

CRITICAL CARE ALERT®

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Does Prone Positioning Improve Survival in Acute Respiratory Failure?

ABSTRACT & COMMENTARY

This paper reports the results of a multi-center, randomized trial of supine vs. prone positioning in patients with acute respiratory failure. Enrolled patients had a $\text{PaO}_2/\text{FIO}_2$ ratio of ≤ 200 mm Hg with positive end-expiratory pressure (PEEP) ≤ 5 cm H_2O , or a $\text{PaO}_2/\text{FIO}_2$ of ≤ 300 with PEEP ≥ 10 cm H_2O , plus bilateral pulmonary infiltrates on chest x-ray and absence of left heart failure. Patients were excluded who were younger than 16 years of age, who had evidence of cardiogenic pulmonary edema, cerebral edema, or intracranial hypertension, or who had conditions that might have contradicted use of the prone position such as spinal fracture or severe hemodynamic instability. Patients randomized to be managed prone were placed into this position for ≥ 6 h/d for 10 days. There were 304 patients enrolled, with 152 in each group.

When patients were turned to the prone position, the $\text{PaO}_2/\text{FIO}_2$ increased by at least 10 mm Hg in 73% of patients. The daily $\text{PaO}_2/\text{FIO}_2$, measured each morning while all patients were prone, increased significantly more over time in the prone group than the supine group. Complications such as pressure sores and accidental extubation were similar in the 2 groups. During management in the prone position, however, there was an increased need for sedation (55% of patients); airway obstruction occurred in 39% of patients, facial edema developed in 30% of patients, and there was an increased need for muscle relaxants (28% of patients). Patients spent an average of 7 h/d in the prone position. Most important, the mortality rate did not differ significantly between groups, either at the end of the 10-day study period, at the time of discharge from the ICU, or at 6 months. On post-hoc analysis, a survival benefit for prone (at the end of the 10-day study period) was found for the sickest patients: $\text{PaO}_2/\text{FIO}_2 \leq 88$, SAPS score > 49 , or tidal volume > 12 mL/kg of predicted body weight (Gattinoni L, et al. Effect of prone positioning on the survival of patients with acute respiratory failure. *N Engl J Med.* 2001;345:568-573).

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■ COMMENT BY DEAN R. HESS, PhD, RRT

In recent years, there has been increasing interest in the use of prone position for patients with the acute respiratory distress syndrome (ARDS). Clinical studies, such as the one described here, have reported improvements in PaO₂ for about two thirds of patients with ARDS. Moreover, animal models of ARDS have suggested that the prone position may attenuate the effects of ventilator-induced lung injury.^{1,2} Accordingly, there is a sound clinical and experimental rationale for the use of the prone position. However, despite improvements in oxygenation that occurred with prone position in this study, there was no improvement in survival. Therefore, prone position cannot be recommended as a standard therapy in the care of patients with ARDS.

This study once again demonstrates the follies of over-reliance on physiologic outcomes such as improvements in PaO₂. Similar findings have been reported for the use of inhaled nitric oxide in the treatment of ARDS³ and use of mask continuous positive airway pressure for treatment of acute hypoxemic respiratory

failure.⁴ Moreover, in the ARDSnet trial, patients with the higher PaO₂ were those receiving the higher tidal volume—the group with a worse survival.⁵

One can only speculate about the reasons for the finding of no improvement in survival with the use of the prone position. Perhaps the study was under-powered. In the ARDSnet trial, for example, more than 800 patients were enrolled. Perhaps the wrong dose was used. On average, proning was only done for 7 h/d, and for no more than 10 days. My personal experience has been to use prone position nearly continuously throughout the day, rather than limiting the duration of the therapy. Finally, it may be that the prone position, unlike a low tidal volume strategy, does not attenuate the effects of ventilator-induced lung injury. Moreover, it is interesting to speculate that prone positioning may be effective in reducing mortality if combined with other strategies such as a low tidal volume, permissive hypercapnia, or inhaled nitric oxide. Although prone positioning with inhaled nitric oxide has been shown to effectively improve PaO₂,^{6,7} there are no published reports of enhanced survival with the use of this strategy.

It is intriguing that this study did find a survival benefit on post-hoc analysis for the sickest patients. Although these findings must be confirmed with a properly designed prospective study, it does suggest a limited role for the prone position in patients with ARDS. It is also interesting to note that the incidence of complications was similar for patients in the prone and supine groups, suggesting that prone positioning is safe in this patient population. However, increased needs for sedation and neuromuscular blocking agents was reported for management of patients in the prone position.

