Commentary

Recently published papers: Bugs, fluids, obesity and food

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Infection and sepsis continue to dominate the critical care literature, and in particular a condensation of evidence-based practice in this area, from the Surviving Sepsis Campaign, was published in March. Choosing the right resuscitation fluid in the right clinical setting remains contentious, and why don't we include body mass index in severity of illness scoring?

Nosocomial infection

In a report [1] and accompanying editorial [2], the March issue of *Intensive Care Medicine* examined therapy for ventilator-associated pneumonia (VAP) caused by Gram-positive organisms. Methicillin-resistant *Staphylococcus aureus* (MRSA) in VAP accounts for 50% of all cases due to *S. aureus,* which is the micro-organism most commonly responsible for nosocomial pneumonia, with mortality ranging from 14% to 47% [3].

Kollef and coworkers [1] compared linezolid with vancomycin therapy for MRSA VAP. In their retrospective analysis of two randomized, double-blind studies, 544 patients with suspected Gram-positive VAP (including 264 with proven Gram-positive VAP and 91 with MRSA) were treated with linezolid 600 mg or vancomycin 1 g every 12 hours for 7–21 days, both combined with aztreonam (a monobactam specific to Gram-negative organisms). Clinical cure rates assessed 12–28 days after therapy significantly favoured the linezolid group among Gram-positive and MRSA patients, with clinical cure odds ratios of 2.4 for Gram-positive VAP and 20.0 for MRSA VAP. Linezolid was an independent predictor for survival, with odds ratios of 2.6 for Gram-positive VAP and 4.6 for MRSA VAP. This difference is probably due to linezolid achieving much higher levels in lung tissue than vancomycin, which has relatively poor pulmonary penetration.

A further study relating to nosocomial infection reiterated the importance of early and effective nutrition [4]. Nosocomial infections acquired by intensive care unit (ICU) patients account for nearly 50% of all infections in hospitals and may directly cause or contribute to death in up to 10% of cases [5]. The study investigated whether caloric intake is associated with risk for nosocomial bloodstream infection in critically ill medical patients. In this prospective cohort study the caloric intake of 138 adult patients on the medical ICU was recorded and grouped into <25%, 25–49%, 50–74% and ≥75% of their recommended daily calorie intake. Nosocomial bloodstream infection was detected by routine infection control surveillance methods. Bloodstream infection occurred in 22.4% of patients with a significantly lower risk for infection in those groups receiving >25% of their recommended daily caloric intake. Given the potential morbidity and mortality associated with nosocomial infection and the effects of low caloric intake on other ICU outcomes such as weaning, aggressive nutritional care is worthy of repeated emphasis.

Staying with management of sepsis, March witnessed a seminal publication, which is a 'must read' [6]. The multinational Surviving Sepsis Campaign has produced a document laying out evidence-based guidelines for the management of severe sepsis and septic shock following expert systematic review of the literature, a consensus conference and numerous roundtable debates. Key areas covered in this landmark review include initial resuscitation, early identification of sepsis source and causative organism, empirical and definitive antimicrobial therapy, fluid therapy, vasopressor/inotropic therapy, steroid therapy, recombinant activated protein C therapy, blood product administration, mechanical ventilation, sedation, glycaemic control, renal replacement therapy, and deep venous thrombosis and stress ulcer prophylaxis.

BMI = body mass index; ICU = intensive care unit; MRSA = methicillin-resistant *Staphylococcus aureus*; TBI = traumatic brain injury; VAP = ventilator-associated pneumonia.

This report provides a foundation on which the bedside clinician can build a sepsis care bundle. The authors are keen to stress that this is a dynamic process, and we must now endeavour to document the impact of our management strategies on patient outcome, and thereby carry the evidence-based process forward.

