Implementation results of a Best Practice Guideline in stroke patients hospitalized

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Abstract Stroke is a significant cause of morbidity and mortality in adults and implies high social and health costs. Best Practice Guidelines (BPG) are useful tools for improving patient health outcomes and quality of care.

Aim: To evaluate the results of BPG implementation in the care of hospitalised stroke patients.
Method: Pre-post quasi-experimental study. Sample: 18 years old or older with a stroke diagnosis admitted to Albacete General Hospital. Duration or Timeline: Baseline measurement (T0; December 2014); Implementation start (T1; October-December 2015); Consolidation (T2; January-December 2016). Variables: Independent; implementation of the guideline "Stroke assessment across the continuum of care".
Results: (i) Implementation process: neurological assessment, dysphagia, fall risk, pain detection, pressure ulcer development risk (PUD), health education. (ii) Patient results: Aspiration pneumonia, falls, independence for basic activities of daily life (ADL), PUD, pain.
Results: 457 patients (30 T0, 66 T1, 361 T2). 64.1% men, mean age 68.8 years; ischaemic stroke 76.1%, 16.8% transient ischaemic attack (TIA), and 7% haemorrhagic. There were no statistically significant differences in age, sex and independence for ADL between periods, but there were regarding types of stroke diagnoses. There were significant improvements in all process variables per period. The patient results were: 6 pneumonias, 3 PUD and 7 falls; 54.5% patients had ADL independence at discharge.
Conclusions: There were good implementation results of all recommendations, detecting possibilities of improvement in dysphagia assessment and independence assessment at discharge, providing healthcare education and filling of records.

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PALABRAS CLAVE
Accidente cerebrovascular; Guía de práctica clínica; Evaluación de procesos (atención de salud) y resultados; Atención de enfermería

Resultados de la implantación de una Guía de Buenas Prácticas en pacientes con ictus hospitalizados

Resumen El ictus es una causa importante de morbimortalidad en adultos y supone un elevado coste socio-sanitario. Las Guias de Buena Práctica Clínica (GBP) son herramientas útiles para mejorar los resultados en salud de los pacientes y la calidad de los cuidados.

Objetivo: Evaluar los resultados de implantación de una GBP para la atención de pacientes con ictus hospitalizados.

Método: Estudio cuasi-experimental pre-post. Mayores de 18 años ingresados en el Complejo Hospitalario Universitario de Albacete con diagnóstico de ictus. Periodos: Medición basal (T0; diciembre 2014); Inicio implantación (T1; octubre-diciembre 2015); Consolidación (T2; enero-diciembre 2016). Variables: Independiente: implantación de la guía «Valoración del ictus mediante atención continuada». Variables de resultado: a) Proceso implantación: Valoración neurológica, disfagia, riesgo caídas, detección dolor, riesgo lesión por presión (LPP), educación sanitaria. b) Sobre el paciente: Neumonía por aspiración, caídas, independencia para actividades básicas de la vida diaria (ABVD), LPP, dolor.

Resultados: Un total de 457 pacientes (30 T0; 66 T1; 361 T2); 64,1% hombres, edad media 68,8 años; ictus isquémicos 76,1%, 16,8% AIT y 7% hemorrágicos. No existieron diferencias estadísticamente significativas en edad, sexo e independencia para las ABVD entre periodos, si respecto al tipo de ictus. En todas las variables de proceso se produjeron mejoras significativas por periodos. Como resultados en pacientes se produjeron 6 neumonías, 3 LPP y 7 caídas; un 54,5% eran independientes para las ABVD al alta.

Conclusiones: Existen buenos niveles de implantación de todas las recomendaciones, detectando posibilidades de mejora en valoración de disfagia e independencia al alta, proporcionar educación sanitaria y sobre la cumplimentación de registros.

