

Special article

The Pediatric Allergy and Immunology Unit of Ain Shams University in times of SARS-CoV-2 pandemic: approach and challenges

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The Pediatric Allergy and Immunology (PAI) Unit of Ain Shams University, founded in 1988 by Professor Yehia El-Gamal and currently headed by Professor Shereen Reda, is a tertiary referral center for pediatric allergy, primary immunodeficiency, and rheumatology patients in Egypt. It serves more than 1300 patients with different immunological disorders, with an outpatient and inpatient sections and investigational laboratory. With the widespread of the SARS-CoV-2 and its declaration as a "pandemic", and owing to the heterogeneity of the different disorders managed and followed up in the unit, several measures have been taken in order to provide the necessary services for the patients. This service should maintain a rational balance between the need to mitigate the virus spread and to provide the optimum care for those who get infected, when in the meantime keep their original disease morbidity and mortality to the minimum. These measures were taken by the members of the PAI unit with the help of the head management team of Children's Hospital, Ain Shams University and were subjected to continuous modification based on the evolving situation, emerging information, problems faced and the availability of human and medical resources.

Measures taken in the PAI unit-outpatient clinics

Since the start of the pandemic and realizing the critical situation, the clinics were shifted from routine follow up visits of patients to emergency management of problematic cases. Messages were sent on mobile phones of parents whose contact details were available, for reassurance, advice about the necessary protective measures, and for emphasizing the importance of adherence to treatment in order to minimize disease exacerbation

and the need for hospitalization. Regular follow up visits of patients were spaced, and medications were prescribed in sufficient amounts to cover longer duration than usual for patients in remission. Patients were encouraged to report to their physicians, via phone calls, any emerging symptoms and were instructed to seek medical help in emergency situations or based on physician's advice. In the Clinic, personal protective measures were provided by the hospital for the physicians, and patients were instructed to follow the general precautions of hand washing, mask wearing and social distancing all through the clinic visit. Aerosol generating procedures, such as inhalation therapy via nebulizers were withheld from the clinic and were only prescribed for home management. Skin prick tests and pulmonary function tests were withheld as well, except for limited selected cases after weighing the risk versus benefit, while routine dates were cancelled.^{1,2}

A triaging system has been applied as a mandatory step for patients for the detection of suspected cases (those presenting with fever, chest symptoms, gastrointestinal symptoms, and anosmia/ageusia) before being allowed to the PAI clinic. COVID-19 suspected cases were immediately referred to a transit ward to undergo a swab test for SARS-CoV-2 by PCR. However, the differentiation between infection and immunological disease activity, especially among patients with rheumatologic and autoinflammatory disorders, was a real challenge, as the aforementioned symptoms could be part of the disease exacerbation, a situation that necessitated extensive laboratory workup and repeated SARS-CoV-2 swabs to exclude SARS-CoV-2 infection before taking decisions to start or modify the immunosuppressive treatment. We adopted judicious use of immunosuppressive treatment

especially n-methyl prednisolone pulsed therapy and cyclophosphamide with restricted use of rituximab. Patients on intravenous immunoglobulins were maintained on regular dosing as possible regardless their insurance coverage, to minimize the risk of infections and the need of hospitalization.

Measures taken in the PAI unit-inpatient section

As most of the PAI patients are considered immunocompromised, whether having a primary immunodeficiency disorder or developed secondary immunosuppression by medications, the admission of patients to the PAI inpatients ward was only done after the exclusion of SARS-CoV-2 infection (by swabs for PCR and antibody testing). Patients were thus admitted to a transit ward until investigated before being admitted to the PAI inpatients ward. Visitors to the inpatients were minimized. All physicians, nurses, workers, and caregivers were instructed to adopt protective measures during hospital attendance. Disinfection measures were continuously applied. In case of development of any symptoms or signs suggestive of SARS-CoV-2 infection, swabs were repeated, together with laboratory and radiological evaluation, guided by the hospital protocol for SARS-CoV-2 diagnosis and management algorithm. In case SARS-CoV-2 infection is proven in an admitted case, all contacting physicians, nurses and workers were tested for infection, and the case was immediately transferred to the COVID-19 isolation ward in the same hospital including those who required intensive care unit admission.

Measures taken for the PAI unit-working staff

The PAI working staff members were classified into two alternating teams, to allow safe distancing and minimize exposure. Whenever a staff member develops symptoms suggestive of COVID-19, he/she undergoes a PCR testing for COVID-19 and is sent home for isolation. In that case, the alternating physician takes over. Meetings are carried out regularly for the discussion of the diagnosis and management of complicated cases but through online platforms. Consultants are available 3 days per week, and specialists 4 days a week for the assessment of outpatient and inpatient cases. Several webinars are being held for discussing the emerging information about COVID-19, its different presentations, diagnosis, and management. Emerging scientific information is shared among all the PAI unit members and the whole team is continuously updated with the

COVID-19 presentations observed in our allergic, rheumatologic and immunodeficiency patients. All data relevant to COVID-19 in our patients are compiled and are prepared for publishing with the aim of spreading information in due time.

Challenges faced by the PAI unit during the SARS-CoV-2 pandemic

Management of work in the PAI Unit during the SARS-CoV-2 pandemic is not without challenges. At the outset, the lack of sufficient information and the limited sensitivity of the available rapid viral testing were among the early challenges. Many times, the clinical presentations of COVID-19, and the laboratory findings mimicked those of rheumatic disease activity. Patients with rheumatic disorders tended to stop their immunosuppressive treatment without medical consultation for fear of contagion. This predisposed them to disease flare. Intravenous immunoglobulins and certain anti-rheumatic drugs (such as hydroxychloroquine and tocilizumab) are consumed in the pandemic, which markedly affects their availability for our patients.³ Infections among the healthcare workers was another challenging problem.

In summary, our PAI Unit has taken several measures with the help of the Children's Hospital management team for providing the optimum care of patients and minimizing losses in patients and health care workers. Still, the situation is challenging, and more efforts are needed to provide continuing support of the patients and integrating the clinical work with research activity. On the horizon, multicenter analysis of COVID-19 patients' data will provide a more comprehensive view and might provide accurate information that would allow better decision making. The PAI unit is thanking its entire working staff including professors, consultants, specialists, residents, nurses, and infection control team for their courageous and continuous efforts in facing of the pandemic. The unit is also grateful to the pediatric dialysis and intensive care units for their extreme support throughout this challenging time.

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