Prone positioning in patients with ARDS is inexpensive, results in an improvement in PaO₂ in the majority of patients, and is relatively risk-free. However, it does not improve survival—at least as applied in this study—except possibly in the subgroup of the sickest patients. ❖

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In order to reveal any potential bias in this publication, and in accordance with Accreditation Council for Continuing Medical Education guidelines, we disclose that Ms. Ball serves as a perioperative consultant to hospitals, industry, organizations, etc., is a stockholder of Steris Corp., and SLT, and is on the speaker's bureau of AORN. Dr. Hoffman is involved in research with an NIH-funded grant that has no industry support. Dr. Rubenfeld is a paid consultant to Eli Lilly and has received educational grants from Byk-Gulden and Bayer in his name to the University of Washington. Drs. Baigori, Durbin, Hess, Johnson, O'Keefe, and Pierson report no consultant, stockholder, speaker's bureau, research, or other financial relationships with companies having ties to this field of study. Drs. Crawford, Gladwin, Nanavaty, and Takezawa did not return a 2001 financial disclosure form.

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CT Angiography and Clinician Behavior in Suspected Pulmonary Embolism

ABSTRACT & COMMENTARY

Synopsis: In this retrospective comparison of patients suspected of having pulmonary thromboembolism who underwent V/Q scanning vs. CT angiography, subsequent management was more likely to be concordant with the study findings for the latter group, perhaps reflecting greater clinician confidence in the newer procedure.

Source: Crawford T, et al. The effect of imaging modality on patient management in the evaluation of pulmonary thromboembolism. *J Thoracic Imaging*. 2001;16:163-169.

Crawford and associates from ucla sought to determine how the results of pulmonary CT angiography (CTA) were related to subsequent management of patients suspected of having pulmonary thromboembolism (PE). They reviewed the charts of 138 consecutive patients who underwent ventilation-perfusion (V/Q) scanning for investigation of suspected PE during a 6-month period in 1994-1995. They compared the findings with data from 149 patients in whom CTA was used for the same indication during the same calendar months in 1996-1997, after the latter procedure had largely replaced V/Q scanning for this indication at Crawford et al's institution. CTA interpretations were made according to a fixed protocol and required the agreement of 2 thoracic radiologists; how the V/Q scans were read is not stated.

From the information recorded in the patients' charts, the patients who underwent CTA for suspected PE had tachypnea, auscultatory abnormalities, and normal ECGs more often than those undergoing V/Q scanning, while the latter group had a higher incidence of recent surgery and right heart strain by ECG (all, $P < 0.05$). Crawford et al do not state how many of the 287 patients in this report were in the ICU or on the wards, nor do they provide in-hospital mortality or other outcome data aside from the duration of hospitalization following the index diagnostic procedure (7 vs 9 days for V/Q scans and CTA, respectively).

The V/Q scans were interpreted as normal to low probability for PE in 64% of patients, intermediate/indeterminate in 25%, and high probability in 11%. Corresponding results for CTA were negative in 81%, indeterminate in 5%, and positive in 15%. The diagnosis of PE was excluded on the basis of a negative CTA in 79 patients (53%) without further investigation. The corresponding numbers for patients with normal or low-probability V/Q scans were 56% and 41%. All 22 patients whose CTA results were read as positive were treated for PE without further study. Additional studies in patients with intermediate or indeterminate results on the index study were done in 6 CTA patients and 20 V/Q scan patients. Only 3% of CTA patients and 4% of V/Q patients underwent catheter angiography.

Clinicians subsequently managed patients with respect to PE in concordance with the study procedure's findings 69% of the time with V/Q scanning and 94% of the time with CTA. Crawford et al conclude that pulmonary CTA results are more directly reflective of physician management, are less frequently indeterminate, and reduce the proportion of patients in whom management is initiated despite inconclusive diagnostic information.

