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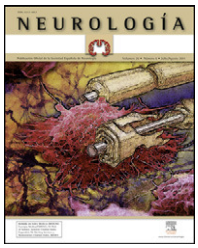

ORIGINAL ARTICLE

The use of a pro-forma improves the quality of the emergency medical charts of patients with acute stroke☆,☆☆

A. García Pastor*, C. Alarcón Morcillo, F. Cordido Henriquez, F. Díaz Otero, P. Vázquez Alén, J.A. Villanueva, A. Gil Núñez

Unidad de Ictus, Servicio de Neurología, Hospital General Universitario Gregorio Marañón, Madrid, Spain

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KEYWORDS
Acute stroke;
Medical chart;
Emergency;
Medical care quality;
Diagnosis

Abstract
Introduction: The information obtained from the Emergency Medical Chart (EMC) is a key factor for the correct management of acute stroke. Our aim is to determine if the use of a pro-forma (PF) for filling in the EMC improves the quality of the clinical information.
Material and methods: A PF was created from a list of 26 key-items considered important to be recorded in an EMC. We compared the number of items recorded in the EMC of patients admitted to our Stroke Unit (SU) in January—February 2009 (before PF was introduced) with the data obtained with the PF (April—May 2009). We also analysed the agreement with the final diagnosis on discharge from the SU.
Results: A total of 128 EMC were analysed, and the PF was used in 48 cases. The mean number of recorded items was 20.5 for the PF group and 13.7 for the non-PF charts ($P < .001$). Sixteen of the 26 items were recorded significantly more frequently ($P < .05$) in the PF Group. The most notable scores being: previous baseline situation (100% vs 51%), previous Modified Rankin scale score (94% vs 1%), time of symptom onset (100% vs 85%), time of neurological evaluation (100% vs 39%), NIHSS score (92% vs 30%), ECG results (88% vs 59%), time of perform brain scan (60% vs 1%). Diagnostic agreement: nosological/syndromic diagnosis: PF group: 94%, Non-PF group: 60% ($P < .001$), topographic diagnosis: PF: 71%, Non-PF: 53% ($P = .03$), aetiological diagnosis: PF: 25%, Non-PF: 9% ($P = .01$).
Conclusions: The use of a PF improves the quantity and quality of the information, and offers a better diagnostic accuracy.
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* Corresponding author.
E-mail address: angarpas@yahoo.es (A. García Pastor).

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PALABRAS CLAVE
Ictus agudo;
Historia clínica;
Urgencias;
Calidad asistencial

El empleo de un formulario estructurado mejora la calidad de la historia clínica de urgencias de pacientes con ictus agudos

Resumen
Introducción: La información obtenida mediante la historia clínica de urgencias (HCU) resulta determinante para el correcto manejo del paciente con ictus agudo. Pretendemos determinar si el empleo de un formulario estructurado (FE) para la elaboración de la HCU mejora la calidad de la información clínica.
Material y métodos: Elaboramos un listado de 26 variables que consideramos importantes en el manejo del ictus agudo. Comparamos el número de variables recogidas en las HCU de pacientes ingresados en la unidad de ictus (UI) en enero-febrero 2009, antes de la implantación del FE (FE−), con los datos recogidos con el FE (FE+) (abril-mayo de 2009). Asimismo, analizamos la coincidencia con el diagnóstico definitivo al alta de la UI.
Resultados: Analizamos 128 HCU, 80 FE−, 48 FE+. En las FE+, se recogió una media de 20,5 variables frente a 13,7 en las FE− ($p < 0{,}001$); 16 variables se recogieron con frecuencia significativamente mayor ($p < 0{,}05$) en las historias con FE+. Entre ellas destacaron: vida basal (100% vs 51%), escala Rankin previo al ictus (94% vs 1%), fecha y hora de inicio del ictus (100% vs 85%), fecha y hora de atención neurológica (100% vs 39%), NIHSS (92% vs 30%), resultado ECG (88% vs 59%), fecha y hora de realización de TC craneal (60% vs 1%). Coincidencia diagnóstica: diagnóstico nosológico/sindrómico: FE+: 94%, FE−: 60% ($p < 0{,}001$), diagnóstico topográfico: FE+: 71%, FE−: 53% ($p = 0{,}03$), diagnóstico etiológico: FE+: 25%, FE−: 9% ($p = 0{,}01$).
Conclusiones: El empleo de un FE permite mejorar cuantitativa y cualitativamente la información recogida en la HCU y aporta una mayor precisión diagnóstica.
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Introduction

Stroke is a first-order social health problem in our environment: its prevalence and incidence rate are high and it represents the main cause for disability in adults. The consequences of this illness can be mitigated, at least partly, thanks to treatments used in the acute phase of the stroke.

