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SHORT COMMUNICATION

Assessment of perioperative cognitive disorders in elderly patients undergoing elective surgery

Christiane Rodrigues da Silva [a,b,*], **Luciana da Silva De Armond** [a,b], **Adilton Correa Gentil Filho** [c]

[a] *Hospital Universitário Getúlio Vargas (HUGV), Manaus, AM, Brazil*
[b] *Universidade Federal do Amazonas (UFAM), Programa de Mestrado Profissional em Cirurgia (PPGRACI), Manaus, AM, Brazil*
[c] *Universidade Federal do Amazonas (UFAM), Manaus, AM, Brazil*

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In recent years, the number of patients over 60 years of age undergoing surgery has increased significantly and several clinical studies have revealed cognitive function decline after anesthesia and surgery, even in the absence of symptoms. Studies have shown that cognitive decline is primarily associated with older age, lower preoperative intelligence quotient, lower level of schooling, or a combination of these factors.[1]

Perioperative Cognitive Disorder (POCD) is defined as a cognitive impairment in elderly patients that is triggered by surgery. It is considered a transient condition, but its progression resulting in cognitive impairment is reported in roughly 10—38% of patients in the first 2 to 3 months, and 3—24% in 6 to 12 months after major surgery.[2]

According to the new recommended nomenclature in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders-5), perioperative neurocognitive disorders can be classified as postoperative delirium or delayed neurocognitive recovery, when they develop up to 30 days after surgery. When recovery occurs from 30 days to 12 months after surgery the condition can be classified as mild or severe POCD.[1] Recent guidelines suggest that prompt detection of disability should not rely only on standard assessment, but mainly on structured screening tools.[3]

This study aimed to determine the prevalence of neurocognitive disfunction in elderly patients to be submitted to surgery at the Hospital Universitário Getúlio Vargas/Universidade Federal do Amazonas (HUGV/UFAM) and correlate the prevalence of neurocognitive disfunction with patients' level of schooling, presence of previous comorbidities, anesthesia technique, and surgery duration.

The study was approved by the Ethics Committee of the Universidade Federal do Amazonas/UFAM (CAAE: 20360319.3.0000.5020, opinion 3.683.997) on November 5, 2019. Informed consent was obtained from participants before the administration of the cognitive tests.

Collaborators: Ruan Angel Silva e Silva and Maria Laura Brunelli Innocente.

* Corresponding author.
E-mail: christianerdasilva@gmail.com (C.R. da Silva).

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A single-center, analytical, observational, and cross-sectional clinical study was carried out in patients that were scheduled for elective surgery under anesthesia from September 10, 2019 to January 30, 2020 at HUGV/UFAM, Manaus, AM (tertiary center).

The study included patients over 60 years of age, with complete independence and classified as ASA (American Society of Anesthesiologists) physical status I, II, or III. We excluded patients refusing to participate at any stage of the study; patients with special needs, and patients presenting neurological or psychiatric disorders precluding the administration of the cognitive test.

We assessed participants in the ward on two different occasions, on the day before surgery and on the first postoperative day. On both occasions, they answered the Portuguese version of the 10-Point Cognitive Screener (10-CS) questionnaire. Then we compared patient preoperative with postoperative scores. According to the score, a patient is classified as a normal cognitive test ($\geq$ 8 points), possible cognitive impairment (6—7 points), and probable cognitive impairment (0—5 points). The test was timed and comprised assessing the speed of processing and the execution of requested control processes, skills that are impaired at the onset of dementia.[3]

After test completion, when required, the score was adjusted according to the patient's level of schooling, adding 2 points for illiteracy, and 1 point for 1 to 3 years of schooling. The primary outcome of the study was to determine prevalence of early POCD and the secondary outcome was to assess the correlation of POCD with the level of schooling, pre-existing comorbidities, type of anesthesia technique, and duration of surgery.

