COVID and me: a radiologist's perspective

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I am an American-born, trained and board-certified pediatric tele-radiologist living abroad and interpreting studies from the northeastern United States. I also work as a dedicated pediatric radiologist in a hospital-based practice in Israel. I have practiced radiology through the SARS (severe acute respiratory syndrome) and Ebola outbreaks; in both of those cases the outbreaks were relatively limited. The radiology findings academically reported were things that practically I had no chance of ever encountering. With the dawn of this new pandemic, I questioned what impact COVID-19 (coronavirus disease 2019) would have on me, the patient population I serve, my professional practice, and the world at large. I thought about this more when I contracted COVID-19, the disease caused by the SARS-CoV-2 (SARS coronavirus 2) virus, and I want to share these observations and thoughts about the ongoing pandemic.

On Jan. 20, 2020, the first confirmed case of COVID-19 infection in the United States was reported. In Israel, where I reside, the first case of COVID-19 was diagnosed on Feb. 21.

In my capacity as a tele-radiologist I usually cover the overnight shift in American hospitals. I am the main pediatric reader but still read 70% adult cases. I recall, from March 2020, the first CT scan I interpreted that had findings possibly related to COVID-19. It was for a hospital in Massachusetts. At the time, spread of the disease was still quite limited. Their emergency room was not yet testing for the SARS-CoV-2 coronavirus. Covering multiple hospitals limits the depth of my personal relationship with each hospital's emergency room staff. Because of this, I called the emergency room physician to explain why I was reading the study as COVID-19. Trying to explain to her what "crazy paving" looks like and its pathological meaning and lack of specificity

felt slightly surreal. With her on the phone we Googled that phrase together — "crazy paving + COVID" — and using synchronous sites I explained to her my concerns. I did this because I didn't want the hospital's emergency physicians to ignore the possibilities raised by my interpretation. Simultaneously I was concerned that maybe I was over-calling things and creating emergency room panic or hysteria. At this point in time this hospital had not yet encountered a patient with COVID-19, and they did not have testing available in the emergency room. I knew that by calling them I was changing the hospital's status and the way they encountered patients going forward. At the time no one was quite sure how pervasive the pandemic would eventually become. Unfortunately, as time progressed these findings have become omnipresent, and, by my own estimates, 60% of the thoracic imaging I review have findings positive for coronavirus.

In my role as a pediatric radiologist in Israel, a country that quickly transitioned into an early lockdown, I saw fewer cases of COVID-19 pulmonary infection but tried to stay vigilant looking for pulmonary manifestations and signs of multisystem inflammatory syndrome. Ultimately, although this syndrome was reported in many hospitals in Israel and there have been a tremendous number of pediatric infections, my hospital has not had many pediatric imaging studies and has had no cases of the COVID-related multisystem inflammatory syndrome in children (MIS-C).

As portions of the United States went into lockdown, especially in the Northeast, emergency room radiology volume dropped significantly. Very few of the hospitals I covered had significant COVID-19 radiography or CT volume. I knew the hospitals were overwhelmed; however, the traumas and other usual fare of the overnight shift were significantly decreased. As the calendar turned my teleradiology case mix vacillated with the infection curve from the northeastern United States. Studies with the history of suspected COVID-19 replaced the usual histories of appendicitis and change in mental status. Eventually, COVID-19 became the overwhelmingly dominant history, with patients in the emergency room presenting with radiographs of severe COVID-19 lung disease and associated complications. Most of the abdominal CTs for right

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lower quadrant pain had COVID-19. One hospital I work with created a COVID dictation template, which made me realize the unfortunate ubiquity. This continues still.

On Dec. 24, Christmas Eve, at 3:15 p.m. I received the first dose of the Pfizer COVID-19 vaccine. Until this point, I had successfully avoided contracting COVID-19 and even stayed out of quarantine (required in our country for those exposed to people testing positive for coronavirus).

