Editorial

H1N1 influenza pandemic: What we did and what we learnt?

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The year 2009 came with a great new challenge for the intensivists around the world and in India too. Soon after Mexico and North America, the 2009 H1N1 influenza pandemic hit India in May 2009. In the subsequent monsoon, the pandemic spread in all parts of the country and cases of severe respiratory failure due to H1N1 pneumonia-related acute respiratory distress syndrome (ARDS) were reported from almost all over India. Young and healthy population without any co-morbidities constituted 25-50% of the patients in various case studies.[1] Relentless progression of pneumonia/ARDS and hypoxia in around 30% of intensive care unit (ICU) admitted patients created panic among healthcare professionals.[2] Initially, there was no consensus even in the scientific community and there were no clear guidelines about antiviral treatment, case isolation, prevention of aerosol-mediated infection inside the hospitals and ICUs, use of adjunct therapies, and even ventilatory management. Many ICUs in the country were not prepared for this pandemic and there was a fearful atmosphere among healthcare workers. The experience of the severe acute respiratory syndrome (SARS) epidemic in China was at the back of our minds, where the disease had taken a toll of a few healthcare workers as well. Against this background, we must proudly say that in India, intensive care healthcare professionals accepted this challenge to treat these critically ill patients, even with potential risk to their lives. Many ICUs from public and private hospitals quickly geared their units to treat these patients. Though observational cohort studies started to be published from North America, Europe, and Australia from 2009, there were only a few case reports published from Indian hospitals.[3,4]

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In the current issue of the journal, Chawla *et al*.[5] have reported their experience of treating H1N1 influenza patients at their tertiary level referral center in Delhi in 2009 and 2010. They have reported a retrospective case study of 77 consecutive confirmed H1N1 influenza cases having an average age of 40.48 ± 13.45 years. Out of these 77 patients, 43 patients developed respiratory failure and 36 required mechanical ventilation. From an intensivist's perspective, this is a very relevant and pragmatic data from an Indian ICU. The authors have shown that presence of bilateral opacities on admission is associated with poor outcome. Similarly, the number of organ failures (OR = 8), low PO_2/FiO_2 ratio at 24 h, and higher PCO_2 at admission were independently associated with mortality. Though the authors have not proposed a cut-off limit for these variables, it may not be too wrong to propose that those with moderate to severe ARDS as per the Berlin definition need special attention even in the ICU as their hypoxia tends to worsen rapidly and many such patients need some kind of rescue therapy in the form of prone ventilation, transpulmonary pressure-guided ventilation, high frequency oscillatory ventilation (HFOV) or extracorporeal life support.[6] Contrary to the contemporary belief that H1N1 influenza infection is associated with single (i.e., lung) organ failure, it is noteworthy that in this case series, acute kidney injury and cardiovascular dysfunction were seen in 17% and 12% patients, respectively. Thus, our management strategies during mechanical ventilation,

like fluid resuscitation and hemodynamic monitoring, positive end-expiratory pressure (PEEP) titration for refractory hypoxia, or use of diuresis, need to be tailored keeping these data in mind. In SARS outbreak in 2003, non-invasive ventilation (NIV) was successfully used for managing even severely hypoxic patients. Similarly, in this study, the authors have made a valuable observation about NIV in H1N1 influenza related respiratory failure. Out of 36 patients who needed mechanical ventilatory support, 17 were successfully managed with NIV alone and never needed invasive ventilation. But caution must be borne in mind about "not stretching NIV too far" as evidence for NIV for ARDS is not very strong and unnecessary delays in intubation must be avoided. Considering the fact that this is a case series from a tertiary care referral hospital, 46.75% patients (36/77) needed ventilatory support. Amongst the patients who needed ventilatory support, about one third died due to refractory hypoxia (10/36). Of this, 19 patients were ventilated invasively, with mortality in this group being 53%. Since severity scoring is not available in this study, accurate comparisons with global mortality rates is difficult, which are reported to vary between 14% and 46% among mechanically ventilated patients.[1,2] Though the authors have not given the details of use of rescue therapies for these severe ARDS patients, none of these patients received extracorporeal life support which has shown promising results due to H1N1 influenza related severe ARDS in many centers in North America, Europe, and Australia.[7]

Another important issue has been dealt with in this analysis, i.e., "role of corticosteroids." The data in the literature are not very conclusive on this, though European Society of Intensive Care Medicine (ESICM) H1N1 registry has clearly shown that use of steroid was associated with no mortality benefit and was associated with increased risk of super infection.[2] Authors have made similar observation in this case study, although there is imbalance between illness severity in the groups receiving and not receiving corticosteroids. Thus, use of steroids in various dosing regimens, besides their independent medical indication, should be discouraged in such patients.

We must admit that H1N1 pandemic taught us many lessons (*the hard way!*) about managing severely ill cases of viral pneumonias or else they would not have been centerpoint of our discussion. It proved the fact that modern Indian ICUs have got the strength to face such natural biological disasters, in close association with various governmental and private institutions. Our tertiary level ICUs can treat such severely hypoxic patients in large numbers with reasonable survival rates. This pandemic somewhat created a basic level of preparedness in our ICUs and hospitals to handle such epidemics in consonance with the rest of the world. Today, we are in the post-pandemic era and are likely to face peaks of H1N1 influenza outbreaks for the next few years and threat of other influenza outbreaks like the recently reported novel H7N9 influenza illness. High-risk groups have been identified like third trimester pregnancy and obesity. These groups should be given advantage of pre-emptive vaccination.

Lastly, we feel that this study by Chawla *et al*., which elaborated the predictors of mortality, gives us original Indian data that could help us in our decision making in managing influenza-related pneumonia with and without ARDS, in the first 24 h of hospital admission. Patients with bilateral infiltrates on X-ray, low P/F ratio, and high PCO_2 on admission, along with poor response to therapy in first 24 h indicate advanced stage of illness due to late presentation. Once this stage is reached, patient will need to be transferred to an ICU having ability to deliver "rescue therapies," and the rest can be managed in other healthcare facilities so as to follow the basic principle of epidemic management, i.e., "*appropriate utilization of resources*."

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