■ COMMENT BY DAVID J. PIERSON, MD

Few diagnostic procedures have so taken the medical world by storm as CTA for suspected PE during the last 5 or 6 years. Two big reasons for this are the notorious ambiguity of V/Q scan results, particularly when the patient has underlying lung disease, and the ease with which clinicians can obtain a CTA at any time of the day or night—often in stark contrast to the situation with V/Q scans. Laying aside for a moment the issue of whether the present study contributes anything in the ongoing debate about CTA's diagnostic accuracy, Crawford et al demonstrate that clinicians have embraced the procedure and tend to act on its results without seeking further confirmation. In particular, when CTA was negative, the doctors managing the patients concluded that PE had been excluded, and nei-

ther anticoagulated them nor pursued further workup for PE.

For telling us anything beyond that, there are several major problems with this study. One is its retrospective, open design, and the challenge of obtaining unbiased data in one of the most controversial areas of clinical medicine. This problem is compounded by the 2-year interval between sampling periods, which strains the credibility of the implicit assumption that the diagnostic investigation of first choice was the only thing different in the patients' management. Crawford et al's finding that there were multiple significant differences between the clinical characteristics of 2 patient groups reinforces this concern.

Perhaps more worrisome, however, is the lack of use of a reference standard for the diagnosis of PE. Fewer than 4% of the patients underwent traditional pulmonary angiography, and only a minority had Doppler ultrasonography or any other procedure to detect thromboembolism. Thus, the fact is that we have no way of really knowing what the patients in this study actually had—and especially how many of those who were not treated for PE because their CTAs did not show clots actually had PE. All that we can say for sure is that the physicians at Crawford et al's institution appear to have placed greater reliance in the results of CTA than in the findings of V/Q scanning. Whether that greater reliance is justified remains to be seen.

The results of a recently published study from Geneva underscore the importance of not placing too much faith in a negative CTA.¹ In that study, Perrier and colleagues prospectively evaluated 299 patients suspected of having PE, using a validated algorithm that included clinical assessment, D-dimer levels, V/Q scans, and pulmonary angiography. Each patient also had CTA but this was not read until 3 months later and thus was not used in making patient management decisions. Of the 299 patients, 118 (39%) had proven PE. Sensitivity and specificity of CTA for the diagnosis of PE were 70% (95% CI, 62-78%) and 91% (95% CI, 87-95%), respectively. The false-negative rate for CTA when used as the primary determinant of PE was 30%—meaning that 30% of the patients whose CTA results would have “excluded” PE in the Crawford study actually had it. Perrier et al echo the conclusions of other investigators in recommending that CTA not be used as the sole diagnostic study for suspected PE.

Considering these findings in the context of the study by Crawford et al discussed above, the diagnosis of PE should not be ruled out solely on the basis of a negative CTA, particularly in patients with moderate-to-high clinical suspicion of PE. ❖

Reference

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Adrenal Insufficiency Common in Surgical ICU Patients

ABSTRACT & COMMENTARY

Synopsis: Adrenal insufficiency, as diagnosed by an abnormal response to ACTH stimulation, occurred in 34% of the patients older than 55 who required vasopressors following complicated trauma or surgery. Those patients who received therapeutic steroid replacement experienced a lower mortality than those who did not (21% vs 45%).

Source: Rivers EP, et al. Adrenal insufficiency in high-risk surgical ICU patients. *Chest*. 2001(3);119:889-896.

Occult adrenal insufficiency (ai) has been identified in up to 28% of seriously ill medical patients. The occurrence of AI in other patient populations has not been quantitated, and the implications for patient outcome in this disorder are not clear. Rivers and associates sought to identify the patterns of adrenal function in critically ill surgical patients. They prospectively studied patients following surgery who were older than 55 years and dependent on vasopressors during the first 24 hours of ICU treatment. Patients were considered vasopressor dependent if, after a carefully controlled, pulmonary artery assisted-volume loading procedure, they needed a vasoactive substance to maintain a mean arterial blood pressure of 65-70 mm Hg. Patients with known adrenal dysfunction, those who had received intra-operative steroids, those who had received etomidate (which is known to inhibit steroid synthesis), or those who had received therapeutic steroids in the previous 3 months, were eliminated.

A total of 104 patients were studied over a 2-year period. Each patient received a 1-hour cosyntropin (ACTH) stimulation test. Immediately following determination of baseline serum cortisol level, 0.25 mg of ACTH was administered, and cortisol was measured again at 30 minutes and 1 hour. Normal results would be all cortisol levels greater than 20 µg/mL and a rise of a greater than 50% over baseline (to at least 30 µg/mL), or an absolute rise of more than 9 µg/mL. Two patterns of AI were defined:

patients who had any abnormal cortisol level ($< 20 \mu\text{g/mL}$ on any measurement) and experienced less than a $10 \mu\text{g/mL}$ rise following stimulation, and those with any value $< 30 \mu\text{g/mL}$ or an inadequate response to stimulus. The 43% of patients entered into the study had one or the other form of AI; 63% of patients were functionally normal.

