The inter-rater reliability of the Italian version of Aphasia Rapid Test (ART) for acute ischemic stroke

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Abstract

Background The Aphasia Rapid Test (ART) is a screening questionnaire used for examining language in acute stroke patients. The ART was initially developed and validated in French. The purpose of this study was to assess the inter-rater reliability of Italian ART.

Methods The original version of the ART was translated into Italian. The inter-rater reliability was assessed by two independent neurologists who were blind to each other's ratings in 52 acute post-stroke patients.

Results The 52 patients (28 men, 24 women; mean age 73.73 ± 28.99 years) were included within 1 week of stroke onset (46 ischemic, 6 hemorrhagic), as assessed by clinical examination and confirmed by CT and/or MRI. The mean ($\pm$ SD) ART value was 9.38 ($\pm$ 9.26) for rater 1 and 9 ($\pm$9.31) for rater 2. The inter-rater agreement was very good, with a coefficient of concordance of 0.99 (95% CI 0.986–0.995; $p < 0.0001$) and a weighted kappa of 0.878 and a quadratic weighted kappa of 0.983.

Conclusions This study showed that the cross-cultural adaptation of the French version of the ART was successful in an Italian-speaking population.

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Introduction

The Aphasia Rapid Test (ART) is a 26-point scale aimed to test language in post-stroke patients. It was initially developed in French at the Pitié-Salpêtrière Hospital in Paris and further validated by Azuar et al. [1]. This scale has multiple advantages: (i) it is simple and rapid to realize in clinical setting, (ii) it allows to rate aphasia severity at the bedside of acute post-stroke patients, (iii) it may be used for the follow-up, and (iv) it can be administered by any health care professional after brief training, without requiring any specific test material. The ART is based on the scoring of items that are commonly used in language's examination in acute post-stroke patients, but the limit of this scale is the impossibility to discriminate between aphasia, apraxia of speech, and dysarthria and therefore cannot be used as a diagnostic test or replace comprehensive language assessment of patients in speech therapy departments [1]. ART was designed to be easy to translate into any language and to be as little language-specific as possible, and authors concluded that it needs to be tested and validated in other languages by independent studies in different countries. The cross-cultural adaptation guidelines described by Guillemin et al. that are widely accepted were used for the translation and adaptation of questionnaires [2].

The aim of this study was to translate the French ART into Italian to provide a simple and rapid method for the evaluation of language in Italian acute post-stroke patients.

Methods

Translation and cross-cultural adaptation process

Two neurologists (CZ and MP), whose native language is Italian, made translation from the French version of ART into Italian. Italian version and French version of the ART are presented in Appendix 1 in the supplementary material.

The Italian version of the ART was analyzed for Italian cultural characteristics, and no inconsistencies were observed. We asked to an Italian professor to verify the translation. The only discrepancy that she found was for the term "macaron" translated in "maccherone," meaning pasta in Italian and not macaroon. This is not correct from a translation point of view, but culturally, it is closer to Italian habits; moreover, it is phonologically similar to the French "macaron."

Patients

Fifty-two consecutive patients, referred to the Neurological Department of Catania (Italy) between May 2015 and November 2015 for acute stroke, were recruited. These patients met the following criteria: admission to the stroke unit within 12 h of the onset of an acute stroke and left middle cerebral artery (MCA) infarct and/or hemorrhage confirmed by CT and/or MRI. All patients were right-handed, with Italian as their first language. Patients with impaired consciousness were excluded. Informed consent was not necessary, because aphasia assessing is part of standard care in stroke patients.

Outcome scores

The ART score ranges from 0 to 26, with higher values indicating more severe impairment. The patient is successively asked to follow two simple orders (maximum 2 points), one more complex order (3 points), repeat three single words (6 points), repeat one sentence (2 points), and name three common objects (6 points). This is followed by a 1-min verbal semantic fluency task (4 points). The examiner additionally scores dysarthria (3 points) using the same scoring system as in the NIHSS. The final version of the questionnaire was administered to patients by two neurologists (MP: rater 1 and SN: rater 2) in an attempt to quantify the severity of aphasia within 1 week of stroke onset. The neurologists were blind to each other's ratings.

Statistical analysis

The inter-rater reliability of the ART was assessed by computing the coefficient of concordance. All statistical analyses were carried out using MedCalc for Windows (version 11.6.1.0; http://www.medcalc.be).

Table 1 Descriptive statistics of Italian and French population

Population	Italian ($n = 52$)	French ($n = 91$)
M/F	28/24	52/39
Mean age (years)	73.73 (SD ± 28.99)	63.96 (SD ± 19.3)
Ischemic/hemorrhagic	46/6	80/11
Mean, ART rater 1	9.38 (SD ± 9.26)	13.4 (SD ± 9.51)
Mean, ART rater 2	9 (SD ± 9.31)	13.49 (SD ± 9.52)
Median, ART rater 1	4 (IQR 2–19)	11 (IQR 4.25–24)
Median, ART rater 2	4 (IQR 2–18.5)	12 (IQR 4.25–24)
Mean duration of ART administration (seconds)	169 s	171 s

