

Normal Body Temperature and Negative Covid 19 Questionnaire Sufficient Prior to Diagnostic Neurological Testing to Prevent Covid 19 Transmission to Health Personnel

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Abstract

The aim of this study was to find a simple and effective way to screen patients for Covid 19, prior to them being submitted to neurophysiological or neuropsychological testing in order to protect employees from being infected during the pandemic from patient contact. On May 18, 2020 when Michigan, a critically affected pandemic area, reopened for medical business after lockdown declared by the Governor on March 23, 2020, medical personnel in our office-which is an academic neurology practice-EEG and sleep technicians, medical Assistants, physician assistants and myself fretted about potential Covid 19 transmission during neuro-diagnostic procedures-EEG, video-EEG, ambulatory EEG, PSG, MSLT, CPAP titration, neuropsychological testing, EMG/NCV, VNG/Balance test and autonomic testing including the tilt table test, which require an intimate patient contact and risk of exposure. We screened all unselected and consecutive patients who were scheduled for neuro-diagnostic testing in our facility by infrared thermometer, a standard Covid 19 questionnaire and a single Covid 19 PCR nasal/throat swab prior to these tests. 542 consecutive unselected neurological or sleep/wake disorder patients aged 18 - 90, 65% males, 35% females were tested over six months as a part of this project. A total of 1109 diagnostic tests were performed. No test was limited in scope or duration. Standard PPE precautions were still taken despite the negative screening, room door left open and relatives' presence limited during the test procedure. All were afebrile and negative on questionnaire and only 3 were found to be positive for Covid 19 PCR, indicating that a negative infrared temperature reading and a standard Covid 19 questionnaire is over 99 percent effective in prescreening for intimate neurological diagnostic test-

ing. The technician, administering most of these tests, never contracted the virus. The technician collecting the nasal/throat swab never contracted the virus. One PA, two sleep technicians and one medical assistant came down with Covid 19 but were all felt to have contracted that from domestic exposure from family members or friends and not when at the job. All had mild disease and rapidly recovered. Infrared temperature testing and standard Covid 19 questionnaire are sufficient prior to intimate neuro-diagnostic testing when combined with standard PPE precautions to limit exposure to Covid 19 in medical personnel in a neurology office with on-site diagnostic testing.

Keywords

Covid 19, Questionnaire, Neuro-Diagnostic Testing

1. Rationale

On March 10, 2020 Governor of Michigan declared state of emergency due to Covid 19 Pandemic [1]. On March 23, 2020 stay a home order was issued [2]. We closed our office that day and were open to only Telemedicine appointments until May 13, 2020 when the order was partially lifted. No neuro-diagnostic testing of any kind was performed in this period [3]. On May 18, upon reopening, we were faced with dilemma of providing neuro-diagnostic testing to our patients with whom we had face-to-face encounter while reasonably protecting our employees against this disease. In the absence of any guidelines for such an endeavor, precious little data in literature [4] [5] and calm their nerves of jittery medical personnel in our office we utilized a 3 pronged approach.

We took forehead temperature on each patient prior to face-to-face encounters and insisted on a negative standard Covid 19 questionnaire (**Appendix**). Since, headache, myalgias and fatigue are common neurological symptoms, they were not automatically considered as a cause of exclusion unless both were present together at least 2 of 3 in the same person, however. Clinical evaluation required only the first two items but if neuro-diagnostic testing of any kind was contemplated, we also required a single negative Covid 19 PCR test, taken on-site by the same technician either nasal or oral depending on the type of availability of the swab at that time. Our rationale was that neuro-diagnostic testing requires more intimate and prolonged contact with the patient and requires additional layer of protection. Abbott laboratory technique [6], authorized on or about the same time on an emergency basis, was utilized for PCR amplification and results were typically available in 24 - 96 hrs. The tests were all processed at the same laboratory. We still insisted that the medical personnel observe all PPE, leave the door ajar for proper ventilation and limit the access of the patient's relatives to the test area except under most exceptional circumstances. Unlike some suggestions in the literature [5], the test duration was not curtailed.