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Introduction

According to the World Health Organisation (WHO), cerebrovascular disease is the second cause of death worldwide. In 2015, 6.24 million people died across the world as a consequence of this disease. Stroke is a brain injury caused by a sudden disruption in blood flow, due to an obstructed (ischaemic stroke) or ruptured (haemorrhagic stroke) artery. There are between 80,000 to 90,000 new cases annually in Spain. The incidence is higher in men and reaches a peak at the age of 85 years. It is the main cause of death for women and its sequelae constitute the primary cause of disability in adults. Prevalence increases with age and, due to our society’s increased life expectancy, entails major needs and demands with the consequent increased social and health costs. It is estimated that the hospital cost of cerebrovascular disease in Spain during 2004 was 1526 million euros, and added to this are the consequences in terms of years living with a disability.

Institutions have drawn up various plans to improve prevention and the care and rehabilitation of these patients, from the Health Department (“National Health System Stroke Strategy” as part of the Quality Plan) to the WHO and the European Stroke Council (Helsinborg Declaration on European stroke strategies, which sets out management objectives). Comprehensive assessment of the stroke patient involves an interdisciplinary approach in which nurses play an important role in patient screening and evaluation, and in identifying complications.

Best Practice Guidelines (BPG) are a set of recommendations that have been systematically developed to help healthcare professionals and users in health-related decision-making. Their implementation is an acknowledged strategy to improve health care, its effectiveness and efficiency, and to reduce variability of care. These BPG should be evaluated using tools to demonstrate how effective they are in both adapting care processes and in patient outcomes.

In this context, the Registered Nurses’ Association of Ontario (RNAO) set up the Best Practice Spotlight Organisation (BPSO®) in 1999 to develop, disseminate, implement and evaluate BPG. The Spanish centre for evidence-based healthcare—a Joanna Briggs Institute Centre of Excellence—in collaboration with the Healthcare Research Unit (Investén-isciii) and the RNAO, started the BPG implementation programme in Spain in 2011. This resulted in the Centres Committed to Excellence in Care (CCEC®) initiative: institutions committed to implementing, assessing and maintaining BPG to improve care. The implementation of these guidelines seeks to facilitate the transfer of knowledge to daily clinical practice in the area of nursing care. Albacete’s General Hospital (CHUA) joined the CCEC® initiative in 2012. In 2015 they started to implement the guideline “stroke assessment across the continuum of care”, which contains
recommendations for nurses based on the best available evidence for stroke patient care.1

The general aim of this study was to evaluate the results of implementing a BPG for the care of hospitalised stroke patients.

The specific objectives were: to examine the implementation of the BPG recommendations by nurses, to identify stroke patient outcomes in terms of dependence, hospital falls, incidence of pressure ulcers (PU) and pneumonia, and to determine any improvements in the application of the recommendations and patient outcomes over the time that the BPG were implemented.

Method

Design

Quasi-experimental study pre-post implementation of a BPG.

Scope

The stroke unit and neurology ward of the CHUA.

Population and sample

Inclusion criteria: everyone over the age of 18 years admitted to the neurology department of the CHUA with a diagnosis of transitory ischaemic accident (TIA), ischaemic or haemorrhagic stroke during the study periods.

There were no exclusion criteria.

Three phases were examined: baseline measurement (T0: December 2014; as a reference prior to implementation); start of implementation (T1; October–December 2015), and consolidation (T2; January–December 2016). All the patients who met the criteria in each of these three phases were included in the study.

Variables

• Patient features: sex, age, hospital stay, type of stroke (TIA, ischaemic or haemorrhagic).
• Independent variable: implementation of BPG recommendations. This was undertaken according to the "BPG implementation tool",12 with the objective of facilitating the implementation and sustainability of BPG in institutions. The guideline was presented to the multi-professional team of the neurology department at the beginning of 2015. A team (neurologists, nurses and assistants) to drive the initiative met to examine the barriers and enablers of implementation and to select the recommendations that it would be feasible to implement in hospitals. By consensus, they agreed to implement the following recommendations: "conduct a neurological assessment using a scale on admission, and when there is a change in client status", "clients with identified signs and symptoms of neurological deterioration should be referred to a trained healthcare professional", "risk assessment for PU, risk of falls and pain using a validated tool", "dysphagia screen in the first 24 h post stroke completed with neurological changes", "assessment of the ability to perform the basic activities of daily living (ADL) using a validated tool" and "assessment of the patient’s and their caregiver’s learning needs", all with a level of evidence IV.2 The stroke patient protocol was reviewed and updated, and two continuous training days were held on updating knowledge and the recommendations to be implemented, to ensure that all the professionals were familiar with them. The computerised clinical history records were adapted.