As I exited the vaccination center, I felt vindicated that all the precautions, the months of lockdown, social distancing, hand washing and mask wearing were justified. In 4 more weeks, I would be 1 week post the second dose, the point of immunity according to Pfizer.

On Dec. 26, the newspaper reported the “British” mutation had been detected throughout Israel. On Jan. 4, while drinking a cup of coffee at the hospital, I realized that it had no taste, even for hospital coffee. I immediately went to the hospital testing center, was tested and began to self-quarantine. The next day, Jan. 5, I received my positive test results for the coronavirus.

Although unable to work at the hospital, aside from my loss of taste and slight fatigue, I felt fine. An immunologist I am in conversation with hypothesized that my vaccination might have given my immune system valuable lead time to fight off a more severe course.

Aside from the usual feelings that one has when ill, a flood of emotions came over me as I tried to sort out this new reality. My family needed to get tested right away. I was quite concerned for their health and safety. Simultaneously, I began to think about everyone I had interacted with the last few days. I needed to inform them of this diagnosis. I began to feel ashamed and guilty over my role as a possible vector. I had done everything right, I didn’t travel, wore a mask, tried to remember to sing happy birthday while washing my hands, and yet I was now another statistic and possibly a spreader. This was antithetical to my professional and personal aspiration to help heal the sick.

I notified my chairman of radiology; we had met the day before for 45 min. While we wore masks during our meeting, he as well as the other two radiologists who were in that meeting needed to be tested. They were forced into quarantine, awaiting two negative test results. Two residents that I was teaching during the day also entered quarantine. Fortunately, and uncharacteristically, no patients were exposed to me on the day I was in the hospital. Other various support staff including information technology support and some administrative assistants had passing interactions with me, but not enough to require them to enter isolation or require testing; some still pursued testing on their own.

Israel has a vigorous contact tracing infrastructure. I was contacted by the hospital’s epidemiology nurse, the medical school’s security team and my city’s ministry of health contact tracers to identify anyone I was in contact with, in a risk-

involved setting, over the previous 4 days. I personally notified some friends I had seen over the weekend. This didn’t help with my persistent feelings of guilt. I knew that everyone was trying to do the job and combat the pandemic, but it still made me feel like a criminal being interrogated about my whereabouts.

My wife and children were tested on Jan. 6; both of my boys were positive. My wife was fortunately negative. Our house became a zone of alternating isolation, the uninfected having free reign, the rest of us restricted to our rooms. We all tried to maintain some semblance of a normal schedule to prevent ourselves from going cabin crazy. I was able to eat meals with my sons because we were all infected, and my wife ate at a different time or place.

Fortunately, after a few days I was able to continue working. This helped the time pass and tempered my guilt because I felt I could help people.

During my career I have read studies on patients who had diseases that I had and have suffered through. However, I have never read a study on a patient while simultaneously suffering through the same disease. I was aware of the reports of coronavirus causing silent hypoxia and rapid pulmonary decompensation. Looking at COVID-19 chest radiographs and CTs with severe pulmonary parenchymal disease, wondering whether I would progress to that stage, was a feeling I had never experienced as a radiologist. I felt fortunate that I was in decent health during this stage of the disease. It was a source of thought, thanks and prayer.

The common question asked by people reaching out to wish me well is, “Do you know where you got it from?” I reply, “I really don’t know.” Ultimately, none of my social or professional contacts tested positive. I might have been infected at the hospital, or at the store by someone not wearing a mask properly, or perhaps one of my boys was infected before me but was asymptomatic.

In my opinion, that question is a unique psychological response during this pandemic because of the overwhelming media coverage of vector and disease transmission. No one I remember has ever asked me where I got the flu. As a physician, with many friends who are physicians, this question is even more frequent. Maybe because of our training and the intensive way we’ve been trying to avoid this disease.