There was no difference between normals and patients with AI with respect to age, sex, body temperature, leukocyte count, serum electrolytes or glucose, or hemodynamic variables. However, the relative percentage and absolute number of blood eosinophils was higher in the patients with AI (1.5% vs 3%). A total of 42% of all the patients received therapeutic steroids (100 μg hydrocortisone every 8 hours for 3 doses), and those with AI who received treatment were more likely to be weaned from vasopressors within 24 hours (19 out of 23 who received steroids, or 83%; vs 3 out of 11 who did not, or 27%). Normal patients receiving steroids also appeared to wean more quickly, but this effect did not reach statistical significance (10 out of 23 who received steroids, 43%; vs 16 out of 47 who did not, 34%).

Mortality was higher in patients without AI (46%) than in those with AI (29%). However, mortality was higher in those patients with AI who did not receive steroids (45%) than those who did (21%).

■ COMMENT BY CHARLES G. DURBIN, Jr., MD

While this study has several major problems, it confirms the high incidence of AI in the very ill surgical patients. The study included a prospective collection of data, but no treatment arm was included. Patients were treated or not at the choice of the care team. This resulted in some normals being treated with steroids and some patients with demonstrated AI not being treated. The effect on outcome from treatment with steroids cannot be inferred from this study. How the decision to treat was made has not been evaluated and was not randomized. However, treatment appeared to have a positive effect on weaning from vasopressors and maybe improved survival. One of the effects of steroids is to increase the number of adrenergic receptors. In stressed patients on vasopressors, it is not surprising that pharmacological doses of steroids would improve vasopressor responsiveness.

The effect on survival is more problematic. Those patients with AI, treated with steroids, actually did better than the group as a whole, while those with AI not treated did the same as the group as a whole. This suggests (but does not prove, due to the study design) that the patients with AI were actually less sick than the others. This could be true since the effects of untreated AI would be to need more vasopressors to achieve normal blood pressure. Since hypotension was a study criterion, this might mean

that less ill patients with AI would be selected. The fact that untreated patients with AI did no worse than the group as a whole gives little comfort, as these patients might have done better with treatment of their AI.

A major problem with this study is that determination of adrenal function was only performed at one point in time. It is possible that if repeated measurements were performed, many other patients would have demonstrated AI at some point in their illness. Also, some of the initially identified patients with AI might have proved normal on subsequent study. The “normal” variability of adrenal function during critical illness has not been well studied. The duration of treatment needed for AI could be more appropriately determined with such studies; only 24 hours of steroid treatment was used in this group of patients.

The implication for empiric steroid treatment, although not proven, is certainly suggested by this and other studies. With the high percentage of AI demonstrated in vasopressor-dependent patients and the lack of significant side effects of treatment, consideration must be given to empiric steroid replacement in these very ill ($> 40\%$ mortality) patients. ❖

How do Patients React to Family Presence During Invasive Procedures & Resuscitation?

ABSTRACT & COMMENTARY

Synopsis: Patients articulated that family presence provided comfort, strength, and support and helped them understand and cope with painful events. Patients believed that providers treated them more as persons, and less as cases, when family members were present.

Source: Eichhorn DJ, et al. During invasive procedures and resuscitation: Hearing the voice of the patient. *Am J Nursing* 2001;101(5):48-55.

This study was conducted to determine how patients react to the presence of family members during invasive procedures. Subjects were 9 patients (3 men, 6 women) aged 32.2 ± 15.5 years (range, 15-63 years) who underwent a variety of invasive procedures following admission to an emergency department (ED) located in a university-affiliated regional level I trauma center. The procedures were orthopedic reduction ($n = 3$), lumbar puncture ($n = 2$), cardiopulmonary resuscitation ($n = 1$),

chest tube insertion (n = 1), central line insertion (n = 1), and open wound exploration (n = 1). Each patient was interviewed by telephone approximately 2 months after the event using a series of open-ended questions. The conversation was audiotaped and transcribed. Two investigators trained in qualitative methodology then categorized patient comments into themes. Four other co-investigators then reviewed the categorization for accuracy.

