissions (reduction of 12.3%), compared to the emergency care given to those patients by internal medicine. It also stressed the contribution of urgent neurosonological studies carried out by the neurologist, which meant more patients were safely discharged and diagnostic and therapeutic processes were optimised in the case of stroke. Ara et al[7] drew attention to another fact in their series, expressing the importance of a neurologist in ED: 76% of neurological urgent cases could prove life-threatening and/or potentially life-threatening, compared to 61% of emergencies due to a medical pathology. Elaborating on the theme, Más-Sesé et al[12] analysed "avoidable" hospital admittances, that is, those that in the opinion of the neurologist who assessed the patients the following morning after their admissions could have been sent from ED to other care areas (primary care, out-patients, hospitalised in other department, etc.). The authors quantified these admittances as 26% of all admittances in the neurology department during the 3 months that the study lasted. From the avoidable admittances, 32.2% were

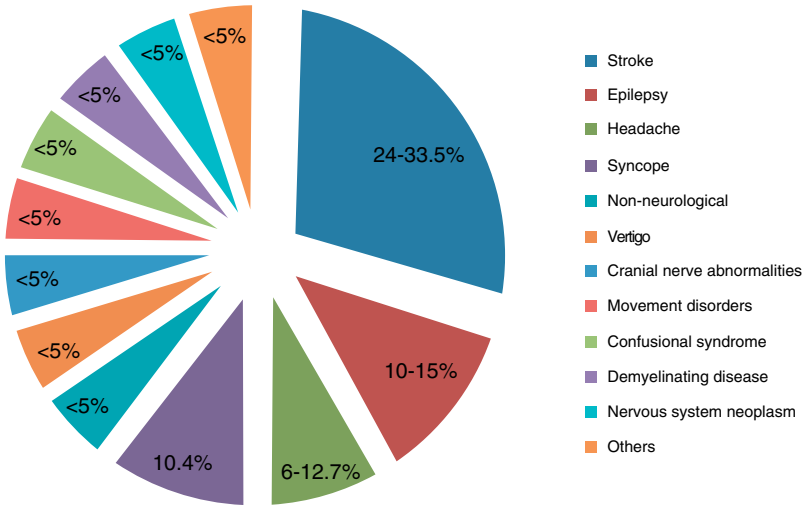

Figure 2 Frequency distribution of neurological diseases attended in hospital EDs in different Spanish hospitals during the last decade (built from published data[5–13]).

"non-neurological" disease and constituted the third most common diagnosis among the total admittances (behind neurovascular disease and the symptoms and signs group). Proper diagnosis established in ED was greater in the case of neurovascular disease (98.5%) than in headache (33% of cases).

Another interesting study is the one recently published by Olazarán et al,[13] which analyses the quality of the care received in hospital EDs for neurological diseases among patients who later attended neurology consultations. In this prospective study undertaken in the Community of Madrid in 2002, they found that the most frequent reason for consultation was headache, followed by stroke and epilepsy. The majority of patients had only been attended by internal medicine (47%compared to 25%jointly by internal medicine and neurology and 8% exclusively by a neurologist). Furthermore, involving a neurologist contributed to a greater percentage of correct diagnosis and care, and that the ED diagnoses was correct in 48% of cases. They concluded, as in previous research, that the presence of an on-call neurologist increases the quality of care, emphasising its use when coordinating care levels and highlighting the essential role of a consultant in systemic pathologies that are not purely neurological.

As seen in the literature, stroke is the most common pathology in urgent neurological cases. There are currently effective treatments such as thrombolysis, which can be given early during a narrow treatment window, so that stroke prognosis could be conditioned in many cases by the actions in ED. Urgent neurological care is especially interesting in the case of handling strokes and there are various articles specifically devoted to the topic. Álvarez-Sabin et al,[15] in a prospective analysis of more than 5,000 stroke patients over 5 years, showed that the implementation of a "stroke team" that included the presence on an on-call neurologist and specialist vascular neurologists significantly improved the indicators for quality care; these improved indicators included mean stay (progressive decrease of 18 to 7 days), the need for hospital admittance (by 34.2%), hospital mortality (by 50.1%), early hospital readmission (by 81%) and the need to be admitted to a care home (by 50.5%), which would lead to an overall cost reduction for strokes (a fact already indicated in previous research[20]). Ribó et al,[16] on comparing urgent handling of stroke in hospitals with or without an on-call neurologist, conclude that the setting up of an inter-hospital network and means of transfer for patients are not enough to guarantee care equality (there is better quality care in hospitals with an on-call neurologist). Bermejo-Pareja et al,[17] through a survey undertaken between medical directors and specialist hospital doctors, made clear the burden of care strokes impose on hospital emergency cases and the lack of specific resources -an on-call neurologist, for example- when compared to other European countries, as well as the poor knowledge among management of how important the subject is.