Among these treatments we should highlight stroke units (SU), which reduce morbidity and mortality, complications and degree of dependency of these patients[1,2] together with the administration of intravenous rt-PA for ischemic strokes of less than 3 h evolution, which has shown to be effective and safe.[3,4] It has recently been seen that intravenous rt-PA treatment continues to be beneficial when it is administered between 3 and 4.5 h from the onset of symptoms.[5] During the last few years, neurovascular interventional treatments have also been developed for the acute phase of the stroke, with very promising results.[6]

The efficacy and safety of these treatments depend, to a great extent, on their early administration and proper selection of patients to be treated. There is a large number of exclusion criteria that should be taken into account before a specific treatment is indicated. This selection should also be carried out in the shortest time possible, always respecting the timeframe windows established for each treatment.

Consequently, the information obtained from the clinical history undertaken in the first few minutes after the patient arrives at the emergency department is crucial. Fundamental data are obtained from it to diagnose the stroke and to indicate or contra-indicate different treatments in the acute phase.

Unfortunately, the medical staff in charge of caring for the stroke patient in the emergency department usually has little time, the information provided by the patients, their families or the health care team that attended them at home is sometimes incomplete, confusing and contradictory. As a consequence, the information obtained from the Emergency Medical Chart (EMC) is sometimes insufficient and can lead to diagnostic and/or therapeutic errors.

The aim of this study was to determine if the use of a structured form (SF) for filling in the EMC for acute stroke patients improves the quality of clinical information obtained.

