Implementability of stroke guidelines: a pragmatic comparison between US and European recommendations using eGLIA

Andrea FREIXA\textsuperscript{a,b,1}, Tiago MOREIRA\textsuperscript{c,d}, Olivier BILL\textsuperscript{c,d} and Nadim ANANI\textsuperscript{b}

\textsuperscript{a}Medicine faculty, Universitat de Barcelona, Barcelona, Spain
\textsuperscript{b}Health Informatics Centre, LIME, Karolinska Institutet, Stockholm, Sweden
\textsuperscript{c}Stroke Unit, NeuroCentrum, Karolinska University Hospital, Stockholm, Sweden
\textsuperscript{d}Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden

Abstract. Due to the prevalence and severity of stroke, and the emergency of its management, the need of reaching a consensus towards its treatment is of prime importance. This paper’s aim is to compare two stroke guidelines by using eGLIA in order to evaluate their implementability. Methods included a systematic assessment of the European (ESO) and American (AHA/ASA) guidelines with eGLIA and a review of literature and analysis of each recommendation with the program. The ESO performs better in Executability and Decidability, as 91.5\% and 34.8\% of recommendations show no barriers, compared to 81.0\% and 14.0\% in the AHA/ASA guidelines. On the other hand, AHA/ASA guideline have more recommendations with positive assessments in the Validity and Effect on the Process of Care (91.4\% vs 83.0\% and 58.1\% vs 25\%). Results show that ESO guidelines address a wider patient view and that the AHA/ASA guidelines are stricter, only publishing recommendations with a high level of evidence; AHA/ASA guidelines are updated with more frequency and have a clearer sequence of action. Both guidelines show some contradictions, but of minor importance. The strength of this study is the fact that the whole guidelines were read and analysed; and, although we would suggest an improvement of the tool by adding an automatic statistics chart and clarifying some questions, it showed that eGLIA should be used whenever such a text is published.

Keywords. Acute stroke; transient ischemic attack; practice guidelines; computer-assisted decision making.

Introduction

A guideline aims to streamline particular processes according to a set routine or sound practice. Stroke is the fourth leading death cause worldwide. The prevalence and impact of stroke added to the fact that its management is an emergency sets the need of reaching a consensus, and in 2000 when the first European guideline as published by the European Stroke Initiative entitled European Stroke Initiative recommendations for stroke management \cite{1}. Practicability of guidelines influences compliance with them and guideline violations are common in the stroke field \cite{2}. Systematic study of implementability (i.e. the characteristics predicting the ease of use) of guidelines is a recent promising field that usually isn’t included within recommendations. Some of the

\footnote{1 Corresponding Author: Andrea Freixa. Univeristy of Barcelona. Muralla street,12, 2nd 08510 Roda de Ter (Spain) afreixebe11@alumnes.ub.edu}
reasons of unpracticability are: guidelines are complicated to interpret, containing a lot of ambiguous recommendations and professionals are reluctant to follow their statements because guidelines aim a too general population [3]. Shiffman et al. designed an instrument to appraise the implementability of a guideline[4], GLIA, with the aim to identify obstacles in the process of implementation. So far, the evaluation task has been regarded as time-consuming, and new electronic versions are gaining momentum for being less complicated to use and more convenient for daily workflow. It is of prime importance to pragmatically assess guideline implementability since it correlates with guideline compliance and therefore patient survival[5][6]. Some previous intents of comparing different guidelines have been done with the ACC/AHA Guidelines, Adult Treatment Panel III Guidelines, and European Society of Cardiology Guidelines for Cardiovascular Disease Prevention[5], with interesting conclusions such as the need to establish a threshold for statin treatment and overestimation of the cardiovascular risk when merging the three guidelines due to different scales[7]. The novelty here is to use a structured, independent and objective tool to assess the implementability of guidelines.

The aim of this paper is to compare two stroke guidelines, the AHA/ASA [8] and the ESO guidelines[1] by using the eGLIA tool.

1. Methods

1.1. eGLia tool

ESO and AHA guidelines in management of ischaemic stroke and transient ischaemic attack were appraised with the eGLIA tool by answering a questionnaire for each recommendation. The program consists of 9 dimensions: executability, decidability, validity, flexibility, effect on the process of care, measurability, novelty/innovation and computability, and a general one. According to its authors the most important dimensions are Executability and Decidability[4]. The appraising can be done by diverse professionals and the administrator makes the reconciliation, by gathering them, discussing the issues where disagreement was found and reaching a consensus, or voting if it is not otherwise possible. This is the eGLIA website: http://nutmeg.med.yale.edu/eglia2/login.php

1.2. ESO and AHA/ASA Guidelines

The guidelines here analysed are specific for ischaemic stroke management. The latest ESO Guideline was published in 2008 through the European Stroke Organisation and the latest AHA/ASA Stroke Guideline was published in 2013 by the American Heart and American Stroke Association. Both guidelines are free open access on the website of the concerned organization.