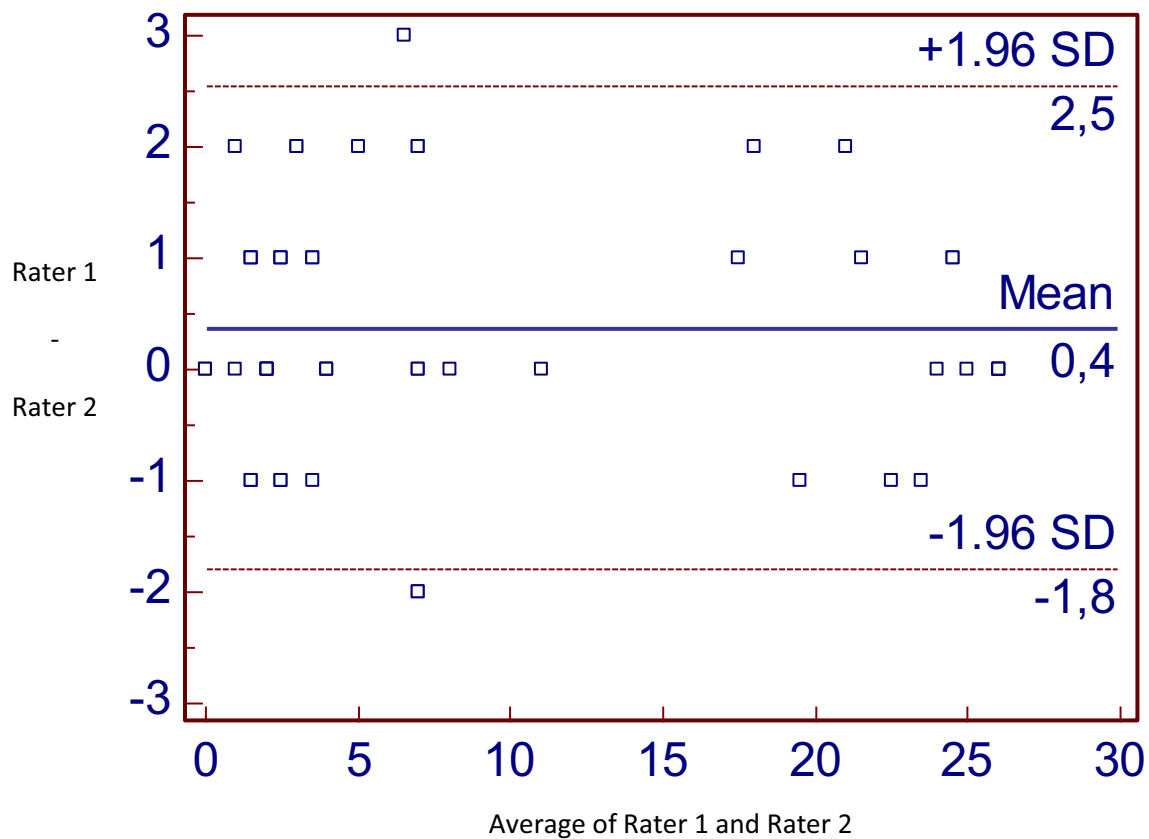*ART* aphasia rapid test, *SD* standard deviation, *IQR* interquartile range

Fig. 1 Bland-Altman plot of ART reproducibility

Results

We tested the inter-rater reproducibility of ART in 52 patients within 1 week of stroke onset.

The mean age (± SD) of this population (28 men and 24 women) was 73.73 (± 28.99) years. They had ischemic (*n* = 46) or hemorrhagic (*n* = 6) stroke. The mean (± SD) ART value was 9.38 (± 9.26) for rater 1 and 9 (± 9.31) for rater 2. Mean duration of ART administration was 169 s, including the 1-min fluency task. Table 1 shows the descriptive statistics of Italian population compared to the French one (see Azuar et al. [1]).

The inter-rater agreement was very good, with a coefficient of concordance of 0.99 (95% CI 0.986–0.995; *p* < 0.0001), a weighted kappa of 0.878, and a quadratic weighted kappa of 0.983. The weighted kappa for ART's items ranged from 0.804 for the execution of simple orders to 0.968 for object naming.

The Bland-Altman plot of ART reproducibility (Fig. 1) shows that ART is stable across all degrees of aphasia severity.

Discussion

The ART was designed in French language as a simple and reproducible language-stroke scale to quantify the initial aphasia severity and to monitor acute stroke patients.

Our study showed that the inter-rater agreement in Italian language was very good, with a coefficient of concordance of 0.99 (similarly to the French study). The time needed to fill in the questionnaire, as well as the correlation between mean ART value rater 1 and 2 obtained in Italian language, were very similar to those reported in the original French language [1].

Recently, ART was also validated in European Portuguese with an excellent inter-rater reliability (concordance coefficient between the two raters = 0.95) [3] similar to the French and Italian inter-rater reliability. One possible explication of this excellent reliability is the lexical and grammatical similarities among the Romance languages (also called Neo-Latin languages) as French, Italian, and European Portuguese. Another explication is the simplicity of the ART test.

Finally, ART has equivalent evaluation capacities in Italian population with acute stroke involvement to the original one. In this study, the limit consisted in the impossibility of evaluating the presence of a test-retest effect, but this was avoided in the French study that showed the lack of a test-retest effect of the ART scale. Another limitation was the absence of the validation of the Italian version of the ART with other existing aphasia severity scales. However, in the Portuguese version, the correlation between ART and the Lisbon Aphasia Examination Battery was strong (r = −0.958, *p* < 0.001). The French

version of the ART correlated with the severity score of the Boston Diagnostic Aphasia Examination [4] (see Table 1 in study of Rosso et al.) [5].

Conclusions

In conclusion, the ART appears to be a simple, rapid, and reproducible language-focused stroke scale to quantify the severity of initial aphasia and to monitor early changes in acute stroke patients.

Compliance with ethical standards

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

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