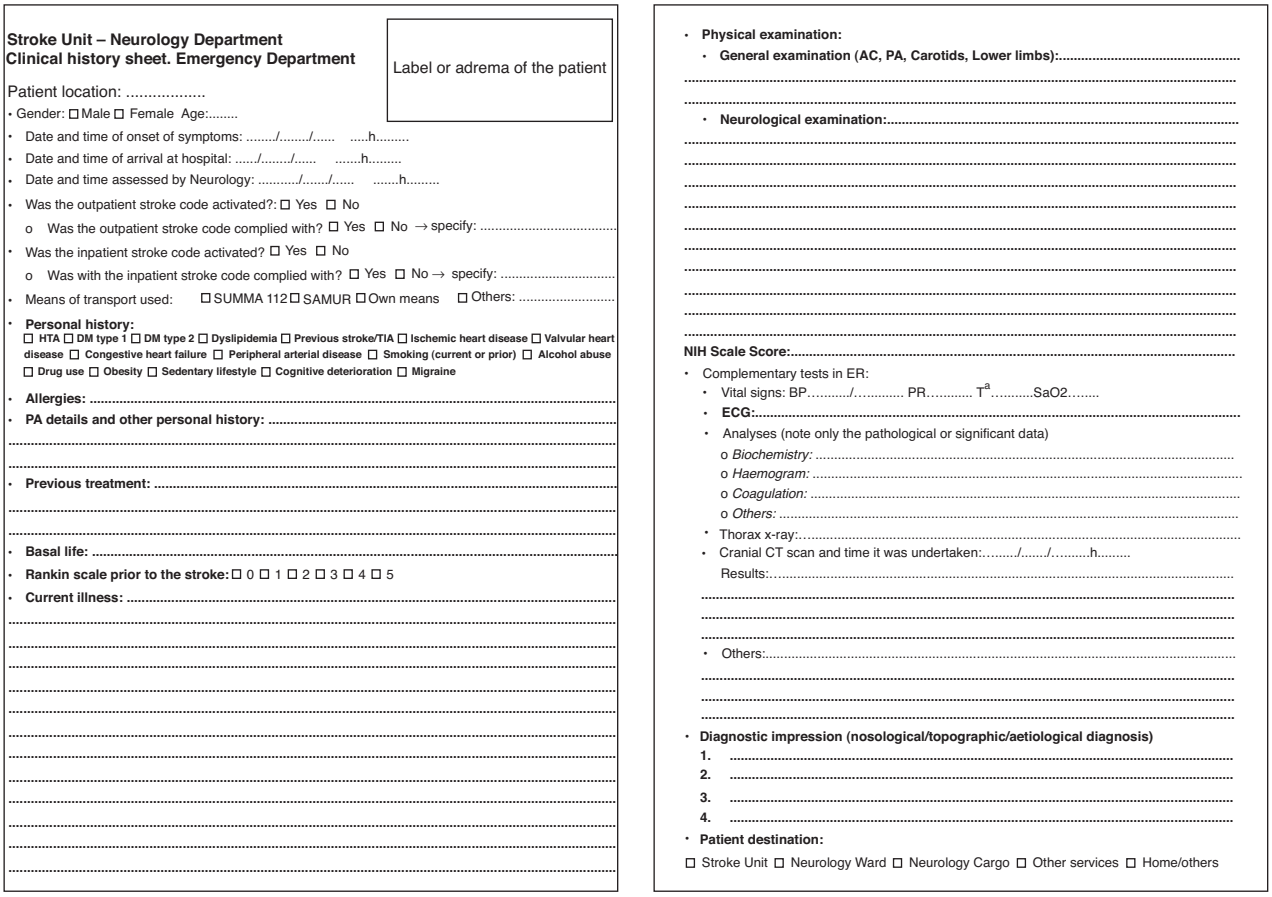
Patients and methods

A list was created from 26 variables that we considered should be recorded in an EMC for the proper diagnosis and handling of an acute stroke (Table 1). We created a SF from these 26 variables, made up into a DIN A4 data collection sheet (Fig. 1). The SF was implemented in our centre's emergency department from 1st April 2009 and was used by on-call neurologists to create an EMC for stroke patients.

The information contained in the EMC of patients admitted to the SU of our hospital was reviewed in June 2009. Two periods were analysed: January and February 2009, before the implementation of the SF, and April and May (after the SF implementation).

The EMCs filled in using the SF (group SF+) were compared to those which did not have a SF filled in (group SF−).

The total number of variables collected in the EMC was analysed, together with the frequency that each variable



Stroke Unit – Neurology Department
Clinical history sheet. Emergency Department

Label or adrema of the patient

Patient location: .....

- Gender: ☐ Male ☐ Female Age:.....
- Date and time of onset of symptoms: ...../...../..... .....h.....
- Date and time of arrival at hospital: ...../...../..... .....h.....
- Date and time assessed by Neurology: ...../...../..... .....h.....
- Was the outpatient stroke code activated?: ☐ Yes ☐ No
  - o Was the outpatient stroke code complied with? ☐ Yes ☐ No → specify: .....
- Was the inpatient stroke code activated? ☐ Yes ☐ No
  - o Was with the inpatient stroke code complied with? ☐ Yes ☐ No → specify: .....
- Means of transport used: ☐ SUMMA 112 ☐ SAMUR ☐ Own means ☐ Others: .....
- **Personal history:**
  ☐ HTA ☐ DM type 1 ☐ DM type 2 ☐ Dyslipidemia ☐ Previous stroke/TIA ☐ Ischemic heart disease ☐ Valvular heart disease ☐ Congestive heart failure ☐ Peripheral arterial disease ☐ Smoking (current or prior) ☐ Alcohol abuse ☐ Drug use ☐ Obesity ☐ Sedentary lifestyle ☐ Cognitive deterioration ☐ Migraine
- **Allergies:** .....
- **PA details and other personal history:** .....
- **Previous treatment:** .....
- **Basal life:** .....
- **Rankin scale prior to the stroke:** ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
- **Current illness:** .....

- **Physical examination:**
  - **General examination (AC, PA, Carotids, Lower limbs):** .....
  - **Neurological examination:** .....

