COVID-19

Digital triage for people with multiple sclerosis in the age of COVID-19 pandemic

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Abstract

We propose a possible approach for the remote monitoring of infection risk in people with multiple sclerosis, especially those on immunosuppressant drugs, during COVID-19 pandemic. We developed a digital triage tool to be sent to patients to quickly identify people with high risk of COVID-19 infection. This tool will also limit unnecessary accesses to the MS centers reducing the risk of spreading the infection.

Keywords Digital triage · Digital health · Multiple sclerosis · COVID 19

On March 11, 2020, the World Health Organization (www.who.int) recognized COVID-19 as a pandemic.

COVID-19 spread much faster than both SARS, which infected 8000 people in eight months (https://www.cdc.gov), and MERS that took 12 months (https://www.cdc.gov) to infect 108 people. COVID-19 took only 8 weeks to infect 80,000 people worldwide.

The symptoms of COVID-19 are similar to those of influenza [1] and include fever, dry cough, hyposmia/anosmia, hypogeusia/ageusia, and shortness of breath. Eighty percent of those infected are asymptomatic or have a mild illness. Person-to-person transmission through airborne droplets has been established with a median incubation period of 5 days; the reproductive number is 2 to 3, and those who develop symptoms will do so within 11.5 days [2]. Case fatality rate is 1–4% (increasing with age > 50). So far, there is no specific treatment although remdesivir has been approved by FDA as an investigational new drug [3]. At the National Institutes of Health, a phase 1 study is ongoing for vaccine development.

Infection Prevention Practice includes the identification of potentially infected cases for isolation. At the same time, health care systems try to maintain the ability to provide essential health care while limiting the nosocomial spread of COVID-19 so that both non-COVID-19 patients and COVID-19-negative health care workers are protected from infection. Thus, responding to COVID-19 demands rapid adoption of new methods for triaging, educating, and monitoring patients.

During the COVID-19 pandemic, neurologists involved in the care of people with multiple sclerosis (pwMS) face a particular challenge since many of these patients (i) are on an immunotherapy, or (ii) belong—due to their disability and/or comorbidities—to the vulnerable proportion of the population, or both. While careful surveillance is required of pwMS who belong to these categories, they should be kept away from the hospital or outpatient clinics to minimize their risk of COVID-19 infection.

Approaches to reduce the risk for pwMS as well as the community may include the following steps:

1. Prior to engagement with the health system (outreach)

(a) Ensure pwMS with scheduled appointments are screened in a non-face-to-face setting.
(b) Pro-actively review population segments deemed high risk (e.g., immunocompromised).

2. During engagement with existing triage pathways (triage)

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Table 1 Triage tool that can be sent to pwMS. The digital triage can be easily setup using Google Forms	Q1)	How old are you?
		a. Less than 18 years
		b. 19-50
		c. 51-70
		d. More than 70
	Q2)	Have you had any contact with
		a. No contact with any of b-d
		b. People from high risk or lock-down areas
		c. Suspected case of COVID-19 infection
		d. Positive case of COVID-19
	Q3)	Are you on disease modifyng treatment? If yes, please tell us which treatment you are on.
		a. Interferon or Glatiramer acetate/glatiramoids
		b. Teriflunomide, Fingolimod, Siponimod, Dimetylfumarate, Natalizumab,
		c. Ocrelizumab, Cladribine, Mitoxantrone, Cyclophosphamide
		d. Alemtuzumab, Hematopioetic Stem Cells Transplantation
		• None
	Q4)	Which was/were your previous treatment(s) *multiple choice is possible*
		a. Interferon or Glatiramer acetate/glatiramoids
		b. Teriflunomide, Fingolimod, Dimetylfumarate, Natalizumab,
		c. Ocrelizumab, Cladribine, Mitoxantrone, Cyclophosphamide
		d. Alemtuzumab, Hematopioetic Stem Cells Transplantation
		• None
	Q5)	Do you have any of the following disease?
		a. Hypertension
		b. Chronic Kidney disease
		c. Diabetes, Heart disease, Respiratory disease
		d. Cancer on chemotherapy
		e. None
	Q6)	Do you have a recent blood cell count? (last month)
		• Yes
		• No
	Q7)	If yes, your lymphocytes are:
		a. More than 1400/mm^3
		b. 701-1400/ mm^3
		c. 501-700/mm^3
		d. 200-500/mm^3
	Q8)	Do you have any of the following symptoms? *multiple choice is possible*
		a. Sore throat, Nasal congestion, Runny nose, Diarrhea
		b. Dry cough
		c. Fever
		d. Breathing difficulties, shortness of breath
		e. Lost or reduced sense of smell and taste
		f. None
	Q9)	If you have symptoms are they getting worse?
		a. No
		b. Yes
	Q10)	If yes, do you think they are getting worse rapidly?
		a. No
		b. Yes

(a) Enhance triage to include automated next site of care decision-making via chatbot; telehealth intervention for high-risk patients; assignment of patients for ongoing surveillance via phone, text, or email surveys; and rapid distribution of up-to-date information from a customized knowledge base.

3. Post-engagement (surveillance)
(a) Automatically ensure follow-up and ongoing surveillance of vulnerable patients.
(b) Ensure testing sensitivity and follow-up by enabling automatic enrollment of patients with negative lab results for monitoring.

4. Approaches to decrease the burden for health care workers and mitigate their risk
(a) Empower improved handling of inbound volume

(b) Reduce unnecessary visits and increase efficiency of triage protocols by proactively engaging patients through customized digital programs and care pathways.

A possible way to pursue this objective is to use digital tools for surveillance and to triage patients through remote assessment of symptoms based on the US Center of Disease Control guidelines. In the COVID-19 context, as neurologists dedicated to pwMS, we found the management of immunocompromised patients particularly challenging. As a possible solution, we explored the use of a remote triage system to identify patients at risk for COVID-19. Based on the experience by colleagues at the Mount Sinai Hospital in New York, which leverages its existing digital tools to survey immunosuppressed patients with inflammatory bowel disease (Atreja A., personal communication), we developed a triage tool that can be sent to pwMS (see Table 1). The digital triage can be easily setup using Google Forms (https://docs.google.com/forms/u/0/) which enables collection of responses almost in real time. The Google Forms platform may be used before checking for each specific country the General Data Protection Regulation (GDPR) compliance.

The use of digital triage could be personalized (in terms of frequency of invitation) according to the risk level and to the pandemic evolution.

Using digital triage during COVID-19 pandemic may have the following advantages. It may:

1. Limit unnecessary attendance of patients at the MS centers;
2. Reduce the disparities for patients living far from MS centers; and
3. Limit the economic impact of the disease.

In conclusion, patient-centric care using digital triage may decrease burden on health facilities, while enabling ongoing individualized surveillance and health care provision.

Compliance with ethical standards

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