For me, there is an additional COVID emotion: there is an element of self-doubt. Perhaps if I had done something better or different, I wouldn’t have this disease. It took me 3 days to realize it doesn’t matter where I got it from and there’s no way to ever know.

As the new mutation spreads around the globe I have been contacted by cousins in New Jersey, California and Toronto who have contracted the disease. Many were in much worse condition, some intubated. As I worry for their health, I realize that this pandemic is bigger than any one person. While as a physician I have a need to understand how an illness spreads,

in this case the disease is too prevalent and determining the exact provenance, impossible.

As I progressed through stages of disease my thoughts wandered to possible post-infectious complications including descriptions of late-onset cardiomyopathy, psychosis and depression. A friend and colleague who I interned with committed suicide post COVID-19, with her family stating that the disease caused her depression. Will my knowledge of her experience help me avoid that outcome?

I've started thinking about the increased incidence of thrombotic disease; is there anything I can do to prevent that outcome? The radiologist workday does not require tremendous motion, but generally I do work standing up. While still feeling some fatigue, I try to maintain an active workday.

As I approached the end of my quarantine, I was symptom-free, but if I developed post-COVID-19 cognitive issues, would I notice? How could I monitor the quality of my work? I feel reassured by the various ongoing quality assurance measures of my radiology group and the various educational formats with which I engage. I am comforted that along with the American College of Radiology case in point, and the American Board of Radiology online learning assessment, those can serve as metrics to determine maintenance of my cognitive skills.

I began to wonder about the second dose of vaccine. A close relative of mine, who also has recovered from COVID-19, attempted to donate plasma to a local hospital. He was told he did not have any antibodies. However, because he recovered from the disease, he was not eligible for the vaccine. There are no data that I am aware of or can find online comparing the immunity of patients who have survived the disease to patients who have been vaccinated. There are case reports of patients who have become reinfected post-recovery. I spoke to my immunologist friend who was going through the same temporal experience; he also became infected after the first shot. He had a much rougher course than I did. He was determined to get the second shot; he theorized that any additional antibodies to different parts/alleles of the virus would help. I felt conflicted: on the one hand, I was afraid of reinfection; on the other hand, was I preventing a different person from getting vaccinated? I didn't have time to delay because I was required to get the second shot at 3 weeks' time, the day my quarantine expired. After further consultation with my

personal physician, it was decided that as a high-risk individual working in a hospital and consistently exposed to potential sources of infection, I should receive the second dose.

The Ministry of Health requires 3 symptom-free days before one can return to a regular lifestyle. My taste had partially returned and I was symptom-free for 3 days. As a precaution I self-quarantined for longer. I returned to the hospital on Jan. 18, still slightly fatigued but happy to see my colleagues and provide diagnostic assistance.

For now, I am still worried. As a physician I have watched firsthand the outbreak decimate two separate countries. I have seen innumerable radiology studies for patients with COVID disease and its complications. It is especially troubling because of the severity with which patients initially present to emergency rooms. This is true in both countries, one of which has privatized medicine and the other socialized. I don't think it's related to the quality of the outpatient care; I'm told the patients don't feel as sick as the radiograph looks. As a radiologist, it is disheartening to observe the severity of this disease, every shift, every hospital, every country. I yearn for a return of "change in mental status and rule out appendicitis." It will happen. It is still jarring to read chest radiographs of people who are currently suffering from the same disease that I recently recovered from. The vaccine is available but herd immunity and even sufficient vaccination will take time. Until then we must stay vigilant, help our patients whenever we can and wish to never see another pandemic. The journey has been strange. Thankfully I was able to survive with relatively minor symptoms. I am aware that others, including people I know, will not be as lucky.

As I write this, the global death toll has surpassed 2,200,000, with 435,000 in the United States and 4,700 in Israel. I hope that the vaccine will remain effective against mutants that are currently emerging. I pray that the pandemic ends soon.

Declarations

Conflicts of interest None

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