NIH Scale Score: .....

- Complementary tests in ER:
  - Vital signs: BP...../..... PR..... T[a].....SaO2.....
  - **ECG:** .....
  - Analyses (note only the pathological or significant data)
    - o *Biochemistry:* .....
    - o *Haemogram:* .....
    - o *Coagulation:* .....
    - o *Others:* .....
  - Thorax x-ray: .....
  - Cranial CT scan and time it was undertaken:...../...../.....h.....
    Results: .....
  - Others: .....

- **Diagnostic impression (nosological/topographic/aetiological diagnosis)**
  1. .....
  2. .....
  3. .....
  4. .....
- **Patient destination:**

☐ Stroke Unit ☐ Neurology Ward ☐ Neurology Cargo ☐ Other services ☐ Home/others

Figure 1 How the data collection sheet (structured form) used to create an EMC looks.

was noted in each group studied. Likewise, we studied the coincidence between the diagnosis given in the emergency department and the final diagnosis on discharge from the SU.

The following diagnostic categories were considered:

- Nosological diagnosis: patients were classified in the following categories: (a) transient ischemic attack defined as a period of focal or monocular cerebral dysfunction lasting less than 24 h attributed to inadequate cerebral or ocular perfusion; (b) stroke, neurological deficit of more than 24 h duration caused by an alteration to circulatory supply to a brain area; (c) cerebral haemorrhage, neurological symptoms related to the collection of blood within the brain parenchyma due to spontaneous rupture (non-traumatic) of a cerebral vessel, and (d) no stroke/doubtful, when the clinical symptoms did not meet the characteristics of the previous categories.
- Topographic diagnosis: patients with transient ischemic attacks or ischemic strokes were classified as: (a) of anterior circulation, when the deficits were related to carotid circulation involvement (areas of the middle and/or cerebral artery); (b) of posterior circulation, if the patient presented dysfunction signs in the vertebrobasilar area; (c) lacunar, in the case of a small infarction (<15 mm diameter), involving perforating arteries, or clinical lacunar syndrome, and (d) unspecified location, when the symptoms did not allow for a precise topographic diagnosis. Cerebral haemorrhages were classified by: (a) lobar supratentorial; (b) deep supratentorial and (c) infratentorial.
- Aetiological diagnosis: for transient ischemic attacks and ischemic strokes, we used the classification of the Cerebrovascular Diseases Group of Studies from the Spanish Society of Neurology,[7] which distinguishes between atherothrombotic stroke/large artery atherosclerosis, cardioembolic stroke, occlusive disease of small blood vessels, uncommon cause stroke and cerebral infarction of undetermined cause. In the case of cerebral haemorrhages, we distinguished the following aetiological diagnoses: hypertensive, from cerebral amyloid angiopathy, iatrogenic, from arterial malformation or aneurism and other causes.

The statistical analysis was carried out using the SPSS programme (Statistical Package for Social Science) version 15.0. The frequencies for the qualitative variables and means were calculated, together with the standard deviations for the quantitative variables. Contingency 2×2 tables were designed to compare the qualitative variables and proportions were compared with the Chi squared test. Student's *t*-test was used to compare quantitative variables for independent samples. We considered that the differences

Table 1 List of 26 variables included in the structured form.

Personal history
Basal life
Modified Rankin scale before the stroke
Previous treatment
Means of transport used
Date and time of onset of symptoms
Date and time of neurological care
Current illness
Physical examination
General examination
Neurological examination
NIH scale score
Vital signs
Analysis
Haemogram
Biochemistry
Coagulation
Other analysis
ECG
Thorax X-ray
Cranial CT scan
Date and time cranial CT scan was carried out
Other tests
Nosological/syndromic diagnosis
Topographic diagnosis
Aetiopathogenic diagnosis

detected between groups reached statistical significance when *P* values were under .05.

Results

A total of 128 EMC were reviewed. During the period January—February 2009, we studied 62 EMC and, during the months of April and May, we analysed 66 EMC, of which 48 (73%) were created using a SF. Therefore, 80 EMC were carried out without a SF (SF—) and 48 were obtained using a SF (SF+) (Fig. 2).

