



be corrected slowly<sup>4</sup> to avoid secondary alkalosis, as occurred in our case.

The main determining factor in CO<sub>2</sub> removal is airflow: up to a maximum of 10 l/min is recommended for most devices.<sup>11,12</sup> However, blood flow has also been studied as a related factor, and some authors determine that it should be increased in cases of severe respiratory acidosis (pH < 7.2).<sup>13,14</sup> The membrane surface area seems to play a less critical role in CO<sub>2</sub> clearance, although a membrane of 0.8 m<sup>2</sup> proved more effective than one of 0.4 m<sup>2</sup> in a bovine animal model.<sup>13</sup> The surface area of our polymethylpentene membrane was 0.32 m<sup>2</sup>, similar to that used by Terragni et al.<sup>2</sup>

These ECCO<sub>2</sub>R-CRRT systems can provide respiratory support alone, or both respiratory and renal support. This is important, because 60% of patients who suffer multiple organ failure and require MV also develop acute renal failure. In these patients, volume overload and increased alveolar permeability derived from acute renal failure negatively affect the lungs and, similarly, MV and biotrauma diminish renal function.<sup>15</sup>

Systemic anticoagulation is needed to maintain the whole system (hemofilter and ECCO<sub>2</sub>R), maintaining an aPTT ratio of 1.5–2 to balance the risk of bleeding and/or clotting. In our case, clotting of the hemofilter (but not of the membrane lung) occurred after 24 h despite maintaining aPTT within the range, and this limited treatment. This complication has been previously described and may be related to the hemofilter surface.<sup>15</sup> Clotting of the membrane lung occurs in 14%–16.7% of cases.<sup>3,10,11</sup> These thrombotic complications in veno-venous ECCO<sub>2</sub>R systems are the most feared, since they require the system to be changed, or treatment to be discontinued, as in our case.

In summary, this combined ECCO<sub>2</sub>R-TRRC system at a flow of less than 400 ml/min was very effective for CO<sub>2</sub> removal, but limited by rapid clotting of the hemofilter.

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