2. Patients and Methods

542 consecutive neurological patients aged 18 - 90, 35% females, 65% males who needed any neuro-diagnostic testing in our office were all pre-screened. The patients suffered from conditions such as headaches, low back pain, seizures, sleep apnea, narcolepsy, Alzheimer's disease, Parkinson's disease, radiculopathy, carpal tunnel syndrome, cubital tunnel syndrome, parasomnias, insomnias, attention deficit disorder, pseudo-dementia, dizziness, orthostatic hypotension, dysautonomia, postural tachycardia etc. (**Table 1**).

Evaluation by the physician or a mild-level provider including H and P required only negative temperature reading and a negative standard Covid 19 questionnaire. However, if a neuro-diagnostic testing was considered necessary, the Covid 19 swab was also obtained.

LPOW infrared forehead thermometer model: HTD8813C was utilized. The patient was considered afebrile if the temperature was 99.1 degree F or less.

A standard Covid 19 questionnaire modified for our office from the guidelines from CDC at that time was used (**Appendix**) and any patient with any one of the most common symptoms namely cough, fever, shortness of breath, dry cough, anosmia, ageusia, chills, sore throat, running nose, sneezing, nausea, vomiting or diarrhea or two or more of auxiliary symptoms such as headache, fatigue and myalgia were considered not fit for testing. Those exposed to a patient with Covid 19 within 14 days, those in quarantine or those who had travelled elsewhere within 14 days were excluded.

A single Covid 19 swab was taken either nose or throat depending on which swab was available on the day of testing using the standard technique by the same laboratory technician throughout the study period and processed/amplified by standard PCR technique by Abbott, approved for emergency use on about the same time when we began this study, at the bio-tech laboratories. The results were available in 24 - 96 hours after the swab was taken.

Table 1. Subjects.

| |
|--|
| Time period: May-Oct 2020 |
| N = 542 |
| Males: 65% |
| Females: 35% |
| Age: 18 - 90 |
| Types of neurological illnesses: |
| sleep apnea, insomnia, narcolepsy, parasomnias |
| seizures, syncope |
| Headaches, |
| Low back pain, |
| Radiculopathy, |
| Strokes, |
| Alzheimer's, Parkinson's etc. |

Table 2. Neuro-diagnostic tests.

| | |
|---|------|
| Neuro-diagnostic tests: | N= |
| EEG | 151 |
| 12 hr Video-EEG | 22 |
| 48 hr Ambulatory EEG | 20 |
| EMG/NCV | 266 |
| PSG | 106 |
| MSLT | 14 |
| CPAP titration | 83 |
| VNG | 51 |
| Balance test | 52 |
| Q Sart | 64 |
| HRDB | 64 |
| Valsalva | 64 |
| Tilt table test | 64 |
| Brief computerized neuropsychological testing | 88 |
| Total: | 1109 |

Table 3. Outcome.

| |
|---|
| Patients: <i>N</i> = 542, Total neuro diagnostic tests: 1109 |
| Temp 99.1 degree <i>F</i> or less: 542 |
| Negative sleep questionnaire: 542 |
| Negative Covid 19 PCR: 539 |
| Positive Covid 19 PCR: 3 |
| Accuracy of negative temp and questionnaire: 99.45% |
| Employees: <i>N</i> = 13 |
| Age: 29 - 73 |
| M: 5F = 8 |
| Employee infected by patients: 0 |
| 1 physician: Had Covid 19 during the lockdown prior to opening of office on May 18—No recurrence—did all EMG/NCV tests |
| 2 PA's: One developed Covid 19-possibly exposed to mother during a weekend visit and not at work, recovered, mild illness |
| 1 non sleep tech: Did all non-sleep and non-EMG/NCV tests, did not develop Covid 19 |
| 3 sleep techs: 2 developed Covid 19, one at a assisted living home visit to see a loved one and another from his daughter, very mild illnesses |
| 2 medical Assistants: One collected all nasal/throat swabs-never developed Covid 19, the other one developed Covid 19 after exposure to a friend he gave ride on his private time and not at office |
| 1 biller: No Covid 19 illness |
| 2 receptionists: No Covid 19 illness |
| 1 neuro-psychologist: No Covid 19 illness] |

Neuro-diagnostic testing was always carried out with full PPE precautions, keeping the door ajar while testing and not allowing relatives during the procedure, whenever possible. The scope and duration of testing was not limited or curtailed for any test.