In Table 2, the main characteristics of the population studied are summarised.

In the SF+ group, we collected a significantly greater number of variables (mean ± standard deviation: 20.5 ± 208 compared to 13.7 ± 4.2 in the SF— group; $P < .001$). All the variables studied were collected more often in the SF+ group (Table 3). Of these 26 variables, 16 were collected with a significantly greater frequency in the SF+ group. We must highlight that there was no type of diagnostic judgement in 16% of the EMC for the SF— group, while there was at least 1 nosological/syndromic diagnosis in the total of the SF+ group.

The coincidence between the diagnosis carried out in the emergency department and the final diagnosis on discharge from the SU was significantly greater in the SF+ group at all levels of diagnosis (nosological/syndromic, topographic and aetiological) (Table 4).

Discussion

Stroke is currently considered a medical emergency. Patients with acute strokes require an immediate assessment, with the same priority as patients with acute myocardial infarction or multiple trauma. For this reason, over the last few years we have been making an important change in the organisation of caring for acute stroke patients, so as to improve their early care. Setting up outpatient and inpatient stroke codes has allowed us to establish an integrated care network, from the moment the patient suffers a stroke at home, until he or she receives specialised care in hospital. This organisational chart has been shown to reduce delays in care and improves the prognosis of patients.[8—10]

The Emergency Medical Chart constitutes one of the main actions for inpatient stroke codes and should be undertaken in an organised, systematic way in the shortest time possible. The main guides for handling acute strokes recommend the use of specific diagnostic protocols in emergency departments, which allow identifying patients with strokes and selecting candidates for thrombolytic treatments. Clinical assessment in the emergency department (clinical history, general and neurological examination) is undoubtedly the cornerstone to assess an acute stroke patient. The anamnesis should collect fundamental data,

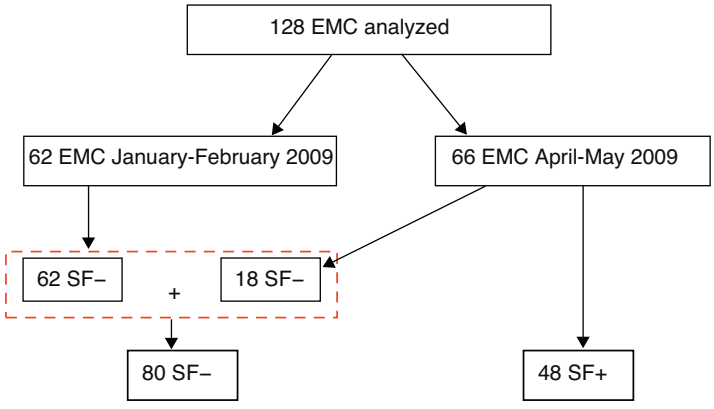


Figure 2 EMC studied and distribution into FE+ and FE— groups.

Table 2 Characteristics of the population studied.

	Total	SF−	SF+	*P*
Gender male, n (%)	75 (58.6)	47 (58.7)	28 (58.3)	.73
Age, mean (SD)	68.9 (12.9)	69 (13.2)	68.8 (12.5)	.94
HTA, n (%)	79 (61.7)	49 (61.2)	30 (62.5)	1
DM, n (%)	29 (22.6)	19 (23.7)	10 (20.8)	.83
DL, n (%)	45 (35.1)	30 (37.5)	15 (31.2)	.57
Smoking, n (%)	35 (27.3)	23 (28.7)	12 (25)	.69
Atrial fibrillation, n (%)	21 (16.4)	10 (12.5)	11 (22.9)	.14
Ischemic cardiopathy, n (%)	17 (13.3)	11 (13.7)	6 (12.5)	1
Other cardiopathies, n (%)	16 (12.5)	13 (16.2)	3 (6.2)	.17
Previous stroke, n (%)	19 (14.8)	13 (16.2)	6 (12.5)	.62
NIH scale score in the Emergency department, mean (SD)	6.9 (6.9)	7.3 (7.2)	6.5 (6.8)	.59
Transient ischemic attack, n (%)	24 (18.7)	13 (16.2)	11 (22.9)	.27
Ischemic stroke, n (%)	77 (60.1)	51 (63.7)	26 (54.2)	
Cerebral haemorrhage, n (%)	14 (10.9)	6 (7.5)	8 (16.7)	
No stroke/doubtful, n (%)	6 (4.7)	4 (5)	2 (4.2)	
Number of patients with a modified Rankin scale score on discharge of $\leq$2, n (%)	75 (70.7)	42 (67.7)	33 (75)	.52
Hospital stay (days), mean (SD)	9.2 (12.5)	9.7 (12)	8.3 (13.4)	.56

