

The Proton Pump Inhibitors versus Histamine-2 Receptor Blockers for Ulcer Prophylaxis Therapy in the Intensive Care Unit (PEPTIC) study<sup>1</sup> has now been published.<sup>2</sup> With 26 828 participants, the PEPTIC trial is the largest clinical trial ever conducted in intensive care medicine and provides very precise estimates of the likely range of possible treatment effects associated with proton pump inhibitors versus histamine-2 receptor blockers. In this issue of *Critical Care and Resuscitation*, Young and colleagues<sup>3</sup> discuss the meaning and implications of this extraordinary trial in detail in a not-to-be-missed editorial.

In the field of perioperative medicine and rapid response teams, investigators from the Mayo Clinic seek to identify perioperative variables that predict subsequent need for rapid response team intervention in a study involving more than 100 000 patients.<sup>4</sup> In a system with a very conservative rapid response team rate of less than 1/1000, they identify several predictors of subsequent deterioration, which can be used by clinicians to identify higher risk patients. Among such risk factors is the intraoperative use of colloid solutions. However, in some patients, such as those admitted to Australian ICUs after cardiac surgery, colloid therapy is frequent. Despite such common use, little is known about the immediate haemodynamic effects of hyperoncotic (20%) albumin solution — a therapy that may achieve desired haemodynamic targets with only 20% of the volume. Cutuli et al<sup>5</sup> address this issue in a pilot prospective physiological study and show that 20% albumin infused over 7 minutes has dissociated cardiac index and mean arterial pressure effects, with the mean arterial pressure effect being maximal as the infusion is ongoing and dissipating in half of the study patients and the cardiac index response being more durable.

The use of extracorporeal membrane oxygenation (ECMO) in patients with refractory cardiac arrest is expanding. In a case series from Sydney, Dennis and colleagues<sup>6</sup> report data in 25 such patients with ECMO establishment at 57 minutes after cardiac arrest. They demonstrate survival with favourable neurological outcome in 44% of patients in a cohort with an expected mortality of essentially 100%. It is very likely that the next 10 years will see a major expansion in the use of ECMO for such patients in Australia and New Zealand. Moreover, as reviewed by Lee and Butt,<sup>7</sup> the management of both cardiopulmonary bypass and ECMO is changing with the more widespread introduction of the adjunctive use of nitric oxide, not only by inhalation via mechanical ventilation but also by diffusion into the circuit during extracorporeal oxygenation.

Overweight and obesity are now highly prevalent among ICU patients as reported by Secombe and colleagues<sup>8</sup> and seen in 68% of patients admitted to Australian and New Zealand ICUs. Such patients are often believed to be at

higher risk of complications and/or mortality. However, the authors confirm that, in the Australian and New Zealand population, the “obesity paradox” is alive and well even up to class II obesity. Moreover, they find that the lowest risk is in the class I obesity group, with a 22% adjusted relative risk reduction in mortality. Being mildly to moderately overweight at ICU admission may be protective.

Another common problem in ICU patients is the presence and/or accumulation of a pleural effusion. However, there is no systematic knowledge about their management and prognosis. This issue is tackled by Bates et al<sup>9</sup> who studied the radiological and clinical outcomes of such patients. They found that one-quarter of patients in a tertiary ICU had radiological evidence of a pleural effusion and that one in six such patients died in hospital. Moreover, drainage of such effusions was only applied to around 10%, and one-third of such drained effusions reaccumulated.

Like pleural effusions and obesity, diabetes is extremely common among Australian and New Zealand ICU patients. However, little is known about the long term outcomes of such patients. In this issue, Ali Abdelhamid and colleagues<sup>10</sup> focus on autonomic dysfunction at 3 and 12 months after ICU discharge. They report clear evidence of autonomic dysfunction and postprandial hypotension at 3 months, with an associated threefold increase in the risk of falls.

International interest in the best way to sedate patients and in the use of dexmedetomidine continues after the Sedation Practice in Intensive Care Evaluation (SPICE) study. In this issue, the protocol and statistical approach of a multicentre randomised controlled trial of the use of a dexmedetomidine versus propofol-based sedation protocol in severely septic ventilated patients is presented by Chandrasekhar and colleagues.<sup>11</sup> The study has been completed and will provide important new insights into the ideal approach to the sedation of this unique group of patients.

Finally, following a recent randomised controlled trial,<sup>12</sup> there has been a resurgence of interest in the use of bicarbonate to treat metabolic acidosis. However, key questions for future trials of such an intervention require that the bicarbonate be double-blinded and stable in solution in polyolefin bags. To address these two questions Briony et al<sup>13</sup> and Naorungroj et al<sup>14</sup> report the findings of two technical studies. The results are clear: bicarbonate can be placed in polyolefin bags and thereby blinded (clinicians cannot tell when bicarbonate has or has not been added) and, when added, its concentration remains stable for at least 48 hours. These findings open the door to pilot randomised controlled trials of this intervention in 2020.

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