• Outcome variables and measurement tools:

  a) Variables of the outcomes after the implementation of the recommendations:

   • Neurological assessment (first 24 h of admission) using the Canadian Scale.13 Assess mental status (level of consciousness, orientation and language) and motor function (face, arms and legs, adapted in the event of problems with understanding). Maximum score 10 points and maximum neurological impairment 1.5 points. A reduction of 1 point indicates altered neurological status.
   • Neurological assessment after every change in neurological status (Canadian Scale).
   • Consult a specialist after detecting neurological changes.
   • Direct notification (in person or by telephone) and record in clinical history.
   • Dysphagia assessment (first 24 h after admission). Water swallow test.14 Tests swallowing function after administration of water with a syringe, assessing dribbling, laryngeal movement, cough and stridor. First, 2 ml of water are administered. Then, if swallowing is not impaired, 10 ml are administered. If swallowing is efficient, the patient is offered 50 ml in a glass. The result can be: normal swallowing, mild, moderate or severe dysphagia. The test is not applicable if the patient is admitted with a prescribed diet or fasting (the neurologist performs the test) or if they require admission to critical care in the first 24 h.
   • Dysphagia assessment pre oral intake (water swallow test).
   • Fall risk assessment on admission (first 24 h). J.H. Downton scale.15 Assesses: previous falls, medication, sensory deficits, mental status and balance according to ability to walk. A score <3 is classified as low risk and ≥3 points high.
   • Detection of pain intensity (first 24 h following admission and after clinical changes) using numerical scale of visual analogue scale (VAS).16 The patient scores their pain intensity from 0 to 10. Classification: no pain; 0; mild, 1–2; moderate, 3–5; intense, 6–8; unbearable, 9–10.
   • Assessment of pressure ulcer (PU) (first 24 h) using the Braden scale.17 Assesses 6 items (sensory perception, skin exposed to moisture, activity, mobility, nutrition, friction and/or shear). Scores range from 6 to 23. Classification: very high risk (score <9); high risk (10–12 points), moderate risk (13–14 points) and low risk (15–18 points).
   • Provision of health education for the patient and their family members during admission and information leaflet prepared by the neurology department.18 Including recommendations on: physical and mental stimulation, nutrition, elimination, hygiene, dressing, mobilisations,
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respiratory secretions, communication, sleep and rest, architectural barriers, leisure and recreational activities and sexuality. Education is provided orally and individually in the stroke unit during visiting times, and reinforced with the information leaflet.

• Establishing degree of independence for ADL (24 h before discharge) using the Barthel index.\(^9\) Testing activities of eating, washing/bathing, dressing, grooming, bowel, urine, toileting, seat/chair transferring, ambulating and going up and down stairs, scored from 0 to 100: total dependence (<20); severe (20–35); moderate (40–55); mild (≥60); independence (100).

b) Outcome variables in the patient:

• Number of aspiration pneumonias, identified by diagnosis in medical discharge report.
• Number of falls during admission.
• Pain intensity in first 24 h following admission and maximum intensity during admission.
• Number and type of PU.
• Situation of Independence for ADL on discharge.

Data collection

Forming part of the programme of the Centres Committed to Excellence in Care (CCEC\(^9\)) involves a commitment to performing monthly evaluations of the implementation recommendations and patient outcomes, in order to see the real effectiveness of the recommendations in the specific healthcare environment where they are being applied. There is an agreed dictionary of indicators to prevent variability. The indicators are assessed from forms and information exported from computerised clinical history records (Mambrino XXI\(^7\)) to anonymised tables within the care quality assessment frameworks. This information is transferred to an online platform (CarEvID\(^+\)) with no information that would enable identification of the subjects, thus establishing a global database registered in the Spanish Data Protection Agency. Access to the database is restricted to designated managers in each centre (including the researchers of this study) and the Programme Coordinating Centre.

Statistical analysis

SPSS v22 was used for the statistical analysis.