Data analysis was carried out using Epi Info for Windows version 7.2.2.6. Sample size calculation was estimated considering the frequency of patients in the hospital, with a margin of error of 0.05 (α) and 95% power, with approximately 10% loss to follow-up and 5% loss due to non-follow-up or discontinued intervention. The Shapiro-Wilk test was used to assess normality of the variables. After the hypothesis of normality had been accepted at a significance level of 5% ($p > 0.05$), Student's *t*-test was used to compare means between paired samples and the Chi-Square test was performed to compare the differences between categorical variables, with a CI of 95%.

A total of 100 patients were initially recruited after hospital admission for elective surgery between September 2019 and January 2020. The study included 86 patients scheduled for surgery, that were comparable regarding demographic characteristics, level of schooling, physical status, and anesthesia technique performed. A total of 70 patients had pre-existing comorbidity, most frequently High Blood Pressure (HBP) and type II Diabetes Mellitus (DM II).

Regarding the results of the cognitive tests, no difference was found between pre- and postoperative test mean scores for 24 participants; the score was positive for 45 participants, and for 17 the score was negative and indicated cognitive impairment (19.76%). There was no statistical difference regarding level of schooling, pre-existing comorbidities, anesthesia technique used, and duration of surgery (Table 1).

As the population ages and medicine progresses, we can expect more elderly patients experiencing major surgery. The finding of 17 participants (19.8%) presenting POCD, revealed by the decrease in the postoperative score compared to the preoperative score, agrees with the results of previous studies in which the time of application of the intervention changed.[3] Regarding the distribution of participants according to the level of schooling, there was no difference in terms of cognitive impairment (p = 0.204), although a higher level of education may play a protective role in late POCD.[4]

As for the occurrence of POCD, no statistical difference was found between participants with HBP (p = 0.413) and DM

Table 1 Comparison of the postoperative score with the preoperative score considering the level of schooling, presence of comorbidities, type of anesthesia and surgery time in patients undergoing surgery at the HUGV, Manaus, AM.

	Postoperative score compared to preoperative							
	Decreased (n = 17)		No change (n = 24)		Increased (n = 45)			
Variable	f_i	%	f_i	%	f_i	%	Total	*p*
Schooling								0.204[a]
Elementary school	9	20.0	9	20.0	27	60.0	45	
High School/University	8	19.5	15	36.6	18	43.9	41	
HBP								0.413[a]
Yes	12	23.5	12	23.5	27	53.0	51	
No	5	14.3	12	34.3	18	51.4	35	
Diabetes mellitus								0.200[a]
Yes	1	5.6	5	27.8	12	66.7	18	
No	16	23.5	19	27.9	33	48.5	68	
Type of anesthesia								0.262[a]
Block/Spinal anesthesia	7	18.0	8	20.5	24	61.5	39	
General anesthesia	10	21.3	16	34.0	21	44.7	47	
Surgery duration (min)								0.680[b]
Median	150.0		137.5		140.0			
Q_1—Q_3	120—180		120—187.5		105.0—180.0			

f_i, Absolute frequency; HBP, High Blood Pressure.
[a] Pearson's Chi-square test.
[b] Kruskal-Wallis test.

II, (p = 0.200) compared to the participants that did not present these comorbidities. Concerning the anesthetic technique, 40.7% of participants underwent regional anesthesia and 39.5% general anesthesia, and it is not possible to associate the type of anesthesia with the onset of POCD (p = 0.262), and the same can be said for the duration of surgery (p = 0.680). These findings disagree with previous studies that described a higher incidence of POCD in major surgeries, generally associated with postoperative complications, higher stress response or longer hospital stays.[5]

Although no correlation was found with the extension and duration of surgery or with the type of anesthesia used, the prevention of POCD requires intervention on multiple factors that may not have been identified preoperatively, but still require concern during rehabilitation. The 10-CS questionnaire, based on empirical data, is considered a fast and user-friendly screening strategy, with higher accuracy and some practical advantages when compared to other commonly used tools. It is noteworthy to consider other existing postoperative factors that may contribute to mental decline, that request further research in this area of anesthesiology.

Conflicts of interest

The authors declare no conflicts of interest.

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