Seven themes emerged from the data. Patients related feeling comfort, strength, and support because family members were present. None reported feeling uncomfortable with family members at the bedside. Patients perceived that family members acted as their advocates during the ED event by interpreting and explaining information to them. In addition, they felt that family presence helped humanize patients for health care providers. Several patients believed family presence prompted caregivers to try harder to help them survive. All patients viewed family presence as a right, but realized that it took a toll on family members and did not wish them to be present if it interfered with their care.

■ COMMENT BY LESLIE A. HOFFMAN, PhD, RN

Family presence during invasive procedures, a relatively new practice, has been attracting considerable media coverage. Numerous public opinion polls and surveys have considered the intervention, mainly from the perspective of family members or health care providers. In an earlier study, Meyers and associates reported findings, supported by the work of others, that indicated that family presence during invasive procedures had many benefits for family members.¹ These included knowing everything possible was being done, feeling they had helped and supported the patient, and reducing their anxiety. There was no indication that family presence was disruptive to health care providers or caused adverse psychological effects. The present study represented an extension of this work to include interviews with patients who had family members present during the original study.

Patients who participated in this intervention reported a range of benefits. They were able to articulate why and how family presence was helpful and perceived the experience in a very positive manner. However, there are a number of limitations that prevent generalizing this study's findings to all patients who undergo invasive procedures. Family members involved were screened by a trained facilitator who evaluated their coping skills and emotional stability prior to offering the visitation option. The facilitator also prepared family members prior entry into the ED and answered questions during and after the observation. Patient reactions might have been different if such support were not

available. With the exception of cardiopulmonary resuscitation, the procedures observed were predictable in duration and relatively minor. Because admission was emergent, neither patient nor family had time to prepare, a factor that may have made family presence especially important. Nevertheless, results of this study, in combination with those of similar studies, suggest there can be considerable benefit to allowing family members to be present—at least in the ED—during invasive procedures. Of importance, findings of this study led to the development of a protocol for family presence during invasive procedures used at the study institution that is now in use hospital-wide and available on the Internet (www.utsouthwestern.edu/parkland/fp/fp.htm). ♦

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Special Feature

ICU Bouncebacks: Rates, Reasons, and Risk Factors

By Karen L. Johnson, PhD, RN

Which of the following patients is most likely to be readmitted to the ICU from a general ward?

- Patient A is 56 years old and 5 days postesophagogastrectomy, with a hematocrit of 34, a 5-kg weight gain since admission, and now-positive blood cultures;
- Patient B is 72 years old and 7 days postradical neck dissection, with a heart rate of 120 beats/min, BP 110/60 mm Hg, respirations 32/min, and temperature 38°C;
- Patient C is 65 years old and was transferred 24 hours ago from the ICU with a recent upper gastrointestinal bleed and hepatic encephalopathy;
- Patient D is 42 years old and several days post-motor vehicle crash and surgical repair of a grade IV liver laceration, with a new-onset right lower lobe pneumonia.

If you guessed that Patient A was most likely to return to the ICU from a general ward you were correct. In fact, if you guessed Patient B, C, or D you were also correct. All 4 of these patients are at high risk to be readmitted, or to “bounce back” to the ICU. What is the incidence of ICU bounce-backs? What are the major reasons for ICU readmission? What are the risk factors? This special feature will address these questions. For the purpose of this essay, ICU bounce-backs are defined as patients who are dis-

charged from and readmitted to the ICU during the same hospitalization.

Incidence

Comparing ICU readmission rates is complicated by many factors including national health care policy, institutional policies, varying patient populations, ratios of ICU beds to hospital beds, and the availability of intermediate care beds.¹ The incidence of ICU readmissions is difficult to state because studies have used different denominators to calculate it. The reported incidence of readmission to the ICU ranges from 4.6% to 16% of the total number of ICU admissions,^{2,4-7} 12% of total ICU discharges,³ and 4.3-9.6% of total live ICU discharges.^{1,8} Since only patients who are discharged alive from the ICU are at risk for readmission, it would make sense to use the total number of live ICU discharges as the denominator. Rosenberg and Watts pooled data from 8 large, multi-institutional studies of ICU outcomes and reported a mean ICU readmission rate of 7% (range, 4-10%).⁹

