Cognitive Inhibition in Suicidal Depressed Elderly: A Case-Control Pilot Study

To the Editor: Suicide is defined as the intentional taking of one's own life.[1] Its prevalence is particularly high among older adults and ranges from 30/100,000 to 120/100,000.[1] Although it is recognized that younger suicidal depressed patients have greater executive dysfunctions than nonsuicidal ones,[2–4] little remains known about the role of executive functions in elderly suicide attempts.[2] Executive functions are heterogeneous cognitive functions that may be separated into 3 main subdomains: mental shifting, information updating, and cognitive inhibition.[5] Cognitive inhibition dysfunction has been reported in depressed patients.[4,6] Because cognitive inhibition dysfunction leads to an inability to inhibit intrusive ideation and production of negative affect,[4] we hypothesized that suicidal depressed older patients could have worse cognitive inhibition performance than nonsuicidal ones. The aim of this case-control study was to compare cognitive inhibition performance in suicidal and nonsuicidal depressed older patients.

Method. Between January and July 2010, among the 31 depressed patients aged 65 years and older hospitalized for a current episode of major depressive disorder according to *DSM-IV-TR* criteria in the Department of Psychiatry of Angers University Hospital (Angers, France), 20 (65%) met the selection criteria and were included in the study. Exclusion criteria were a depression score on the 17-item Hamilton Rating Scale of Depression (HDRS),[7] < 18, psychotic features according to the Structured Clinical Interview for *DSM-IV-TR* Axis I Disorders,[8] and a Mini-Mental State Examination (MMSE) score < 24.[9] Subjects were separated into 2 groups: 10 suicidal depressed patients (mean ± SD age, 75.3 ± 2.3 years; 70% women) and 10 nonsuicidal depressed patients (mean ± SD age, 72.9 ± 1.3 years; 70% women) matched for age, gender, and education. Suicidal patients had a suicide attempt during the 10 days before the admission. Nonsuicidal patients had no lifetime history of suicide attempts and a score on HDRS suicide items calculated at 0.

Three executive subdomains were examined: mental shifting by the Trail Making Test (TMT) parts A and B,[10] information updating by direct Digit Spans,[11] and cognitive inhibition by the Stroop test[12] (attentional inhibition) and the Go/No-Go task (motor inhibition).[13] The ratio score of TMT (ie, TMTB/TMTA), the

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total number of direct digit recalls in correct order, the Stroop interference score (seconds), and the score on the Go/No-Go task (/3) were used as outcomes. Between-group comparisons were performed using the nonparametric Mann-Whitney *U* test or the χ^2 test, as appropriate. Logistic regression models were performed to specify the associations between suicide attempts (dependent variable) and scores on executive function subtests (independent variable). The entire study protocol was approved by the local Ethical Committee.

Results. There was no significant difference between suicidal and nonsuicidal depressed patients for age ($P = .493$), gender ($P = 1.000$), years of education ($P = .376$), mean MMSE score (25.8 vs 27.3; $P = .297$), and mean HDRS-17 score (27.7 vs 28.1; $P = .493$). Suicidal depressed patients had poorer performance on the Go/No-Go task than nonsuicidal ones (mean score = 1.4 vs 2.3; $P = .041$). There was no significant difference for the mean ratio score of TMT (2.4 ± 0.3 vs 2.9 ± 0.3; $P = .199$), the mean direct Digit Spans score (5.3 ± 0.3 vs 6.2 ± 0.3; $P = .070$), and the mean Stroop interference score (115.9 ± 23.9 vs 182.7 ± 39.6 seconds; $P = .406$). Logistic regression models showed that suicide attempt was associated with worse performance on the Go/No-Go task (adjusted odds ratio = 0.26 [95% CI = 0.07–0.95], $P = .041$) after adjustment for age (Table 1).

Table 1. Univariate and Multivariate Logistic Regressions Showing the Cross-Sectional Association Between Suicide Attempt (dependent variable) and Scores on Executive Function Subtests (independent variables) (n = 20)

	Suicide Attempt					
Executive	Unadjusted Model			Age-Adjusted Model[a]		
Function Subtest	OR	95% CI	*P* Value	OR	95% CI	*P* Value
TMTB/TMTA score	1.74	0.69–4.39	.244	1.62	0.63–4.16	.320
Direct Digit Spans score	2.32	0.90–5.97	.80	2.20	0.85–5.71	.104
Stroop interference score	1.01	0.99–1.02	.176	1.01	0.99–1.02	.250
Go/No-Go score	0.33	0.11–1.00	.050	**0.26**	**0.07–0.95**	**.041**

[a]Separate analyses were performed for each executive function subtest. Statistical significance (ie, $P < .05$) indicated in boldface.
Abbreviations: OR = Odds Ratio, TMT = Trail Making Test.

Our results show that depressed older patients with suicide attempt had worse cognitive inhibition performance, especially on the motor component, than their nonsuicidal depressed counterparts. Functional neuroimaging studies have shown that cognitive inhibition is based on prefrontal cortex function.[14] Impaired cognitive inhibition reported in our study was thus in concordance with prefrontal dorsolateral cortex dysfunctions found in suicidal depressed patients.[14,15] Inability to inhibit the intrusive ideation and the production of negative affects has been associated with cognitive inhibition, which could promote suicide attempts in depressed patients, as suggested by our results.[4] Further research is needed to corroborate these findings.

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Author contributions: Study concept and design (Drs Richard-Devantoy and Beauchet); acquisition of data (Dr Richard-Devantoy); analysis and interpretation of data (Drs Richard-Devantoy, Le Gall, Annweiler, and Beauchet); drafting of the manuscript (Drs Richard-Devantoy, Annweiler, and Beauchet); critical revision of the manuscript for important intellectual content (Drs Beauchet, Olié, Garré, and Le Gall); statistical expertise (Drs Annweiler and Richard-Devantoy); administrative, technical, or material support (Dr Richard-Devantoy); and study supervision (Dr Beauchet). ***Potential conflicts of interest:*** None reported. ***Funding/support:*** None reported. ***Disclaimer:*** Dr. Richard-Devantoy has full access to the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. ***Trial Registration:*** clinical trials.gov Identifier: NCT01333215.
doi:10.4088/JCP.10l06797