

B Beauptet^{1,2,3}, A Rambeau⁴, H Solem Lavie^{2,5}, Idlir Licaj^{3,6}, A Leconte⁷, C Chatel⁵, P Le Bon^{2,5}, J Denhaerynck¹, M Lange^{3,6,7}, F Joly^{3,4,6}

¹ Geriatric Department, University Hospital Center, CAEN, France

² UCOGIR NORMANDIE, CAEN, France

³ Normandie Univ, UniCaen, INSERM, U1086, ANTICIPE, Caen, France

⁴ Medical oncology department, François Baclesse Regional Cancer Center, CAEN, France

⁵ Supportive Care Unit, François Baclesse Regional Cancer Center, CAEN, France

⁶ Cancer et Cognition Platform, Ligue Nationale contre le Cancer, Caen, France

⁷ Biostatistics and Clinical Research Unit, François Baclesse Regional Cancer Center, CAEN, France

CONTEXT

Among the various instruments recommended by the International Society of Geriatric Oncology, the Mini Mental State Examination (MMSE) is the most commonly used cognitive screening test before oncological treatment. Although the Montreal Cognitive Assessment (MoCA) has been shown to be more sensitive than the MMSE in several pathologies, no specific data exist for older patients with cancer.

OBJECTIVE

We aimed to compare the proportions of older patients with cancer who had screened positive for cognitive impairment according to the MMSE and MoCA scores obtained during a pretherapeutic geriatric assessment (GA) in oncology.

METHODS

This prospective study, funded by Canceropôle Nord Ouest, was conducted among 66 patients older than 70 years who were candidates for a first-line treatment for either a solid tumor or hematological malignancy. Patients with brain tumor or previously known dementia were ineligible. During GA, cognitive function was assessed using both the MoCA and the MMSE tests administered in a random order. This trial is registered as ID-RCB 2014-A00923-44, clinical trial NCT02558907.

RESULTS

Table 1. Sociodemographic and medical characteristics at inclusion (n=66)

	n	%
Gender		
Women	41	62.1
Men	25	37.9
Age Median = 78 [Min 70 - Max 93]		
70-79 years	41	62.1
80 years and over	25	37.8
Educational level		
Below elementary school	15	22.7
Elementary school	30	45.5
Middle school	15	22.7
High school	6	9.1
Social status		
Alone	26	39.4
Couple	39	59.1
Institution	1	1.5
Risk of falling ¹	56	84.6
Severe comorbidity ²	5	7.6
Number of medications		
0-4	24	36.4
5-9	34	51.5
10 and more	8	12.1
Psychotropic medication		
Total	39	59.1
Benzodiazepine	18	27.3
Neuroleptic	2	3.0
Antidepressant	5	7.6
Morphinic or codeine	14	21.2
Malnutrition ³	26	39.4
Cancer		
Solid tumor, including :	43	65.2
Breast	16	24.2
Colorectal	8	12.1
Gynecologic	4	6.1
Skin	3	4.5
Hemopathy, including :	23	34.8
Lymphoma	11	16.7
Acute leukemia	7	10.6
Myeloma	3	4.5

¹ Were considered at risk for falling if at least one of the following criteria was found: Timed Up and Go test less than 20 seconds, one-leg standing balance test less than 5 seconds or 2 falls during the last 12 months.
² Severe comorbidity was defined as a CIRS-G item score of ≥3/4.
³ Malnutrition was defined as a weight loss of more than 5% within one month or more than 10% within six months or a body mass index below 21 kg/m², or an albumin blood level below 35g/L or an MNA global score below 17 out of 30.

Table 2. Vulnerability of patients according to geriatric scale in comprehensive geriatric assessment at baseline

	Cut-off score	Median	Range	abnormal score
G8 Oncodage	≤14/17	13	6-16	37%
ADL	<6/6	6	4-6	22.7%
IADL	<5/5	5	1-5	36.4%
GDS 15	≥5/15	2	0-15	25.8%
MMSE	< Percentile 10*	26	11-30	19.7%
MoCA	≤26/30	24	9-30	66.7%

MMSE cut-off was different according to educational level: *Percentile 10 cut-off score was: 24/30 for level 1 (below elementary school or elementary school without diploma), 25/30 for level 2 (elementary school with diploma or middle school without the last year), 26/30 for level 3 (last year of middle school or high school without diploma), 27/30 for level 4 (high school with diploma and more).
In patients older than 80, cut-off score was 1 point lower than previously described cut-off.

