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Editorial

Is Extracorporeal Membrane Oxygenation Necessary for Community Hospitals?

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Extracorporeal bypass has been used in operating rooms since the 1950s.[1] With the advent of portable extracorporeal systems in the 1980s, extracorporeal membrane oxygenation (ECMO) became available outside the operating room for patients with both medical and traumatic catastrophic cardiopulmonary collapse.[2] ECMO has been introduced domestically *via* the media, recently garnering attention when it saved a Samsung CEO from cardiac arrest. ECMO is a process which imitates natural gas exchange. In EMCO, blood is continuously pumped from a patient through a membrane oxygenator which removes carbon dioxide and adds oxygen; the oxygenated blood is then returned to the patient. The general criteria for the initiation of ECMO include acute severe cardiac or pulmonary failure that is potentially reversible and unresponsive to conventional management. Clinical use of ECMO has been described in many situations: for cardiogenic shock caused by fulminant myocarditis[3] or acute coronary syndrome,[4] for patients who have undergone cardiopulmonary resuscitation (CPR),[5] for support in the intensive care unit after pulmonary endarterectomy,[6] and in emergency situations (*i.e.* a completely obstructed airway where tracheostomy was not possible,[7] massive aspiration,[8] lung trauma and pulmonary resection,[9] massive pulmonary embolus,[10] and status asthmaticus[11]). Other uses have included severe burns and smoke inhalation,[12] drug overdose[13] and respiratory failure during pregnancy.[14] Advances in EMCO technology have spurred greater interest and explosive growth, especially during the 'swine-flu' (H1N1) epidemic from 2009-2010.[15]

The range of clinical applications for ECMO is gradually growing in Korea as well. In Saint Vincent's hospital, a secondary care university hospital in Suwon, Korea, ECMO was applied from 2011 to present to a total of 62 patients, and the overall survival rate was 35.5%; the 24 patients with acute coronary syndrome (ACS) had a survival rate of 20.8%, and the 38 non-ACS patients had a higher survival rate (44.7%) (Fig. 1). The fact that survival rate was higher in nonACS patients than in ACS patients was analogous to previous result. Based on this finding, ECMO should be considered to be applied to cardiopulmonary collapse patients with underlying causes other than cardiac origin. EMCO complications such as stroke, peripheral arterial ischemia, bleeding, and infections have recently decreased compared to its initial application; as experience with EMCO builds, the survival rate has shown improvement. Therefore, the frequency of its usage is projected to increase for patients with acute severe cardiac or pulmonary failure. Because ECMO

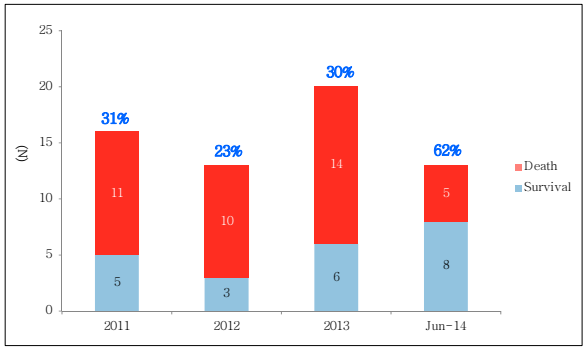

Fig. 1. Incidence and survival rates in patients (n = 62) with acute coronary syndrome (ACS) who underwent extracorporeal membrane oxygenation (ECMO) between 2011 and the first-half of 2014. Blue letters (%) indicate survival rates.

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works as a tool to save time for treatment not as a treatment itself, the indications for its use should be cautiously considered. The deliberate application would improve the survival rate. Meanwhile, it is necessary to widely distribute ECMO, for which creating a guideline, educating medical team, and seeking solutions to alleviate the high cost are needed.

Accurate patient selection and a team approach to make the application time short are required for successful implementation of ECMO. However, in order for ECMO to be used in community hospital as a routine rescue modality for catastrophic cardiopulmonary collapse, continued improvements in technology and reduction in equipment costs should be preceded.

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