Headache, another frequent reason for ED consultation, has been the specific objective of some research in our country[19] and one where the on-call neurologist's role is also highlighted: their presence reduced the number of hospital admissions for this reason by 50%and, in 13.65%of consulted cases, established a diagnosis of secondary headache. In the hospital where this research was undertaken, unlike other hospitals, the first reason to consult an on-call neurologist was headache (19.7% of consultations), probably due to the fact there was another hospital nearby that dealt with geriatric care.[14]

The Spanish Society of Neurology (SEN, its acronym in Spanish) provides a platform for discussion of urgent neurological care among neurologists. In 2002 it created a National Strategic Plan for the Integral Treatment of Neurological Diseases[2] that devoted a vast chapter to urgent care, which was not dealt with under the General Health Law of 1997. It highlighted the lack of planning to date, the reduced availability of on-call neurologists (only present in 13%of Spanish hospitals in 2001), the complexity of urgent neurological disease (whose proper care would only be guaranteed by an on-call neurologist) and its frequency –10%15%of urgent medical disease, with stroke being the

most frequently seen pathology, followed by headache, epilepsy and non-neurological disease. It described the advantages of having an on-call neurologist, such as optimising patient care and the specific training by the professional, as well as the disadvantages of this, when planning the activity of the departments, for example. It also indicated different organisation models of urgent neurological care according to the type of hospital, population and type of pathology that needed to be seen to. It proposed minimum requirements for urgent neurological care (emphasising that a patient should be seen by a neurologist in less than an hour after the symptoms started), as well as possible indicators regarding the quality of care given. Furthermore, it indicated the importance of collaborating with primary care.

Before the Strategic Plan, the Board and Advisory Committee of SEN created an official document[3] called "Present and Future of Spanish Neurology". The survey results from Spanish hospitals were described in it and highlighted aspects such as the discordance among hospital admittances -proceeding from ED in 85%of cases- and there being an on-call neurologist in only 13% of hospitals, together with the geographical inequalities in the urgent care given. The declaration of Madrid (19th February 2000) is also referred to, reflecting the consensus between the SEN and organisations representing patients and families with neurological disease. In its first point, this document stated that care to patients in ED should be provided by a neurologist. Urgent neurological care therefore constitutes a special concern for SEN, which has been addressing the topic at successive meetings.

Given the growing and limitless care demand that our current society is going through, we should expect an increase in urgent neurological cases in the future. The Strategic Plan of SEN for the year 2002[2] already placed this increase parallel to the 4% of the frequency in hospital emergency cases recorded until then by INSALUD.

Some articles put forward future views on urgent neurological care, including the figure of on-call neurologist in neurological care,[21] in the framework of a "services portfolio" of neurology[22] and with improvement proposals that take into account the expected growth of the speciality based on its history.[23] As a future goal, the WHO, in 2002, specified that all health centres should have an on-call neurologist present by 2005.

If we look around us, countries such as France[24] or Italy[25] have also published research analysing the situation of neurological ED cases. In reality, they do not differ much from ours with regards to the lack of on-call neurologists in ED (only present in 36% of neurological departments in Italy[25]), in most common pathologies dealt with –stroke, headache, epilepsy– and the number of neurological urgent cases (14.7% of emergency case consultations[24]). The importance of the neurologist is emphasised not only in quantitative terms, but also qualitative, when diagnosis of complex and insidious pathologies such as confusional syndrome, loss of consciousness, etc. have to be established in the emergency department. This involves a change in diagnosis -with respect to the suspected diagnosis established in ED- in more than half of cases, with the prognostic and efficiency consequences this entails.

When we broaden this search to non-specialised means, we find some sporadic mentions in the written press, which refer to WHO recommendations that underline the importance of early neurological care and confirm what neurologists say about this.[4]

Conclusions

Neurological emergencies are on the increase in our environment, not only in number but in complexity. There is a wide range of neurological diseases that require urgent care, and half of the cases correspond to stroke, epilepsy and headache. The on-call neurologist seems to be the professional with the specific training and ability most suitable for the urgent care of these pathologies. Apart from their diagnostic/therapeutic complexity, the majority of these cases also involve a potential life-threatening risk. According to the literature reviewed, the on-call neurologists play an important role in urgent neurological care when making a diagnosis, and consequently, giving appropriate treatment; this not only has positive repercussions on the patient's prognosis but also on aspects related to quality care and efficiency.

The presence of on-call neurologist has increased in Spanish hospitals since the arrival of early treatments such as thrombolysis. The desirability of neurology rotas is clearly seen in literature and is vouched for by the criteria set out by the WHO for this. There is still a long way to go, dealing with the general concern this topic brings up among professionals and with ways of guaranteeing equal care among the population.

Conflict of interest

The author declares no conflict of interest.

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