Evidence and Experience in Extracorporeal Membrane Oxygenation

To the Editor:

I am in complete agreement with the comments of Morris et al.1 recently published in CHEST (October 2010) that studies unequivocally demonstrating the benefits of extracorporeal membrane oxygenation (ECMO) in adult respiratory failure are lacking. One randomized trial using obsolete equipment and outdated intensive care practices is largely irrelevant to physicians practicing today.2 A more recent study showing some advantage to ECMO for this indication had some methodologic peculiarities, which left it susceptible to armchair criticism from potential detractors.3

However, I respectfully disagree with the arguments adopted by Morris et al.1 to discount ECMO as rescue therapy, which, although of considerable epistemologic interest, are less helpful to the practicing physician. These arguments predominantly revolve around the nature of certainty and scientific proof. What proof should physicians deem sufficient in order to accept ECMO as rescue therapy? To me, the efficacy of ECMO when correctly applied to an appropriate patient is self-evident. To those who do not accept this position, the issue of conducting efficacy trials is problematic. Although ECMO is now easier to use than ever before, it is still a complex means of life support that requires the expertise of an experienced multidisciplinary team to apply with any finesse. Acquiring the skills needed to become expert in ECMO may rob physicians of the equipoise necessary to participate in a trial in which patients dying of hypoxic respiratory failure are randomized to rescue therapy with ECMO or yet more conventional treatment.

Randomized controlled trials have been regarded as the best way of answering scientific queries in clinical medicine, but the practical difficulties of conducting them often leave their results open to widely varying interpretation. It may be time to look at alternative forms of evidence in critically ill patients.4 Sir Karl Popper wrote, “If you insist on strict proof (or strict disproof) in the empirical sciences, you will never benefit from experience, and never learn from it how wrong you are.”5 My own experience in managing adult patients receiving ECMO for refractory respiratory failure caused by proven 2009 influenza A(H1N1) is limited. I have only attended to four such patients, two of whom also had concurrent circulatory collapse. Happily, all four patients completely recovered. Surely, it is time to move beyond the erroneous supposition that ECMO does little but harm. Stop calling for more efficacy trials and focus instead on when, how, and in whom we can optimally use the technique.

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References


Response

To the Editor:

We appreciate the comments to our articles1,2 articulated by Dr MacLaren. We believe that he raises three issues in his correspondence: (1) Extracorporeal membrane oxygenation (ECMO) must be correctly applied, (2) ECMO must be applied to the appropriate patient, and (3) we need to define when, how, and in whom we can optimally use the technique, not whether ECMO is effective. These issues are crucial ones that can only be defined when a detailed method (for selection of patients, conduct of extracorporeal support, management of important clinical interventions) is documented and validated. Short of this, clinicians cannot know when, how, and in whom to optimally apply ECMO.

The alternative is to accept at face value the claim of experts that their experience in “managing adult patients on ECMO for refractory respiratory failure,” or similar expressions, demonstrates, documents, and validates the efficacy of ECMO. Unfortunately, such beliefs, no matter how strongly and sincerely held, are frequently proven to be invalid when formally tested using appropriate, scientifically rigorous methods. Past treatments enthusiastically supported and widely disseminated but subsequently

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