

# Conduct of Virtual Neurology DM Final Examination during COVID-19 Pandemic

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## Abstract

Medical training programs are witnessing immense disruptions worldwide due to the ongoing COVID-19 pandemic. Keeping in mind the trainees' future prospects, it is important to provide continuity of teaching and timely certification assessments. Overcoming the obstacles to routine functioning presented by SARS-CoV-2 spread, we recently conducted the DM Neurology exit examination in a hybrid virtual format. We created a curated case repository with history and clinical examination findings followed by structured questions that could be built upon for case discussions. The external examiners assessed the candidates virtually through a video conferencing platform. The end results were well accepted by all key stake holders. The concerns, logistics and experience of conducting the DM Neurology exit exam in a virtual format are summarized here.

**Keywords:** COVID 19, DM final examination, Virtual Neurology

The world today is drastically different from the one we knew and lived in, even a few months ago. We are witnessing immense disruptions in routine life, unforeseen and unimaginable. These include major challenges in educational activities at all levels. Teaching and training of medical post-graduates is vastly affected not only due to concerns regarding social distancing and avoidance of classroom or bedside teaching but also due to the fact that both medical faculty and residents alike are part of the frontline essential services for COVID-19 management.<sup>[1]</sup> However, keeping in mind the post-COVID world and the trainees' future prospects, it is important to provide continuity of teaching and timely certification assessments to ensure that training programs are completed on time.<sup>[2]</sup> As with many centers, we recently faced the situation of conducting the specialty exit examination for DM neurology residents in the time of SARS-CoV-2 spread. We summarize here the concerns, logistics, and experience of conducting this exam in a virtual format.

## BACKGROUND

The Department of Neurology, AIIMS, New Delhi has 36 residents in training at any given point of time, of which 4–8 candidates appear for the DM exit examination in each session (every 6 months). This year, we had four candidates due to appear for examination in June 2020. The usual examination procedure consists of theoretical examination followed by practical assessment, which is spread over a period of 2 days. Practical assessment has the following components: 1) objective structured clinical examination (OSCE), 2) bedside assessment of the candidate including one case discussion in the long format and two case discussions in the short format, and 3) a viva-voce examination. Two internal and two external

examiners assess each candidate on all these components. This type of assessment requires significant in-person interactions among the candidate, patient, and examiner.

In the initial stages of the pandemic, we were hopeful that services might still resume to an extent making it possible for us to conduct the exams in this usual manner with added attention to social distancing and sanitization. However, as time elapsed and COVID-19 cases continued to rise in New Delhi toward the end of a stringent lockdown, the chances of conducting a regular examination looked bleak. Hence, we began preparing the groundwork for a partial virtual and eventually a completely virtual assessment.

## CONCERNS

The general factors that continue to be of major concern are related mainly to travel restrictions in the wake of nationwide and then location specific lockdown and ensuring safety of the candidates, patients, and examiners during the assessment process. Prevailing travel restrictions made it difficult for both

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external examiners and patients to be present in person. In spite of facilities for social distancing, masks, and frequent sanitization, the closed nature of the assessment rooms and the duration of exposure to one another would increase the chances of SARS-CoV-2 transmission in case of exposure to an as yet unknown symptomatic or asymptomatic infection carrier during the assessments.

We also identified some specific concerns related to the field of neurology. Among the medical specialties, neurology perhaps has the unique distinction of being heavily weighted toward clinical history and examination in practice. Dependence on investigations, though rising, has still not permeated the field to such an extent as to eclipse the significance of clinical neurological examination.<sup>[3]</sup> This is reflected in the pattern of our exit assessment, in which traditionally huge emphasis is placed on eliciting the history, the technique of clinical examination, and the approach to formulating differential diagnoses to guide management, rather than discussions revolving around specific diagnostic possibilities. The essence of the assessment is to capture the candidate's abilities to perform these tasks. When considering a virtual format, one of the biggest concerns was how to assess a candidate's skills in eliciting history and performing examination in a virtual format. Another concern was to ensure a fair representation of clinical cases across the subdomains of neurology and that they are fairly distributed among the examinees. In usual times, this was neither a problem nor limitation, since we always had a surplus of overflowing wards with patients of all specific patterns of neurological disease as well as patients who could be requested to come on the specific day to help out with the examination. Given the current circumstances, this was not possible and the admissions in the ward were heavily weighted toward the emergencies of stroke, meningitis, and the like. AIIMS continued with emergency consults and admissions from our emergency department throughout and incidentally we had on more than one occasion SARS-CoV-2 positive patients being admitted with us as neurological emergencies.<sup>[4]</sup> We, however, had to suspend the routine out-patient clinics and follow-up visits. We are running the teleneurology clinics since the end of March this year to compensate for the suspension of out-patient services.

Besides this particular problem, we also had to strictly disallow any person entering the Neurosciences Center who is neither an employee nor a person with an admittance card, on account of an extreme number of healthcare workers contracting SARS-CoV-2 infection. These aspects severely restricted the availability of in-person patient pool with a wider spectrum of nonemergent neurological diseases.

## LOGISTICS

Keeping these concerns in mind, toward the beginning of May 2020, we explored the possibilities of an in-person examination by contacting specifically patients within New Delhi, who were on the waiting list for admissions and scheduled for them to be

admitted in June during the assessment period. However, by the end of May, it became apparent that nonemergency admissions will not be restarting and indeed, asking the patients to visit the hospital under the existing circumstances maybe unacceptably risky. With increasing numbers of healthcare workers within the hospital ecosystem testing positive for coronavirus, the risks of an in-person visit seemed to outweigh the benefits, both for patients and external examiners. Hence, we decided on conducting the assessment in as virtual a format as possible.

