Reducing Stroke In-Hospital Mortality: Organized Care Is a Complex Intervention

To the Editor:

We read with great interest the article by Saposnik et al regarding the escalating levels of access to in-hospital care and stroke mortality. Many authors agree that the management of the patients in stroke care units has been the most substantial advance in stroke care; however, the mechanism by which the stroke care unit management improves outcomes remains uncertain. Therefore, in their article Saposnik et al argued that the stroke unit admission does not automatically imply receiving comprehensive care and appropriate interventions, and they analyzed the impact of the organized care in stroke mortality. We suggest that this issue should be further analyzed.

We conducted an observational study to this purpose. Retrospective data were collected with standard report forms from the medical records of 253 consecutive patients admitted for ischemic strokes in 29 Italian hospitals in June 2004. Patients with hemorrhagic strokes and transient ischemic attacks were excluded. Stroke in-hospital mortality was selected as the primary outcome and dependency at discharge measured using the Functional Independence Measure as the secondary outcome. We described patient outcomes according to gender, comorbidities (based on their Charlson-Deyo index patients were categorized as having 0 to 1 or >1 comorbidities), medical complications (at least one complication), admission in stroke unit (yes or no), access to organized care (based on organized care index as having 0 to 1 or >1 score), management by a stroke team (yes or no), team clinical expertise (level of knowledge of the evidence) and use of antithrombotic drugs (antiplatelet or anticoagulant during the stay). $\chi^2$ and Fisher exact test were used for categorical variables. Differences in the rate of in-hospital deaths and of dependency at discharge according to each variable under study were also evaluated at individual level using random-effects logistic regression.

Overall in-hospital stroke mortality was 19.76%. In detail we observed the following unadjusted odds ratios (OR): gender, male 0.51 (95% CL, 0.24 to 1.07; $P=0.054$); comorbidities 2.28 (95% CL, 0.92 to 5.93; $P=0.054$); medical complications 8.59 (95% CL, 3.90 to 19.24; $P<0.001$); stroke unit 0.17 (95% CL, 0.24 to 0.45; $P<0.001$); organized care 0.19 (95% CL, 0.09 to 0.41; $P<0.001$); stroke team 0.12 (95% CL, 0.05 to 0.27; $P<0.001$); team clinical expertise 0.13 (95% CL, 0.05 to 0.33; $P<0.001$); antithrombotic therapy 0.33 (95% CL, 0.16 to 0.67; $P=0.008$). In the multivariable analysis the management of the patients by stroke teams (OR=0.25, 95% CL, 0.07 to 0.85; $P=0.025$), the use of antithrombotic therapy (OR=0.26, 95% CL, 0.09 to 0.73; $P=0.009$) and medical complications (OR=6.40, 95% CL, 2.30 to 17.82; $P<0.001$) remained independent predictors of in-hospital mortality.

Regarding dependency at discharge we observed the following unadjusted OR: gender, male 0.58 (95% CL, 0.26 to 1.30; $P=0.154$); comorbidities 3.03 (95% CL, 1.62 to 5.67; $P<0.001$); medical complications 3.59 (95% CL, 1.31 to 10.62; $P=0.005$); stroke unit 0.20 (95% CL, 0.10 to 0.43; $P<0.001$); organized care 0.18 (95% CL, 0.06 to 0.49; $P<0.001$); stroke team 0.46 (95% CL, 0.24 to 0.87; $P=0.01$); team clinical expertise 0.84 (95% CL, 0.41 to 1.72; $P=0.605$); antithrombotic therapy 0.24 (95% CL, 0.08 to 0.65; $P=0.0015$). In the multivariable analysis stroke unit (OR=0.21, 95% CL, 0.08 to 0.55; $P=0.0015$), the use of antithrombotic therapy 0.21 (95% CL, 0.05 to 0.97; $P=0.044$), comorbidities (OR=2.58, 95% CL, 1.11 to 6.01; $P=0.027$) and medical complications 8.51 (95% CL, 1.09 to 66.52; $P=0.040$) remained independent predictors of dependency at discharge.

In conclusion, we think that our data adds further evidence in favor of the argument that stroke patients are best served by a comprehensive and specialized inpatient care and not by individual interventions. This kind of approach could be defined as a complex intervention in which a number of separate elements are essential to the proper functioning of the intervention but the “active ingredient” that is effective is difficult to specify. In fact, the management of patients affected by stroke involves the expertise of several professionals, which can result in poor coordination or inefficiencies in patient treatment, and organized care can significantly improve the outcomes of these patients. However, the active ingredient of organized care still remains unclear, and further studies focused on the evaluation of complex interventions are needed to help to understand which mechanisms within the organization can really improve the quality of stroke care.

Disclosures

None.

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