Patients who are readmitted to the ICU within 24 hours after ICU discharge are of particular interest because of the possibility of premature discharge. In studies that reported these data, readmission to the ICU within 24 hours occurred in 17-30% of readmitted patients.^{1,7,8}

Mortality

Hospital mortality appears to be higher for patients readmitted to the ICU, with reported mortality ranging from 21%² to 58%.³ Even when adjusting for severity of illness, one study reported that readmitted patients were 11 times more likely to die in the hospital, and their hospital stays were almost twice as long, as nonreadmitted patients.⁸ Rosenberg and Watts⁹ offer 3 plausible explanations for the higher death rates among patients readmitted to the ICU: 1) readmitted patients may respond less adequately to ICU treatment, resulting in subsequent readmission or death; 2) patients readmitted to an ICU may reflect potentially ineffective care; and 3) increased mortality rates among readmitted patients may reflect poor quality care such as premature ICU discharge.

Major Reasons for Readmission

Studies that have examined ICU readmission categorize the causes of readmission as either a recurrence of the initial disease (if the readmission diagnosis involved the same organ system as the initial admission) or a new complication (if the readmission diagnosis involved a different organ system from the initial admission). Studies that have examined reasons for readmissions have reported that 30-65% of patients were readmitted to the ICU for a recurrence of the initial disease.^{1,3,4,6,8} The initial ICU admission diagnoses most frequently associated

with readmission included upper GI bleeding, respiratory failure, and neurologic impairment. Patients with the diagnoses of postoperative elective abdominal aortic aneurysm, drug overdose, and chest pain to rule out myocardial infarction have been reported to have very low risk of ICU readmission.^{1,5}

Studies that have examined the incidence of patients who return to the ICU for a new complication report that 30-39% of patients return as a result of a new complication and the leading cause of readmission in these studies was consistently a pulmonary disorder (pulmonary edema, respiratory arrest, aspiration, or bacterial pneumonia).^{1,3,4} Nosocomial pneumonias that developed subsequent to ICU discharge, poor ventilatory reserves, and ventilatory failure from inability to clear pulmonary secretions were frequently reported reasons for these pulmonary disorders.⁹

In the 8 studies conducted between 1983-2001 that were reviewed for this essay,¹⁻⁸ it is striking to note that pulmonary problems—either as a recurrence of the initial disease or as a new complication—account for an overwhelming majority of the causes for ICU readmissions.

Risk Factors Associated with Readmission

A few studies have identified warning signs, or variables present upon initial ICU discharge, that statistically predicted ICU readmission.^{4-6,8} These variables included increased heart rate,^{5,6} increased respiratory rate,^{5,6} decreased hematocrit,^{5,6} positive fluid balance,⁶ positive blood cultures,⁶ and discharge Acute Physiology Score greater than 408. In a retrospective study of ICU readmissions, Snow and colleagues reported that while 78% of the discharges were deemed appropriate, 62% of the patients manifested several retrospectively selected warning signs that might have altered the clinicians to re-evaluate the ICU discharge plans.⁴

ICU Readmission Rates as a Quality Indicator?

In this essay, I have tried to briefly summarize the evidence to date on what we know about the incidence, mortality, reasons for, and risk factors associated with ICU readmission. What we do not know, and can't seem to agree on, is whether we should even pay attention to ICU readmission rates. The Society of Critical Care Medicine (SCCM) supports ICU readmission as a quality indicator. SCCM's Quality Indicators Committee ranked ICU readmission within 48 hours as the top indicator for judging ICU quality.¹⁰ SCCM's Guidelines for ICU Admission, Discharge, and Triage¹¹ state "readmission to the ICU for a similar problem should be closely monitored as it may directly relate to quality of the discharge process."

There are others who debate that patient-related factors cannot be separated from process-of-care issues.⁸ Readmission to the ICU may reflect a patient's specific disease process and the inherent physiologic instability of a severely ill patient.⁹ Chen and colleagues showed that different patient groups had different likelihoods of being readmitted.¹ If ICU readmission rates reflect the quality of process-of-care issues, then I question what process of care are we evaluating: care in the ICU? The ICU discharge decision-making process? Post-ICU care? Cooper and colleagues argued hospitals that are more clinically aggressive may have a lower threshold for readmission to the ICU and thus have higher ICU readmission rates.⁷ On the other hand, hospitals with a very low ICU readmission rate may be an indicator of patients who have inappropriately long ICU stays.⁹