SF+: EMC carried out using the structured form; SF−: EMC carried out without using the structured form.

such as the time the symptoms started, risk factors and previous history that could contra-indicate the use of thrombolytic treatments. Likewise, a proper physical examination is considered essential, together with the use of scales that allow quantifying neurological deficit, such as the NIH stroke scale, and carrying out basic complementary tests (computerised tomography or cerebral magnetic resonance, blood tests with biochemical analysis, haemogram and coagulation, thorax X-ray and an electrocardiogram).[11–13]

The Emergency Medical Chart therefore plays a crucial role in inpatient care of the acute stroke patient. It is the instrument that provides us with the best information for the proper diagnosis and treatment of the patient during the acute phase. However, the quality of the clinical histories, and especially the EMC, is not always as wished. Several studies have pointed out the poor quality of medical documentation, not only in its contents but also in its legibility, and insist on the need to improve this aspect.[14] In the DIAPRESIC study, 1448 clinical histories of stroke patients admitted to 30 Spanish hospitals were analysed and we saw a lack of quality in the diagnostic process and secondary prevention measures.[15] There are several alternatives to mitigate this problem, such as the use of a SF or predesigned clinical history sheet, or the use of computer applications (electronic clinical history).[16] The use of a SF is a resource that is widely used in clinical practice. Several studies have shown that this tool improves the quantity and quality of the information gathered in clinical histories and standardises medical actions.[17–21] The benefits are especially evident in the case of EMC. A study comparing the ''standard'' handwritten EMC of patients attended for a head injury to those carried out with a SF showed an improvement in the EMC contents and a homogenisation of medical actions when faced with this problem. The SF was also well received by the medical staff and was completed in a high number of patients seen. Another recent study analysed the impact of implementing a SF when carrying out an EMC of patients with chronic obstructive pulmonary disease and likewise showed a distinct improvement in the diagnoses carried outpatient and inpatient handling in the emergency department. Finally, a study comparing the EMC performed from a ''blank sheet'' against those with a preconfigured one showed that the EMC filled in using the form presented a quantity of information (relating to clinical history, physical examination and laboratory results) that was significantly higher, and that patients attended to with the form expressed greatest satisfaction with the care received. However, better evolution in patients whose EMC was carried out with a pre-designed sheet could not be shown.[21]

The results of our work show that the use of a SF in carrying out an EMC of patients with acute stroke increases the number of variables collected and offers a greater coincidence between the diagnosis carried out in the emergency department and the final diagnosis on discharge from the SU. This tool has allowed us to obtain crucial data at a better frequency in the handling of acute stroke. It has also helped to obtain better organised and systemised collection of the information and has consequently improved the diagnostic process in the emergency department. The level of SF use was acceptable (73% of the EMC analysed in the period April–May 2009) and, currently (a year after they were set up), the SF is routinely used at our centre, maintaining excellent levels of quality of the information gathered.

Our results therefore confirm that the implementation of a SF has meant an improvement in the quality of EMC filled in for acute stroke patients. Due to this, we recommend their

Table 3 Frequency with which each variable in each group analysed was noted.

