Commentary

Recently published papers: of head injuries, high frequencies and haemodynamic optimization

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That we have come a long way in recent years in the management of head injuries is apparent; that we need to travel further down this road is more so. However, are some of our current management strategies actually deleterious? Coles and coworkers [1] raised the prospect of yet another double-edged sword. Examining hyperventilation for control of cerebral hypertension, they used positron emission tomography to map regional cerebral blood flow. Defining the critical hypoperfusion threshold as a cerebral blood flow of 10 ml/100 g per min, they reduced arterial partial carbon dioxide tension from 4.8 to 3.9 kPa in healthy volunteers and head-injured patients, and found a significant increase in the volume of hypoperfused tissue despite improvements in intracranial pressure (ICP) and cerebral perfusion pressure.

Despite the availability of evidence-based national guidelines for the management of the severely head-injured patient [2], Bulger and colleagues [3] showed that adherence to these guidelines, at least in the USA, is still very variable. Looking at 34 centres, those investigators found considerable variations in care, especially when they looked at numbers of patients being intubated before hospital admission or undergoing ICP monitoring. Only 35% of centres placed ICP monitors in more than 50% of patients who met the recommended criteria. The centres analyzed were classified as either aggressive or nonaggressive in terms of ICP monitor placement, and it was shown that management in the former yielded a significant reduction in mortality risk (hazard ratio 0.43, 95% confidence interval 0.27–0.66), despite the fact that it has not yet been shown elsewhere that lowering ICP directly affects outcome. However, there were more neurosurgical consultations and significantly more head computed tomography scans conducted in the aggressive group. As Bulger and colleagues pointed out, mortality is not the best primary end-point, and long-term functional neurological status is more important. The management of head injury needs to be focused on from injury to outcome, leaving many modalities available for manipulation, as highlighted by Marik and colleagues in their excellent review [4]. In any case, as Wasserberg pointed out [5], national guidelines are there to be followed, and there is work to be done.

Attention has recently been focused on another treatment strategy, namely high-frequency oscillatory ventilation (HFOV). Over the years, HFOV has shown promise in animal models, but no conclusive benefits in humans have yet been reported. Courtney and colleagues [6] conducted an investigation to determine whether ventilation by this method benefited very low birthweight infants and found that, when compared with synchronized intermittent mandatory ventilation, recipients of HFOV could be successfully extubated at a median of 8 days younger. Also, at 36 weeks there may be a small benefit in terms of mortality and oxygen requirement. However, Johnson and coworkers [7] examined the use of HFOV in preterm infants in another large multicentre trial, and did not find significant reductions in infant mortality or development of chronic lung disease. Nevertheless, both groups concluded that, despite previous worries of worsened intracranial pathologies with HFOV, this was not demonstrated, perhaps validating its safety in infants.

What of HFOV use in adults? Case reports and observations have been reported, but until now no randomized controlled trials had appeared in the literature. Derdak and colleagues [8] looked at HFOV in adults with acute respiratory distress syndrome. They concluded that HFOV is at least safe in adults and found an unsustained initial improvement in oxygenation, but what we really need is a study powered to show differences in outcome. Although HFOV may not have been shown to be of benefit in adults with acute respiratory

HFOV = high-frequency oscillatory ventilation; ICP = intracranial pressure; PEEP = positive end-expiratory pressure.

distress syndrome, high respiratory rate with low tidal volumes (and positive end-expiratory pressure [PEEP]) has [9]. However, could the high respiratory rate lead to gas trapping and induce significant increases in intrinsic PEEP in these patients? Richard and colleagues [10] set out to find out, by comparing ventilation at conventional and high respiratory rates, and confirmed this to be the case. The consideration, then, is that total PEEP should be measured, in addition to recommendations regarding plateau pressures.

Kern and Shoemaker [11] recently looked back at the successes of haemodynamic goal-directed therapy in a meta-analysis of randomized controlled studies aiming for normal or supranormal values in high-risk elective surgery, trauma and sepsis patients. Their findings confirmed further that when therapy is aimed at improving oxygen delivery (especially in the severely ill, in whom control group mortality was greater than 20%), goals must be achieved early, before the development of organ failure, if significant improvements in outcome are to be achieved.

The search for haematological markers as predictors of poor outcome in patients with severe sepsis continues, and Beer and coworkers [12] looked at calcitonin gene-related peptide and substance P. They found that whereas elevation in levels of substance P is only associated with lethal outcome during the late course of sepsis, high calcitonin gene-related peptide levels were found in patients with lethal outcome at the onset of sepsis and remained elevated throughout their course. As well as further implicating involvement of the neuroendocrine system in sepsis, have they found a highly predictive marker? Time and further investigation will surely tell.

Are we drawing too many blood samples from our patients? What cutoffs should we use when deciding when patients should red blood cell transfusion? More importantly, what effect does red blood cell transfusion have on outcome? In a paper from the Anaemia and Blood Transfusions in Critical Care investigators, Vincent and colleagues [13] addressed some of these questions. Their snapshot of transfusion practices in Western European intensive care units highlights our practices and the issues surrounding them. They found average blood loss through sampling to be 41 ml/day, with total volumes being proportional to severity of illness. Of patients who stayed on the intensive care unit for longer than 1 week, 73% received transfused blood. The average haemoglobin concentration before transfusion across the study was only 8.4 g/dl. This is lower than anticipated from previous research [14], and may be as a direct result of this. The finding that should provoke most interest, however, is the association between mortality and transfusion. Vincent and colleagues used a propensity scoring system to identify two distinct groups and control for confounders, and found an odds ratio of 1.37 for mortality in transfusion recipients when compared with similar nonrecipients. However, scrutiny reveals that the confidence intervals for this verge on unity, pointing out the problems of analysis with just so many variables. One day soon someone may take up the gauntlet of a matched interventional study so that we can really be sure that transfusion is as beneficial as we would hope.

Finally, and perhaps fittingly so, what should intensivists do when, despite their best efforts, patients' prognoses are hopeless? Holzapfel and colleagues [15] examined the controversial issue of withholding and withdrawing life support from patients who are dying on the intensive care unit. They rightly pointed out that, although we are well trained in how to treat disease, we may be not so well trained in treating the clearly dying, and lack of consensus between health care professionals does little to ameliorate a difficult situation. They describe a four-step protocol with no limitation in care and three gradations of treatment limitation, with daily review of patient status. However, what is perhaps most striking about their protocol is the obligate involvement of patients' surrogates as well as the health care team as an absolute whole. Protocols such as this may well facilitate the making of medical decisions to withhold or withdraw life-sustaining treatments.

Competing interests

None declared.

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