Complex Medical Decision-Making and Outcomes in the ICU

To the Editor:

In an issue of CHEST (December 2011), Drs Schwartzstein and Parker1 made a particularly valuable contribution with an online diagram that well illustrates the rather difficult concept of inadvertent recruitment into zone 1 physiology while clearly dichotomizing the different effects of pressure- vs volume-driven mechanical ventilation. It should be considered invaluable for the initial teaching of medical students and junior house staff.

In addition to expert instruction regarding thoracic physiology and clinical decision-making, the authors’ instructive case study also depicts an arguably more important concept that deserves to be explicitly stated: This situation of difficult and disadvantageous intrathoracic ventilation, further confounded by an external resistive load (abdominal pressure), may have well led to an adverse or fatal outcome if left unrecognized for a further period of time. Instead, the situation was expertly managed by a well-functioning care system. For the arguably fortunate patient, the system was an expertly supervised on-site trainee model. Here, a sharp house officer recognized that something was awry despite stable hemodynamics and oxygenation. The house officer pursued the aberrancy as something potentially dangerous but beyond his or her scope of knowledge and experience. Importantly, the trainee accurately and reliably reported relevant information to the attending physician, who then immediately helped to guide the trainee toward a proper course of action.

Resolution of the patient’s hypercapnea in this case was likely coincident with the attenuation of something much more important, namely splanchic hypoperfusion—the persistence of which may have led or contributed to multiorgan system failure. Furthermore, while the abdominal compartment syndrome was emphasized in this particular case, similar misunderstandings and/or underrecognition of complex relationships between intrathoracic gas and vascular pressures and volumes likely account for most cases of fatal asthma, poorer-than-necessary outcomes in cardiac resuscitation, and other suboptimal outcomes in emergency and critical care.

Unfortunately, a great many hospitals in the United States and elsewhere do not operate as described in the interactive physiology case. Economic or other conditions that preclude in-house 24 h/7 d (24/7) ICU coverage of any kind are surprisingly commonplace. Even if an on-site hospitalist is available, that person might be junior level, not yet board certified, not well trained in critical care, or simply too busy elsewhere in the hospital or ED to recognize and follow up on early, subtle; and, as in this case, complex, correctable physiologic disturbances.

Lack of 24/7 surveillance and management by on-site, adequately trained, and experienced intensivists is increasingly recognized as suboptimal care.2,3 Electronic surveillance and remote intervention in real time (the so-called tele-ICU) is likely a cost-effective alternative for units lacking house staff or otherwise unable to support 24/7 on-site intensivist coverage.4 For elaboration on this subject, Reynolds et al5 recently contributed a comprehensive description of available tele-ICU systems and models of care. The Society of Critical Care Medicine maintains a relatively new website dedicated solely to the principles and practice of tele-ICU.

If nothing else, a second set of eyes belonging to a board certified, fellowship-trained intensivist should provide peace of mind to patients, family members, and risk managers truly concerned about the outcomes of critically ill patients. With such a system in place, the question of whether anything else could have been done will almost certainly be answered in the reassuring negative.

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Response

To the Editor:

I thank Dr Rascona for his comments on our article in CHEST regarding the causes of acute hypercapnia in the setting of an abdominal compartment syndrome. I agree that splanchnic hypoperfusion is a prominent feature of abdominal compartment syndrome, most commonly manifest as decreased urine output, which was masked in this case by the fact that the patient had chronic renal failure and was maintained on dialysis. However, I do not think that in the absence of an acute metabolic acidosis, hypoperfusion was the primary explanation for the rise in Paco 2 in this particular case.

Dr Rascona also comments on the important role of supervision in the education of residents and our ability to provide high-quality patient care. Our institution, Beth Israel Deaconess Medical Center in Boston, Massachusetts, was the first academic medical center in our area to provide 24 h/d, on-site, critical care attending physicians for the ICUs. By allowing residents to evaluate patients (assuming patient acuity permits) prior to presenting the case to the supervising physician, we preserve and enhance the learning process while making clinical interventions in a timely manner. Furthermore, the threshold for a resident to ask for help appears to be far lower when the supervising physician is physically present in the medical center compared with when he/she is taking calls at home.

Although formal studies of the impact of more-consistent attending supervision of residents are just beginning to emerge, initial data show improved patient outcomes in the management of trauma\(^a\) and on general medical units.\(^b\) A systematic review of the topic evaluated 24 studies across a range of medical specialties and found evidence for improved patient and education outcomes.\(^b\)

In the past 25 years, the provision of care in EDs has evolved considerably; patients once evaluated and treated in most hospitals by a range of part-time physicians trained in a range of fields are now primarily under the care of emergency medicine specialists. In the not-so-distant future, we can hope that patients in our ICUs can consistently receive care from critical care specialists.

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