One of the options considered was a telemedicine examination of actual patients who can be located at their home.<sup>[5]</sup> This would have the advantage of the candidate being able to elicit history and perform a partial neurological examination administered through telemedicine and the examiners may assess the same. However, during brainstorming, we felt that such a change in format maybe a difficult adjustment for the candidate to make at short notice, without specific training for the same. It would also require ensuring uninterrupted, good quality Internet connectivity at the patient's end, which was a logistic hurdle.

We then considered virtual patient simulation platforms, like InSimu® and MedicActiv® in which a case repository maybe created and history and examination findings can be queried by the examinee and diagnoses formulated.<sup>[6]</sup> Although an exciting format, we could not find suitable programs available in India for use at such short notice. Eventually, we decided upon an in-house created virtual case repository accessed by the candidates on personal computers and presented in front of the examiners through web-conferencing software. The actual details are mentioned in the next section—execution.

## EXECUTION

In the weeks prior to the assessment, we drew up a list of cases (14 cases for long format and 12 cases for short format). Representative cases were sourced from discharge summaries, outpatient records, and other repositories available with individual faculty members. Where clinical records are not readily available, published cases and reports may also be utilized. The cases were formatted in a digital form in a standardized manner with brief history and prominent examination findings. Two sets of case summaries were prepared: one version for the students that contained only the history and examination and one for the examiners that contained additional investigations and final diagnosis. All relevant clinical information was not shared with the candidate; some important features on history and examination were intentionally withheld. At the end of history, a standard set of questions were presented, which included questions about additional symptoms the candidate would like to elicit, anatomical localization, and possible differential diagnoses after history. This was followed by brief examination. Wherever possible and relevant, patient videos were included in the examination section for the candidate to view and interpret. Written informed consent was obtained



**Figure 1:** Examinee interacting with the external examiner. Internal examiner observes and the coordinating faculty hosts the meeting



**Figure 2:** Examinee presents the case summary projected on screen. Internal examiner participates and the external examiners join in through videoconferencing



**Figure 3:** Video clinical examination being shared on screen for the candidate to present and interpret



**Figure 4:** Internal and external examiners interact among themselves

from all patients for recording and using them for educational purposes. The neurological examination section was followed by structured questions on localization, differential diagnoses, and strategy for management. The questions were only meant to be a guide for the candidate while preparing to present the case; during the actual assessment, examiners were free to interrupt and generate related discussions to gauge the candidate's depth of knowledge. The faculty provided additional information sought by the candidate and although the candidates were not called upon to demonstrate the examination, they were often asked to critique the technique of examination as shown in the video.

Few days prior to the assessment dates, the summaries and videos were shared with the internal and external examiners through an online database and cases were preselected for long format and short format discussion. On the day of the examination, the student version case summaries were provided to the candidates on individual laptop computers.

After the allotted amount of time for each case, candidates were sequentially called upon to present their case with the internal examiners present in person and the external examiners connected through video conferencing software. During the presentation, only the candidate, two internal examiners and one junior faculty for coordinating the video conferencing were present inside the assessment venue [Figures 1-4]. Adequate social distancing, mask etiquette, and hand hygiene were reinforced periodically. The case summaries and videos were displayed to all through screen sharing. This guided the discussion of history and examination assessment.

The major hardware requirements were personal computer, web camera, and projection system in the assessment room. An upgradation of the Internet bandwidth prior to the assessment day enabled the video conferencing to proceed without any glitches, and this was the single most important factor in ensuring a seamless remote assessment. We used

a single computer interface for all the participants in the assessment room with the camera and microphone positioned to capture all three (candidate and two internal examiners) as multiple devices in the same vicinity would have caused audio distortion. The coordinator hosted the meeting and had overall control.

Theory answer papers were digitized and transmitted to external examiners over a secure platform by the examination section of AIIMS. For viva-voce, the external examiners provided content, which was screen-shared from their laptops as PowerPoint® presentations. OSCE questions were also digitized and projected as a PowerPoint® presentation to avoid the traditional method of each candidate visiting the same stations. At the end of the assessments, the examiners discussed the performance of each candidate, prepared score sheets and results, which were also digitally signed by the external examiners.

## EXPERIENCE

Despite the initial reservations and uncertainties, the hybrid in-person and virtual assessments were well accepted by all stakeholders. Prior preparation, trial runs, and sorting out connectivity issues ensured a technically smooth conduct on the day of assessment. The limitations of having actual access to the patient and an opportunity to demonstrate clinical examination techniques were felt as the major drawbacks. These were overcome to a certain extent by partial information in the history and videotapes.<sup>[7]</sup> Having dummy patients on-site would be another option to enhance technique assessment, so also virtual simulation software for procedures that can be used to test the steps while performing an intervention. The case repository format was not too different from what the candidates were used to performing at bedside, which alleviated anxiety. We expect that the case repository generated will also be useful for remote teaching and training. Overall, our initial experience suggests that satisfactory hybrid virtual assessments can be conducted in neurology, similar to in-person evaluations,

and this format maybe considered by other centers in similar situations.

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## Declaration of patient consent

The authors certify that they have obtained all appropriate participant consent forms. In the form, the participants have given their consent for their images and other clinical information to be reported in the journal. The participants understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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