While the debate continues, it seems intuitive that readmissions to the ICU are not a good thing. It seems as though we should try to keep bounce-backs to a minimum. But what is that number? Currently, based on the evidence we have, ICU readmission rate may reflect some crude measurement of quality⁹ and we should, as critical care clinicians, review these cases one by one, because it is at least grounded in good patient care.¹⁰ ❖

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CME/CE Questions

1. The use of prone position results in an improvement in survival in which of the following patients groups?
 - a. All patients with ARDS
 - b. Only patients with primary pulmonary ARDS (eg, pneumonia)
 - c. Patients with ARDS who have a concurrent diagnosis of COPD
 - d. Patients with relatively mild ARDS
 - e. The sickest patients with ARDS, although only supported by post-hoc analysis
2. Among patients clinically suspected of having pulmonary embolism in whom a CT angiogram is negative for thrombus, the likelihood of PE actually being present is:
 - a. less than 1%.
 - b. less than 2%.
 - c. between 2% and 5%.
 - d. between 5% and 10%.
 - e. as high as 30%.
3. Adrenal insufficiency:
 - a. is common in medical but not surgical patients.
 - b. is frequent in patients requiring mechanical ventilation.
 - c. is frequent in surgical patients requiring vasopressors.
 - d. does not require treatment except following adrenalectomy.
 - e. should be treated with high-dose dexamethasone.

CME/CE Objectives

After reading each issue of *Critical Care Alert*, readers will be able to do the following:

- Identify the particular clinical, legal, or scientific issues related to critical care.
- Describe how those issues affect nurses, health care workers, hospitals, or the health care industry in general.
- Cite solutions to the problems associated with those issues.

Asking the Critical Question: Who Should Manage ICU Patients?

By Julie Crawshaw, CRC Plus Editor

Answers vary and feelings run high, but the query may be moot

Should any physician with hospital privileges be able to admit and manage patients in the ICU? or should ICU patients be under the care of an intensivist team regardless of who manages them outside the unit?

These questions continue to concern intensivists and others who work in ICUs. Answers vary widely and feelings behind them run high.

Maurene Harvey, RN, and president-elect of the Society for Critical Care Medicine (SCCM), has been a critical care nurse for 35 years. As a nursing educator, she has spent time in hundreds of hospitals over the years. "In nursing we are very clear about this," Harvey says. "We do not let anybody take care of a critically ill patient unless they have critical care training. We don't let any critical care patient be without a critical care nurse. I don't understand why physicians don't do the same thing."

Harvey observes that while an emergency room may get 1 critically ill patient per day, ICUs are filled with critically ill people. "Where do you find more devices, drugs, and tubes, more complications and disorders than are seen anywhere else?" she asks. "In the ICU. But where do we require a specialty trained physician 24/7? In the emergency room."

Intensivist vs. Hospitalist Studies Lacking

Studies show that those ICU patients under the care of an intensivist experience better outcomes than those under the care of an internist without critical care training. But John R. Nelson, MD, FACP, says those studies compare critical care doctors to all primary care doctors for whom hospital care is only a small part of their practice, and ICU care is a smaller part yet.

Nelson, who is cofounder and past president of the National Association of Inpatient Physicians (NAIP) and director of the hospitalist practice at Overlake Hospital in Bellevue, Wash, doubts that comparing intensivists to hospitalists would produce the same finding.

The NAIP, which represents more than 5000 hospitalists nationwide, takes the position that hospitalists should be able to admit to the ICU and manage patients to their level of expertise, consulting critical care specialists when appropriate.

"My view is that all those studies say 'My gosh, every ICU should have significant leadership, input, and supervision from doctors with critical care training if at all possible,'" Nelson says. "I agree that critical care physicians should lead ICUs where available. However, I think there are valuable contributions that can be made by noncritical-care doctors. And I don't think that just because we have concluded that critical-care-trained doctors are a very valuable component, that means everyone else should be excluded."

Nelson points to studies that show patients with acute respiratory disease syndrome experience better outcomes at lower cost under doctors with critical care training than they do under those without it.

“The problem is that people want to assume that the same result would be obtained in a comparison between critical care doctors with hospitalists,” he says.

Harvey observes that ICU nurses have to be trained in critical care and a specific number must be present. “Trained and present is best, but present is better than nothing,” she says. “Hospitalists are filling a gap in hospitals that don’t have intensivists.”