	SF− (n = 80)	SF+ (n = 48)	*P*		SF− (n = 80)	SF+ (n = 48)	*P*
Personal history, n (%)	78 (98)	48 (100)	.39	Haemogram, n (%)	43 (54)	30 (63)	.22
Basal life, n (%)	41 (51)	48 (100)	<.001	Biochemistry, n (%)	44 (55)	29 (60)	.34
Previous modified Rankin scale, n (%)	1 (1)	45 (94)	<.001	Coagulation, n (%)	45 (56)	31 (65)	.23
Previous treatment, n (%)	67 (84)	47 (98)	.01	Other analyses, n (%)	1 (1)	9 (19)	.01
Means of transport used, n (%)	5 (6)	47 (98)	<.001	ECG, n (%)	47 (59)	42 (88)	<.001
Date and time of the onset of symptoms, n (%)	68 (85)	48 (100)	.003	Thorax X-ray, n (%)	27 (34)	25 (52)	.032
Date and time of neurological care, n (%)	31 (39)	48 (100)	<.001	Cranial CT scan, n (%)	71 (89)	47 (98)	.06
Current illness, n (%)	76 (95)	48 (100)	.15	Date and time cranial CT scan was carried out, n (%)	1 (1)	29 (60)	.001
Physical examination, n (%)	65 (81)	46 (96)	.014	Other tests, n (%)	4 (5)	4 (8)	.34
General examination, n (%)	38 (48)	42 (88)	<.001	Nosological/syndromic diagnosis, n (%)	67 (84)	48 (100)	.01
Neurological examination, n (%)	73 (91)	46 (96)	.27	Topographic diagnosis, n (%)	62 (78)	41 (85)	.2
NIH scale score, n (%)	24 (30)	44 (92)	<.001	Aetiological diagnosis, n (%)	14 (18)	15 (31)	.06
Vital signs, n (%)	53 (66)	46 (96)	<.001	Total of variables collected, mean (SD)	13.7 (4.2)	20.5 (2.8)	<.001
Analysis, n (%)	46 (57)	31 (65)	.27				

SF+: EMC carried out using the pro-forma; SF−: EMC carried out without using the pro-forma.

Table 4 Coincidence between the diagnoses indicated in the emergency department and the final diagnosis on discharge from the stroke unit.

	SF− (n = 80)	SF+ (n = 48)	*P*
Coincidence with nosological/syndromic diagnosis on discharge, n (%)	*48 (60)*	*45 (94)*	*<.001*
Coincidence with topographic diagnosis on discharge, n (%)	*42 (53)*	*34 (71)*	*.03*
Coincidence with aetiological diagnosis on discharge, n (%)	*7 (9)*	*12 (25)*	*.01*

SF+: EMC carried out using the structured form; SF−: EMC carried out without using the structured form.

incorporation into diagnostic and therapeutic protocols for acute strokes, and their routine use in carrying out an EMC for these patients.

Conflict of interest

The authors declare no conflicts of interest.

References

1. Fuentes B, Díez-Tejedor E. Unidades de Ictus: una necesidad asistencial coste efectiva. Neurología. 2007;22:456—66.
2. Masjuan J. Unidades de ictus: el mejor tratamiento para los pacientes con ictus. Neurología. 2009;24:285—7.
3. The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. Tissue plasminogen activator for acute ischemic stroke. N Engl J Med. 1995;333:1581—7.
4. Wahlgren N, Ahmed N, Dávalos A, Ford GA, Grond M, Hacke WH, et al. Thrombolysis with alteplase for acute ischaemic stroke in the Safe Implementation of Thrombolysis in Stroke-Monitoring Study (SITS-MOST): an observational study. Lancet. 2007;369:275—82.
5. Hacke W, Kaste M, Bluhmki E, Brozman M, Dávalos A, Guidetti D, et al. Thrombolysis with alteplase 3 to 4.5 hours after acute ischemic stroke. N Engl J Med. 2008;359:1317—29.
6. Cruz Culebras A, García-Pastor A, Reig G, Fuentes B, Simal P, Méndez-Cendón JC, et al. Intervencionismo neurovascular en la fase aguda del infarto cerebral. Neurología. 2010;25:279—86.
7. Arboix A, Díaz J, Perez-Sempere A, Álvarez Sabin J. por el comité ad hoc del Grupo de Estudio de Enfermedades Cerebrovasculares de la SEN. Ictus: tipos etiológicos y criterios diagnósticos. In: Díez Tejedor E, editor. Guía para el diagnóstico y tratamiento del ictus. Barcelona: Prous Science; 2006. p. 1—23.
8. Álvarez-Sabín J, Vila Moriente N, Gil Peralta A. La cadena asistencial al ictus. In: Gil Peralta A, editor. Organización de la asistencia en fase aguda del ictus. Recomendaciones 2003 del Grupo de Estudio de Enfermedades Cerebrovasculares de la Sociedad Española de Neurología. Madrid: Emisa; 2003. p. 27—34.
9. Dávalos A, Rubio F, Navarro R. Código ictus (extra/intrahospitalarios). In: Gil Núñez A, editor. Organización de la asistencia en fase aguda del ictus. Recomendaciones 2003