1.3. Analysis

A comparison between the different dimensions and between the two guidelines was performed by a medicine student. Any conclusion extracted was written down. The judgement was made from professional experience and by reading the evidence found
in the text itself. As two guidelines were assessed, they could be compared and some more data could be collected.

2. Results

2.1 Global dimension

Nine criteria were addressed: clearly defining target patients: mentioned in the title, abstract and preface; clearly defining target public: mentioned in the title, abstract and preface; specifying the settings: positive assessment; authors credibility: they are widely known and experienced physicians with highly recognized publications; alternative/option to ameliorate the implementability: although the ESO guideline offers an online version which is being updated, the AHA/ASA guidelines are published with more frequency; clear recommendation sequence: the AHA/ASA guidelines being less permissive and therefore, having clearer statements; contradictions: all of them have some; recommendations identification: no barriers found; concise text: in both guidelines the extent is adequate for the purpose.

2.2 Educational programs and prehospital management

Both guidelines suggest professionals attend stroke lessons, the ESO adding the general public. However, neither of them gives precise information and their implementation means a change in the workflow, as the workers should employ some of their time in the lessons. Regarding the activation of the emergency system, the European mentions the existence of an emergency number which is not included afterwards. The AHA/ASA shows some barriers in the Decidability dimension, as they do not recommend public education but ask it to identify stroke symptoms. Without a very strong degree of evidence there are differences in the initial diagnosis.

2.3 Diagnosis

Although supporting the same techniques, the AHA/ASA emphasizes not delaying the treatment. In general, the American guideline is stricter and only makes recommendations when there is a high level of evidence, whereas the ESO guideline advocates for tests with more doubtfulness. Namely, regarding magnetic resonance and computed tomography angiographies, the AHA/ASA recommends to perform them only when the knowledge of intracranial stenocclusive disease will alter management, meanwhile the ESO suggests them for any patient with TIA, minor stroke or spontaneous recovery.

2.4 Treatment

The rtPA is the first line drug for fibrinolysis, and the use of other intravenous fibrinolytic agents is discouraged. The AHA/ASA guideline is more specific and shows less barriers in the Executability and Decidability dimensions. Regarding the carotid stenting the ESO guideline gives more details about the procedure contraindications, but shows limitations when it comes to measuring the results. The American guideline requires more evidence to recommend the procedure. Another invasive acute treatment
used is the mechanical thrombectomy, and similarly, the AHA/ASA guideline is more cautious. Tables 1 and 2 show the statistics that support the results.

**Table 1.** Number of recommendations showing no implementation barriers (questions assessed with a YES) according to the assessment. Crude numbers and percentage.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>European guideline n (%)</th>
<th>AHA/ASA guideline n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executability</td>
<td>108 (91.5)</td>
<td>85 (81.0)</td>
</tr>
<tr>
<td>Decidability</td>
<td>41 (34.8)</td>
<td>20 (19.0)</td>
</tr>
<tr>
<td>Validity</td>
<td>98 (83.0)</td>
<td>96 (91.4)</td>
</tr>
<tr>
<td>Flexibility</td>
<td>39 (33.0)</td>
<td>43 (41.0)</td>
</tr>
<tr>
<td>Effect on the process of care</td>
<td>30 (25.4)</td>
<td>61 (58.1)</td>
</tr>
<tr>
<td>Measurability</td>
<td>109 (92.4)</td>
<td>81 (77.1)</td>
</tr>
<tr>
<td>Novelty/innovation</td>
<td>96 (81.4)</td>
<td>77 (73.3)</td>
</tr>
<tr>
<td>Computability</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

**Table 2.** ESO and AHA/ASA guidelines. Recommendations assessment. Crude numbers and percentage.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>NO (%)</th>
<th>All YES</th>
<th>NA</th>
<th>At least 1</th>
<th>NO-NA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ESO guidelines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executability</td>
<td>10 (8.5)</td>
<td>108 (91.5)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Decidability</td>
<td>6 (5.1)</td>
<td>41 (34.8)</td>
<td>60 (50.8)</td>
<td>0 (0)</td>
<td>11 (9.3)</td>
</tr>
<tr>
<td>Validity</td>
<td>20 (17.0)</td>
<td>98 (83.0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Flexibility</td>
<td>5 (4.75)</td>
<td>39 (33.0)</td>
<td>68 (57.6)</td>
<td>0 (0)</td>
<td>6 (5.1)</td>
</tr>
<tr>
<td>Effect on the process of care</td>
<td>83 (70.3)</td>
<td>30 (25.4)</td>
<td>2 (1.7)</td>
<td>3 (2.5)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Measurability</td>
<td>9 (7.6)</td>
<td>109 (92.4)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Novelty/innovation</td>
<td>22 (18.6)</td>
<td>96 (81.4)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Computability</td>
<td>43 (36.5)</td>
<td>0 (0)</td>
<td>12 (10.2)</td>
<td>118 (100)</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td><strong>AHA/ASA guidelines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executability</td>
<td>12 (11.4)</td>
<td>85 (81.0)</td>
<td>6 (5.7)</td>
<td>0 (0)</td>
<td>2 (1.9)</td>
</tr>
<tr>
<td>Decidability</td>
<td>6 (5.7)</td>
<td>20 (19.0)</td>
<td>79 (75.2)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Validity</td>
<td>9 (8.6)</td>
<td>96 (91.4)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Flexibility</td>
<td>8 (7.6)</td>
<td>43 (41.0)</td>
<td>54 (51.0)</td>
<td>0 (0)</td>
<td>3 (2.9)</td>
</tr>
<tr>
<td>Effect on the process of care</td>
<td>39 (37.0)</td>
<td>61 (58.1)</td>
<td>2 (1.9)</td>
<td>5 (4.8)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Measurability</td>
<td>21 (20.0)</td>
<td>81 (77.1)</td>
<td>3 (2.9)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Novelty/innovation</td>
<td>27 (25.7)</td>
<td>77 (73.3)</td>
<td>1 (1)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Computability</td>
<td>22 (21.0)</td>
<td>0 (0)</td>
<td>31 (29.5)</td>
<td>118 (100)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