Fluids for brains

Comparison studies in heterogeneous groups between crystalloids and colloids commonly yield conflicting results, but certain subgroups of patients may benefit from one type of fluid over another. For example, many researchers have felt that hypertonic saline holds advantages over other resuscitation fluids in the management of trauma, especially when associated with traumatic brain injury (TBI). In unselected trauma patients treatment with hypertonic saline increases blood pressure and reduces intracranial pressure, in addition to having other theoretical advantages such as improved microcirculatory flow. However, clinical outcome studies, most of which have been small, have failed to produce consistent results. Cooper and coworkers [7] investigated whether prehospital resuscitation with intravenous hypertonic saline improves long-term outcome in patients with severe TBI as compared with conventional fluids. In this double-blind, prospective, randomized controlled trial, 229 patients with TBI (Glascow Coma Scale score <9) and hypotension (systolic blood pressure <100 mmHg) received either 250 ml 7.5% saline or 250 ml Ringer's lactate, in addition to protocol driven conventional fluid resuscitation. Unfortunately, once again there was no difference between the two groups in terms of either survival or neurological outcome. The difficulty of studying a single intervention in such a clinically complex situation such as trauma, which demands many interventions, goes some way to explaining the contradictory results in this field. However, survival in both groups was high, which may reflect the benefit of aggressive fluid and haemodynamic management.

Obesity in the intensive care unit

It should come as no surprise to intensivists that obesity increases morbidity and mortality in ICUs; however, body mass index (BMI) is rarely used in scoring systems. Three prospective studies recently investigated the relationship between BMI and mortality, yielding conflicting results.

Bercault and coworkers [8] matched 170 ventilated obese patients (BMI >30 kg/m^2) with 170 ventilated patients with BMI within the ideal range. Matching was based on a number of patient and clinical factors, including the Simplified Acute Physiology Score II. Obesity was found to be an independent risk factor for ICU death. This was especially true for the younger and 'sicker' patients, and was explained by a higher number of complications among the obese patients.

In the second study [9], 1698 patients were divided into four groups based on BMI. Only those with the lowest BMI (<18.5 kg/m^2) exhibited a higher independent mortality. There was no increase in mortality in the obese group.

Finally, a study was published in *Chest* [10] that was based on all admissions to a medical ICU over a period of 1 year ($n = 813$). The obese (BMI >75th centile for the study population) and nonobese (BMI <75th centile) were compared with respect to independent predictors of mortality. The observed mortality in obese patients was greater than that predicted by their Simplified Acute Physiology Score II, and the authors went on to conclude that a BMI greater than 27 kg/m^2 was an independent predictor of mortality.

What can we conclude from these studies? The findings are generally tricky to interpret as a result of heterogeneous case mix. The first study went to great effort to match patients [8], whereas in the second report there were significant clinical and demographical differences between groups [9]. In the latter of those two studies a low BMI was found to be a significant risk factor, presumably representing a lack of metabolic substrate reserve in these patients, whereas a high BMI was not. The editorial in *Critical Care Medicine* that accompanies the first report [11] gives sensible advice; observational studies and clinical experience show us that the obese are vulnerable to complications, and therefore we should redouble our efforts in prevention, diagnosis and early treatment of complications in this group.

Postpyloric feeding

Intensive Care Monitor recently published an interesting review of a paper comparing clinical outcomes, pulmonary complications and success of caloric goals with gastric versus postpyloric feeding [12]. The results did not support postpyloric feeding in preference to conventional gastric feeding because there were no differences between the two groups in terms of incidence of pneumonia, percentage of caloric goal achieved, total caloric intake, length of stay, or mortality. However, the analysis still recommended the postpyloric route for those at high risk for aspiration or when gastric feeding fails – just don't feed them to a patient with a BMI in excess of 30 kg/m^2.

Other recommended papers

The March/April edition of *Intensive Care Monitor* reports on the apparently highly successful implementation of Medical Emergency Teams in Australia [13], although the editorial comment suggests a degree of scepticism. A protocol based strategy for weaning from mechanical ventilation, given credence in the Surviving Sepsis Campaign guidelines, was found to be of no benefit in a prospective study published in the *American Journal of Respiratory and Critical Care* [14]; the conclusions suggested that a structured ICU ward round is all that is required. Finally, a helpful review of the management of acute asthma in adults was published in *Chest* [15].

Competing interests

None declared.

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