del Grupo de Estudio de Enfermedades Cerebrovasculares de la Sociedad Española de Neurología. Madrid: Emisa; 2003. p. 35—9.
10. Alonso de Leciñana-Cases M, Gil-Núñez A, Díez-Tejedor E. Relevant of stroke code, stroke unit and stroke networks in organization of acute stroke care—the Madrid acute stroke care program. Cerebrovasc Dis. 2009;27 Suppl 1:140—7.
11. Adams Jr HP, del Zoppo G, Alberts MJ, Bhatt DL, Brass L, Furlan A, et al. Guidelines for the early management of adults with ischemic stroke: a guideline from the American Heart Association/American Stroke Association Stroke Council, Clinical Cardiology Council, Cardiovascular Radiology and Intervention Council, and the Atherosclerotic Peripheral Vascular Disease and Quality of Care Outcomes in Research Interdisciplinary Working Groups: the American Academy of Neurology affirms the value of this guideline as an educational tool for neurologists. Stroke. 2007;38:1655—711.
12. Egido JA, Alonso de Leciñana M, Martínez Vila E, Díez Tejedor E, et al. por el Comité ad hoc del Grupo de Estudio de Enfermedades Cerebrovasculares de la SEN. Guía para el tratamiento del infarto cerebral agudo. In: Díez Tejedor, editor. Guías Oficiales de la Sociedad Española de Neurología: Guía para el diagnóstico y tratamiento del ictus. Barcelona: Prous Science; 2006. p. 97—132.
13. El European Stroke Organization (ESO). Executive Committee y el ESO Writing comité. Guías Clínicas para el Tratamiento del Ictus Isquémico y del Accidente Isquémico Transitorio 2008. Available from: http://www.eso-stroke.org/pdf/ESO08 Guidelines Spanish.pdf.
14. Wallace SA, Gullan RW, Byrne PO, Bennett J, Pérez-Avila CA. Use of a pro-forma for head injuries in the accident and emergency department—the way forward. J Accid Emerg Med. 1994;11:33—42.
15. Gil-Núñez A, Vivancos J, Gabriel R, en nombre del Proyecto Ictus del Grupo de Estudio de Enfermedades Cerebrovasculares de la Sociedad Española de Neurología. Diagnóstico y prevención secundaria del infarto cerebral en España. Estudio DIAPRESIC. Med Clin (Barc). 2008;131:765—9.
16. Häyrinen K, Saranto K, Nykänen P. Definition, structure, content, use and impacts of electronics health records: a review of the research literature. Int J Med Inform. 2008;77: 291—304.
17. Schmidt M, Rizvi N, Lee DM, Wood V, Amisano S, Fairley CK. An audit of completeness of clinical histories: before and after introduction of a pro forma. Int J STD AIDS. 2005;16:822—4.
18. Thomas K, Emberton M, Reeves B. The use of a structured form during urology out-patient consultations—a randomised controlled trial. Methods Inf Med. 2005;44:609—15.
19. O'Connor AE, Finnel L, Reid J. Do preformatted charts improve doctors' documentation in a rural hospital department? A prospective trial. N Z Med J. 2001;114:443—4.
20. Sen B, Woollard M, Desira NL. Does the introduction of a COPD pro-forma improve the standards of care delivered by junior doctors in the emergency department? COPD. 2010;7: 199—203.
21. Humphreys T, Shofer FS, Jacobson S, Coutifaris C, Stemhagen A. Preformatted charts improve documentation in the emergency department. Ann Emerg Med. 1992;21:534—40.