### 3. Discussion

Regarding our objective, the comparison between the ESO and the AHA/ASA guidelines, limitations and advantages in both consensuses are quite similar. The tool is very effective in pragmatically pointing out the faults. The dimensions which are indispensable and cannot be negatively assessed are Executability and Decidability, since they are sine qua non requirements if a guideline is to be published \[4\]. eGLIA has proved useful in selecting which guideline has formulated a statement better when the same concept is expressed in both texts, which is frequent, as mentioned above.

Unfortunately, it is not possible to extract directly from the tool itself a more detailed statistical analysis, such as a table or array including the assessment per recommendation, as it has been undertaken in this paper. As displayed above, the process of using the tool is quite time-consuming, which is another drawback of the method. However, in previous studies all participants agreed they would use the tool again \[9\][10].

The limitations of this work are: only one person evaluated the guidelines, which can lead to bias in interpretation, and a higher level of knowledge and experience would have added more quality to the results. Added to that, ESO guidelines were
released in 2008 and AHA/ASA in 2013, making them not perfectly comparable due to
the lapse of 5 years. The eGLIA program is designed for the creation of an electronic
version; but the guidelines evaluated do not have a digital format, so the assessment
regarding this feature could not be evaluated. On the other hand, the strength of this
study is the fact that the same person read the whole texts and, therefore, impartiality.
The benchmark for assessing eGLIA program efficiency is the number of
recommendations whose dimensions had a “non-applicable” evaluation. According to
the results, the dimensions with more non-applicable recommendations were
Decidability and Flexibility in both guidelines. The cause of these results in the
Decidability dimension is a conceptual problem, as the non-conditional
recommendations could not be appraised in this dimension, since an imperative
statement doesn’t allow any decision to be made [4]. Although some guidelines might
come with negative evaluation in eGLIA, it does not necessarily imply a lack of quality
of evidence; other tools exist for this purpose [11][12]. As a whole, the AHA/ASA
guidelines had more recommendations showing some barriers, but it had much better
assessment in the Validity part, meaning the strictness and rigour in its elaboration.
Meanwhile, although the ESO guidelines do not have as many barriers, they fail in
providing a clear recommendation sequence and suggest more unattainable actions.
The eGLIA should be a tool for the evaluation of any guideline; it would be useful
for both the authors and the professionals who will have to use the guideline in their
daily routines. eGLIA was found really helpful in the assessment of the
implementability of stroke guidelines.

References

[1] P. Ringleb, M. Bousser, P. Bath et al., Guidelines for management of ischaemic stroke and transient
[2] B. Frank, J. Grotta, A. Alexandrov et al., Thrombolysis in Stroke Despite Contraindications or
development of an instrument to identify obstacles to guideline implementation, BMC Medical
Informatics and decision making 5 (2005).
[5] Z. Landis, C. Mello-Thoms, O. Gadabu et al., The feasibility of automating audit and feedback for ART
Adult Treatment Panel III Guidelines, and European Society of Cardiology Guidelines for
Cardiovascular Disease Prevention in a European Cohort, JAMA 311(14) (2014), 1416-1423.
[7] A. Gagliardi, M. Brouwers, V. Palda et al., How can we improve guideline use? A conceptual
Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart
[9] A. Loyola-Sánchez, J. Richardson, I. Peláez-Ballestas et al., Barriers to implementing the “2008
Mexican Clinical Practice Guideline recommendations for the management of hip and knee
[11] F. Cluzeau, P. Littlejohns, J. Grimshaw et al., Development and application of a generic methodology to
[12] K. Hill, E. Lalor. How useful is an online tool to facilitate guideline implementation? Feasibility study of
using eGLIA by stroke clinicians in Australia, Qual Saf Health Care 18 (2009), 157–159.