Table 3. Characteristics at baseline associated with positive screening for cognitive impairment with at least one cognitive test

	Baseline (n=45/66 impaired)		
	%	n	p
Gender			
Male	68	17	0.98
Female	68	28	
Age			
70-79	57.9	22	0.060
≥80	82	23	
Educational level			
Below elementary school	93.3	14	0.009
Elementary school	73.3	22	
Middle school	40	6	
High school	50	3	
Primary Tumor			
Solid tumor	79.1	34	0.009
Malignant hemopathy	47.8	11	
Palliative situation ¹			
Yes	77.3	17	0.154
No	58.8	20	
ADL score			
<6	86.7	13	0.117
6	62.7	32	
IADL score			
<5	95.8	23	<0.001
5	48.9	22	
Malnutrition ²			
Yes	42.2	19	0.491
No	57.7	26	
Risk of falling ³			
Yes	66.1	37	0.384
No	80	8	
GDS15 score			
≥5	80	12	0.348
<5	63.3	31	
Severe comorbidity ⁴			
Yes	80	4	1
No	67.2	41	
Number of medications			
≥5	85.7	36	<0.001
<5	37.5	9	
Psychotropic medication ⁵			
Yes	79.4	27	0.043
No	56.2	18	
Test assessment order			
MMSE first	75.8	25	0.290
MoCA first	60.6	20	

¹Palliative situation: Non-curative intent of treatment.
² Malnutrition was defined as a weight loss of more than 5% within one month or more than 10% within six months or a body mass index below 21 kg/m², or an albumin blood level below 35g/L or an MNA global score below 17 out of 30.
³ Were considered at risk for falling if at least one of the following criteria was found: Timed Up and Go test above 20 seconds, one-leg standing balance test less than 5 seconds, 2 falls during the last 12 months.
⁴ Severe comorbidity was defined as a CIRS-G item score of ≥3/4.
⁵ Psychotropic medication includes benzodiazepines, antidepressants, opioids.

Figure 1. Results of cognitive screening tests at baseline (n=66)

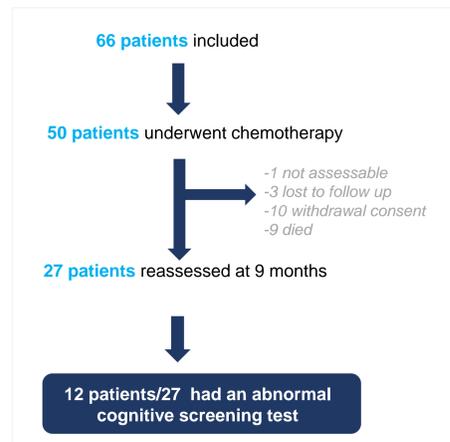
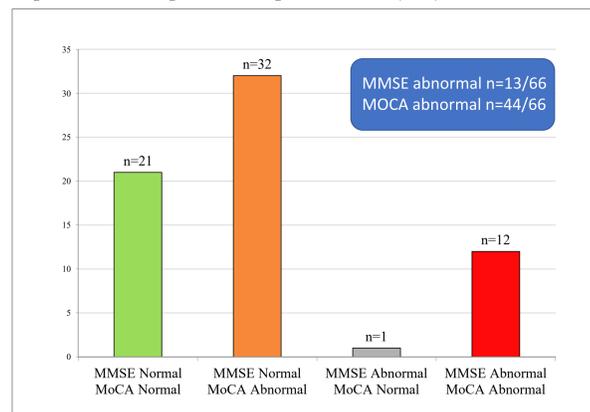


Figure 2. Results of cognitive screening tests at follow-up (n=27)

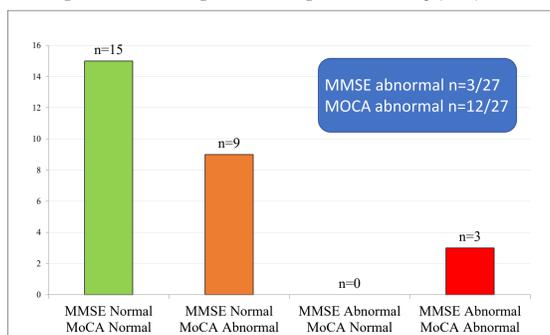
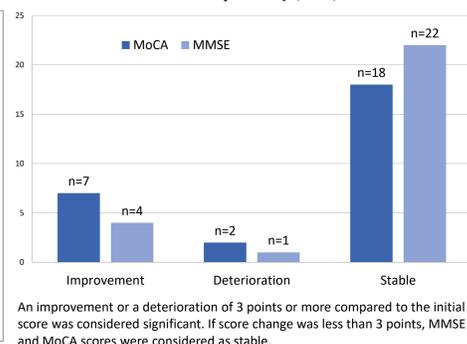


Figure 3. Change between baseline and follow-up for MMSE and MoCA independently (n=27)



An improvement or a deterioration of 3 points or more compared to the initial score was considered significant. If score change was less than 3 points, MMSE and MoCA scores were considered as stable.

CONCLUSION

The MoCA test seems to be more relevant than MMSE to detect cognitive impairment before and after chemotherapy. Most of our patients were receiving a psychotropic medication and were polymedicated. Both of these factors have been found to be significantly associated with cognitive impairment. Such medications can decrease sustained attention and may explain the high prevalence of abnormal MoCA test. Among cognitive screening tools recommended by the SIOG, Mini-COG and MoCA both explore executive functions, unlike MMSE. As impaired executive functions may lower adherence to oral medication, pretreatment executive dysfunction should be detected before starting an oral therapy. Mini-COG and MoCA performances for detecting executive dysfunction has to be evaluated in this population. We have recently launched a prospective study to assess these hypotheses. Its findings may lead to proposals concerning the adaptation of certain practices in geriatric oncology (clinical trial NCT03299855).