



A 5-Minute Cognitive Assessment For Remote Safety Use In COVID-19 Patients

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Background: Early experience with the COVID-19 Pandemic has begun to elucidate brain function changes that may result in compromised cognition both acutely and during variable recovery periods. Reported cognitive assessment is often limited to orientation alone. Further assessment may seem an inappropriate burden in acute COVID-19 cases characterized by fatigue and confusion as well as examiner safety.

Objective: To gain experience in assessing cognition in COVID-19 cases as comprehensively as possible in a brief format, all while observing safety and distancing.

Method: We adapted a brief cognitive assessment, previously applied to liver transplant candidates and medical/surgical inpatients, for remote use in patients hospitalized for COVID-19 treatment. Collecting quality assurance data from telephone-administered assessments, this report presents a series of six COVID-19 case vignettes to illustrate the 5-Minute Assessment use in diagnosis and treatment of brain effects. Primary medical teams referred the cases for neuropsychiatric consultation.

Figure 1: 5-Minute Cognitive Examination For Remote Use

I would like to ask you some questions that will let me know how your thinking is doing today.

Working Memory (temporal lobe)

First, I would like you to remember four things for me: hammer, mailbox, bus, tree.

Say them to me please. (Ask the person to repeat the objects until they can see them all the way through, noting the number of tries required.)

Keep them in your mind and I will ask you to say them in again a few minutes. (Note the time and ask for the objects to be repeated in five minutes by the clock.)

Some of these questions may be easy. For example, what is the name of the place we're in now?

What day is today? (month, year, day of the week)

Calculations (parietal lobe)

I would like you to add some numbers.

First, please tell me how much schooling you've had. (Note down the years of education or accomplished education beyond high school)

Please add 7 + 6 (13) (single digits)

How much is 13 + 9 (22) (single digit with a carryover)

How much is 22 + 15? (37) (double digits without a carryover)

This is the last one. How much is 37 + 45? (82) (double digits with a carryover)

Figure 1: 5-Minute Cognitive Examination For Remote Use (Cont'd)

Concentration (lower centers and frontal lobes)

Think of the word world, and spell it to me backwards. _ _ _ _ _ (DLROW)

Fund of Information: Tell me about your interests or hobbies. Now name 5 items (that relate to your interests).

(For example, fishing: Name 5 fish you can catch here in our State.)

Judgment (frontal lobe, orbito-fronto-subcortical tracks)

I'm going to give you an imaginary, or pretend, situation and I would like you to tell me what you would do in that situation.

1) You are feeling well and decide to watch a movie. You go to a movie theater and are watching the movie. The theater is crowded and you are the first one to see a fire break out in the theater. What would you do?

Poor judgment: yell FIRE! "Is there any danger in doing that." Cause a panic. "What might you do instead that would lessen the chance of a panic?" Good judgment: Inform the theater management, get the lights on, call for help, and so on.

2) You are at home, late at night, and you hear noises. You think someone might be trying to break in. What would you do?

Poor judgment: Get my gun and blow them away. "What if there were more than one intruder?" Good judgment: call the police. Dial 911.

Abstract Thought (frontal lobes)

1) Similarities: Can you tell me how an apple and an orange are alike? Concrete: both are round. Abstract: both are fruits.

How are a table and a chair alike?

Concrete: both have four legs. Abstract: both are furniture.

How are an automobile and a helicopter alike? "One flies, the other drives on a road." That is how they differ. How are they alike? Concrete: both have wheels. Abstract: both are transportation

How are a tree and an ant alike?

Concrete: they are not alike. Abstract: they're both living things.

2) Proverbs If I were to say, 'It's no use crying over spilled milk', what would I be talking about?

(Concrete: you have to wipe the milk up. Abstract: don't worry about what can't be fixed.)

Working Memory Retrieval (temporal lobe)

At about this point, check the clock and, if 5 minutes have gone by, ask the person to repeat the four memory objects. Recalling 3 or 4 is usually in the normal range. Recalling none, 1 or 2 can indicate a pathological response.

___ of 4 objects at 5 minutes

Verbal Trails B Test (frontal lobe, dorso-lateral pre-frontal-subcortical tracks)

This is the last of the tasks I have for you. I appreciate your efforts in sticking with this exam. I am going to give you a pattern and I would like you to take the pattern as far as you can go with it.

The pattern is: 1 A, 2 B, ... What comes next?

This task is timed and begins with the patient's first response. Normal cut score is proceeding through 13 and the letter M or greater in the space of 1 minute, without error.

13-M yes or no _____

Engagement versus Indifference (frontal lobe, anterior cingulate-subcortical tracks)

(For the interviewer: Please judge how engaged the patient presented in the interview over the course of the examination.)

This patient was: 1) indifferent to the conversation yes ___ no ___
2) attentive but flexible yes ___ no ___
3) overly involved and not flexible yes ___ no ___

Table: Selected Cognitive Results In COVID-19 Cases (n=6)

Age (decade)	Exam (hospital day)	Temporal Lobe Working Memory (3 or > of 4 objects)	Parietal Lobe Calculation (2 digits with carryover)	Frontal Lobe Engagement on Day 1	Frontal Lobe Judgment (basic, complex)	Frontal Lobe Verbal Trails B (13-M without error)
70	10	yes	correct	no	complex	poor
60	6	yes	no	no	complex	poor
50	9	yes	no	no	no	poor
40	5	yes	no	no	no	poor
80	8	no	no	no	no	poor
50	7	no	no	no	basic	poor

Results: Varying over four decades in age, none were able to engage meaningfully with their surroundings on admission. On follow-up exam 6 to 10 days later, four of the six had recovered Working Memory, and only one had recovered calculation ability. Two were capable of complex Judgment responses while none of the cases completed frontal executive function testing in the normal range.

Conclusions: Cognitive assessment in COVID-19 cases, using this remote examination, reveals patterns of cognitive recovery that vary among cases and are far more complex than loss of orientation. In this series, testing specific temporal, parietal, and three frontal lobe functions suggests that calculation ability, judgment, and especially frontal executive functions, may characterize COVID-19 brain effects. Used widely, and serially, this exam method can potentially inform our understanding of COVID-19 brain effects with healing from the virus.

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