Letter to the Editor

Nationwide system to centralize decisions around extracorporeal membranous oxygenation use for severe COVID-19 pneumonia in Japan

Dear Editor,

The novel coronavirus disease (COVID-19) is spreading in Japan. The number of patients who need extracorporeal membranous oxygenation (ECMO) is expected to increase; however, the clinical characteristics of the patients who require and will benefit from ECMO are unclear.[1]

On 15 February 2020, the Japanese Society of Intensive Care Medicine, the Japanese Association for Acute Medicine, the Japanese Society of Respiratory Care Medicine, and the Japanese Society of Percutaneous Cardio Pulmonary Support/ECMO launched "Japan ECMOnet for COVID-19" as a telephone consultation, treatment support, and web-based real-time nationwide registry and surveillance system to discuss COVID-19 patients from over 400 hospitals who could be candidates for ECMO.[2] The initiative is led by more than 20 ECMO experts (Japan ECMOnet for COVID-19) from all over Japan.

As of 15 March 2020, 26 patients had been placed on ECMO based on deliberation of the group. Sixteen of the 26 (61.5%) have been weaned off and six have been extubated and on rehabilitation, while the rest remain on ECMO. A few of these patients who have been weaned off ECMO still need treatment for other organ failure.

We report the data from first 14 cases. The median age of the patients is 71 years (range, 45–81 years). The median number of days between intubation and ECMO was 3 days (range, 0–9 days). The median PaO_2/F_IO_2 ratio, positive end-expiratory pressure (PEEP), mean airway pressure, and lung compliance before initiation of ECMO were 70 (range, 52–147), 15 cmH_2O (range, 10–18 cmH_2O), 21 cmH_2O (18–27 cmH_2O), and 28 mL/cmH_2O (range, 13.6–70 mL/cmH_2O), respectively. Selected laboratory data of the patients on admission were: median serum KL-6 (a marker of interstitial pneumonia) was 333 U/mL, lactate dehydrogenase (LDH) was 460 IU/L, and procalcitonin was 0.12 ng/mL. With regard to ECMO settings, the median blood flow was 4 L/min (range, 2.5–5.3 L/min), the median size of the draining cannula was 24 Fr (range, 21–25 Fr), and the median size of the infusing cannula was 20 Fr (range, 16–21 Fr). For antiviral treatment, lopinavir was used for 13/14 (93%) patients. All patients received empirical antibiotics (carbapenems or third/fourth generation cephalosporins). Ciclesonide, a glucocorticoid inhaler, was used for 4/13 (31%) of the cases. The effectiveness of any of the medications cannot be assessed at this time.

Experts within Japan ECMOnet for COVID-19 identified two phenotypes of patients with severe pneumonia: one associated with low lung compliance and the other with preserved lung compliance. Oxygenation of patients with preserved lung compliance did not improve with higher PEEP. For these patients, serum KL-6, SP-D (another marker of interstitial pneumonia), and LDH were not elevated on admission.

These findings suggest that lung fibrosis was not severe for this subgroup of patients. The adoption of a platform for real-time discussion to guide the use of a scarce resource such as ECMO has been valuable to the Japanese doctors who are caring for critically ill patients with COVID-19 infection. A central near-real-time data repository is optimal to undertake just-in-time epidemiologic studies and to develop algorithms that can inform clinical decision-making.

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CONFLICT OF INTEREST

NONE.

REFERENCES

1 MacLaren G, Fisher D, Brodie D. Preparing for the most critically Ill patients With COVID-19: the potential role of extracorporeal membrane oxygenation. JAMA. 2020; 323: 1245-62. https://doi.org/10.1001/jama.2020.2342

2 Japan COVID-19 ECMOnet. Japan ECMOnet for COVID-19. Japan COVID-19 ECMOnet: Telephone consultations for cases with severe respiratory failure caused by COVID-19. J Intensive Care. 2020. (in press).