Descriptive analysis

Absolute and relative frequencies were used for the qualitative variables, measures of central tendency and dispersion (standard deviation [s.d.]) for the quantitative variables. Ninety-five percent confidence intervals (CI) were calculated. The normality of distribution of the quantitative variables was checked using the Kolmogorov–Smirnov test.

Bivariate analysis

Comparison of the variables between groups was performed using ANOVA and the chi-squared test according to the nature of the variables. The level of significance was established for \(p\) values <.05.

Ethical aspects

When they join the CCEC\(^9\) network, everyone involved in assessment processes signs a confidentiality agreement and agrees to follow the best clinical practice standards, complying with current national and international legislation. Anonymous data was used for this study from the databases of the CCEC\(^9\) Programme, collected to assess the quality of implementation of the recommendations. Therefore no patient consent was sought, since their data had been irreversibly disassociated beforehand.

Results

During the study period, 457 patients were assessed: 30 at T0, 66 at T1 and 361 at T2. Sixty-four point one percent (293) were male. The mean age on admission was 68.8 years (s.d. = 12.8), 95% CI: 67.6–70. The mean hospital stay was 5.6 days (s.d. = 5.2), 95% CI: 5.1–6.1. In terms of stroke type, 76.1% (348) were ischaemic, 16.8% (77) TIA and 7% (32) haemorrhagic.

In terms of the homogeneity of the groups, it was confirmed that there were no statistically significant differences between the patients included in the different periods in

| Table 1 | Comparability of the groups between the different times of the study. |
|---------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|         | T0, % (n)                  | T1, % (n)                  | T2, % (n)                  | \(p\)                      |
| Sex     |                             |                             |                             |                             |
| Males   | 63.3 (19)                   | 56.1 (37)                   | 65.7 (237)                 | .326                       |
| Females | 36.7 (11)                   | 43.9 (29)                   | 34.3 (124)                 |                             |
| Type of stroke |                     |                             |                             |                             |
| TIA     | 10 (3)                      | 15.2 (10)                   | 17.7 (64)                  | .026                       |
| Ischaemic | 90 (27)                    | 69.7 (46)                   | 76.2 (275)                 |                             |
| Haemorrhagic | 0 (0)                     | 15.2 (10)                   | 6.1 (22)                   |                             |
| Age     | 73.7 (10.6)                 | 68.6 (12.6)                 | 68.4 (12.9)                 | .094                       |
| Independence for ADL on admission | 72 (31.7)                    | 78.9 (30.6)                 | 78.5 (30.6)                 | .488                       |
terms of sex, age, independence for ADL at time of admission, but there were with regard to type of stroke (Table 1).

In all the indicators, the implementation process of the guidelines resulted in significantly significant improvements per period (Table 2). Eighty-five point three percent (354) had a low risk of falls and 88.2% (365) had a low PU risk.

Ninety-six point nine percent (437) of the patients started an oral diet. Mild dysphagia was detected in 3 patients (.9% of the total assessed) and moderate/severe in 4 (1.2%).

In terms of patient outcome variables, there were 6 cases of aspiration pneumonia (1.3% of the total patients). There were also 3 cases of PU (meaning an incidence of .7%): two
Table 3  Outcome variables in the patient in the different study periods.

<table>
<thead>
<tr>
<th></th>
<th>T0, % (n)</th>
<th>T1, % (n)</th>
<th>T2, % (n)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pneumonias</strong></td>
<td></td>
<td></td>
<td></td>
<td>.399</td>
</tr>
<tr>
<td>Yes</td>
<td>3.3 (1)</td>
<td>0 (0)</td>
<td>1.4 (5)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>96.7 (29)</td>
<td>100 (66)</td>
<td>98.6 (356)</td>
<td></td>
</tr>
<tr>
<td><strong>Falls</strong></td>
<td></td>
<td></td>
<td></td>
<td>.088</td>
</tr>
<tr>
<td>Yes</td>
<td>0 (0)</td>
<td>4.5 (3)</td>
<td>1.1 (4)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100 (30)</td>
<td>95.5 (63)</td>
<td>98.9 (357)</td>
<td></td>
</tr>
<tr>
<td><strong>Pressure ulcers</strong></td>
<td></td>
<td></td>
<td></td>
<td>.669</td>
</tr>
<tr>
<td>Yes</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>.8 (3)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100 (30)</td>
<td>100 (66)</td>
<td>99.2 (358)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mean T0 (s.d.)</th>
<th>Mean T1 (s.d.)</th>
<th>Mean T2 (s.d.)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum pain</strong></td>
<td>.48 (.97)</td>
<td>.83 (1.36)</td>
<td>1 (1.76)</td>
<td>.25</td>
</tr>
<tr>
<td><strong>Hospital stay (days)</strong></td>
<td>5.2 (3.57)</td>
<td>5 (3.65)</td>
<td>5.75 (5.59)</td>
<td>.51</td>
</tr>
</tbody>
</table>