The tests performed were:

EEG, video-EEG, 48 hour ambulatory EEG, PSG, MSLT, CPAP titration, neuropsychological testing, EMG/NCV, VNG/Balance test and autonomic testing including the tilt table test, Q sart, HRDB and Valsalva (**Table 2**).

3. Results

They are shown in **Tables 1-3**.

4. Discussion

There is tremendous fear amongst health care personnel about contracting Covid 19 while dispensing services to the patients. During this pandemic the health care personnel have borne disproportionate burden of infection and illnesses and deaths from the Covid 19 [7]. The pandemic is far from over and the whole world is currently facing its fourth surge. Only one virus illness has ever been eradicated by humanity, *i.e.* the small pox [8]. Even that virus still lives in labs of some of the most powerful nations, hopefully under very tight control in the laboratory.

Most virus illnesses, once they occur, they are there to stay, survive and even thrive, the pandemics typically become endemic. It appears that, barring a miracle, Covid 19 is probably here to stay although the pandemic may change into an endemic [9].

Simple strategies are needed to reasonably reduce the exposure to health care personnel while they strive to dispense much-needed care or diagnostic testing.

It appears that based on our data of 542 consecutive unselected patients and 1109 neuro-diagnostic tests over six months, a simple no-touch frontal temperature testing and a standard Covid 19 questionnaire provides reasonable protection to neuro-diagnostic personnel and technicians from catching the virus provided they continue to observe PPE and common-sense precautions such as limiting the relatives during the testing and maintaining proper ventilation such as leaving the door ajar. Abbreviation of tests, as recommended in some sparse literature on this matter, is not necessary.

We have abandoned the Covid 19 swab pre-screening in all patients if the forehead temperature is normal and the Covid 19 questionnaire is negative, based on our study with no occurrence of Covid 19 in any personnel since. Most telling is the lack of infection to the laboratory tech who collected all our samples and the clinical neurophysiology tech who performed bulk of all tests—the EEG, ambulatory EEG, brief computerized neuropsychological testing, VNG, balance test, Q Sart, tilt table test, HRDB and Valsalva.

As a side note, all our personnel is all vaccinated for Covid 19 Pfizer vaccine since this study was completed except one sleep tech who has elected not to be vaccinated.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix

BG Tricounty Neurology & Sleep Clinic PC

Patient Advisory and Acknowledgement

Receiving Treatment during COVID-19 Pandemic

Dear Patient,

You have presented to the office today because you have an urgent condition which must be treated at this time and cannot be postponed until the current COVID-19 period abates. Please be advised of the following:

While our office complies with the State Health Dept and Centers for Disease Control and Prevention infection control guidelines to prevent the spread of COVID-19 virus, we cannot make any guarantees.

Our staff are symptom free and, to the best of their knowledge, have not been exposed to the virus. However, since we are a place of public accommodation, other persons (including other patients) could be infected, with or without their knowledge.

In order to reduce the risk of spreading COVID-19, we are asking you a number of “screening” questions below. For the safety of our staff, other patients, and yourself, please be truthful and candid in your answers.

Screening Questions:

| | | |
|--|-----|----|
| Are you currently awaiting the results of a COVID-19 test? | YES | NO |
| Do you have a fever? | YES | NO |
| Do you have shortness of breath? | YES | NO |
| Do you have a dry cough? | YES | NO |
| Do you have a sore throat? | YES | NO |
| Do you have gastrointestinal distress? | YES | NO |
| Do you have sneezing, runny nose or sinus pressure? | | |
| That is unusual and not related to seasonal allergies? | YES | NO |
| Do you have a new loss of taste or smell? | YES | NO |
| Do you have chills or repeated shaking with chills? | YES | NO |
| Do you have muscle pain, fatigue or weakness? | YES | NO |
| Do you have a headache? | YES | NO |
| Have you been in close contact with someone who has a | | |
| Confirmed or probable diagnosis of COVID-19? | YES | NO |
| Have you travelled within the last 14 days? | YES | NO |
| If yes: Internationally? _____ Domestically? _____ | | |

****NOTE:** If you are scheduled for testing in our office, you will be screened by a COVID-19 nasal swab PCR.

Patient Name: _____

Patient Signature: _____

Date: _____

FOR OFFICE USE:

Staff Member Name: _____

Patient Temperature: _____