Discussion

In relation to stroke type and patient features, the results of this study coincide with the literature in the percentage of ischaemic and haemorrhagic strokes found, as well as the mean age of the stroke patients, which highlights the need to underscore prevention in these types of patients. The mean hospital stay was less than that of other studies, which confirms the impact of the stroke unit on the outcome of the disease and reduced hospital stay.

All the results of implementing the guideline showed statistically significant improvement between the study periods, which demonstrated the commitment and involvement of nurses in improving evidence-based clinical practice. According to the literature, up to 30% of stroke patients have neurological impairment in the first 24h, and up to 64% have some complication during the first week. In this study the percentage was less. However, a record was not found for all the patients who underwent reassessment and referral to a specialist due to neurological impairment. This shortcoming has also been observed in other studies on the implementation of this BPG. It might be attributed to under-recording, but in any case this is an area for improvement, since identifying incipient impairment would enable any complication to be attended promptly.

The assessment and recording of dysphagia on admission and prior to oral intake also increased, and it was found that the majority of the patients started an oral diet with no swallowing impairment. Unlike other studies, with an incidence ranging from 19% to 81% depending on the detection method used, only 2.1% presented dysphagia in the first 24h following admission, although the assessment was only recorded for two thirds of the patients. The consequence for half the patients with impaired swallowing of any type is aspiration pneumonia, with associated mortality of up to 50%. In this study, the incidence of pneumonia was minimal and the cases were resolved with no complications.

Stroke patients have a greater fall risk for various reasons (cognitive deficit, sight or sensory loss, incontinence, postural instability, sequelae, fear). Only 1.53% of the patients suffered a fall, which is a very low percentage, but we must concentrate on prevention to prevent added complications to the disease.

The incidence of UP was also low compared to other studies (1%). Nursing staff must be vigilant for this complication with early prevention and care since, like falls, these are considered an adverse effect of healthcare. Pain (headache, shoulder pain, spasticity) can also have consequences, hence the importance of early detection and intervention. The results showed high compliance with this recommendation and that the patients had mild pain on average. However, pain control should continue to be improved, especially for women.

Stroke entails a high degree of disability that affects the patients’ quality of life and can lengthen hospital stay if families do not feel able to provide the appropriate care. Therefore it is important to assess the functional ability of stroke patients and educate their families to participate in their care with a view to discharge from hospital. As in other studies, this was found to be an area for improvement.

Possible limitations of this study are that the data were obtained from records. A failure to keep full records on the implementation of this PBG was also detected in other studies. In order to improve record-keeping training days were held before and during implementation, and nursing management provided their express support.
In terms of the implications for practice, the use of BPG has enabled areas for improvement to be detected, variability of care to be reduced, and for the systematic use of validated and standardised assessment tools to be systematised for the early detection of complications that might aggravate the morbidity and mortality of stroke patients. It is important to make professionals aware of the importance of records, because they provide better visibility to the work of nurses in providing documentation of the work undertaken, and they improve interdisciplinary communication and continuity of care, not to mention the legal implications. Furthermore, they will make it possible to continue research to provide better evidence on the outcomes of BPG implementation.

Conclusions

The results show good levels of implementation of all the recommendations of the guidelines, which improved over time. However, room for improvement was detected in assessing dysphagia, providing education and assessing independence for ADL on discharge, and in record keeping, which will prove a challenge in the short to medium term.

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Conflict of interests

The authors have no conflict of interests to declare.

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