However, Ann E. Thompson, MD, current SCCM president and professor of anesthesiology/CCM and pediatrics at the University of Pittsburgh, observes that some hospitalists’ practice at more than 1 facility and may not be available when they’re needed.

“I see both hospitalists and intensivists as a kind of generalist,” Thompson says. “The main separation is the immediately life-threatening nature of the disease. If you are present, you can get things done in a timely fashion. With critical care, patient care is titrated to patient care day and night. That’s the model that we advocate.”

Nelson says he certainly would never try to persuade anyone that hospitalists and critical care physicians are equivalent. “I need help from a critical care doctor for any ICU patient I have,” he says. “The question is, when my patients go into the ICU, should I stop at the door and hand the patient off entirely to the critical care doctor? Who should be in charge while my patient is in the ICU? I think perhaps it could be me, and I would ask the critical care doctor to serve as a consultant.”

Team Leadership May be Most Important Factor

Few would refute the assertion that patients at high risk of dying should have physicians who are specifically trained in managing the critically ill. But the bottom line is that there aren’t enough intensivists or hospitalists to go around, and both groups expect the current situation will worsen.

Thompson thinks an intensivist should be the ICU team leader, but she says the potential for streamlining hospital care is immense if intensivists and hospitalists work together.

But Nelson points out that intensivist is a job description. “The word doesn’t tell you how that doctor was trained,” he says. “When board-certified critical care physicians are available it makes sense for them to have a very significant role in the ICU. But even if you believe they should be doing it all, there aren’t enough of them.”

Harvey sees the hospitals of the future having ICU teams comprised of intensivists, hospitalists, and acute care nurse practitioners. “The nurse practitioners will do not only what they need to do to help physicians care for the patients, but also will help teach the novice nurses as well,” she says.

Pediatric ICU Care Isn’t Comparable

David M. Steinhorn, MD, associate professor of pediatrics at Children’s Memorial Hospital in Chicago, says that the current argument in the adult critical care world shouldn’t extend to pediatric critical care. Steinhorn, who coordinates a pediatric critical care fellowship training program, says ICU care for children absolutely requires a training that includes mentorship and supervision in a pediatric intensive care unit.

“You can’t get these skills from general pediatric training,” Steinhorn says. “The board of surgery says that pediatric surgeons in general are thought to be qualified providers of pediatric critical care services. But the training the pediatric surgery fellow receives is not the same sort of rigorous, mentored, physiologically based training in critical care that a medical critical care specialist receives.”

During their 2 years of fellowship, pediatric surgeons are responsible for managing their surgical and trauma patients in the ICU. Yet Steinhorn says the mentorship and training they receive is quite variable compared to the well-established curriculum that exists for pediatric medical intensive care training.

“Their training will be hit-or-miss based upon who their surgical attending physician is, the period of time, the center they’re in, and the degree to which the surgeons are receptive to education, input, training, and insights from the medical intensivists who are spending literally all their training time in the intensive care unit,” he says.

Thompson points out that because few pediatric patients require intensive care, every critically ill child should be transferred to a pediatric ICU. “It is just not appropriate for a child to be cared for in a small community hospital without pediatric expertise when every region in the country has access to an excellent pediatric ICU,” Thompson says. “The difference in outcomes is so great it makes no sense to risk a child’s life.”

According to Steinhorn, general pediatricians who received training during the last 8-10 years got the short end of the ICU training stick. “They’ve received much less mentored exposure in intensive care pediatrics than we did 15-20 years ago, when there were many more rotations in a 3-year residency,” he says.

Pediatric surgical specialists, Steinhorn says, now also spend less time in formal, supervised intensive care training. And because they are less rigorously trained, he says they are less likely to be exposed to the areas of expertise a medical intensivist develops in the pediatric ICU for the most serious types of cardiovascular or respiratory failure or metabolic derangements.

ICU Patients Benefit from Partners in Care

Thompson says intensivists and hospitalists ought to be partners in care. “My own view is that currently there isn’t enough of either to take care of patients in hospitals around the country,” she says. “Some sort of chaired effort is absolutely in order.”

Thompson adds that the politics between organizations is different from what’s actually happening in hospitals where people are working together. As evidence, she cites St. John Mercy Hospital in St. Louis, where she says intensivists and hospitalists work very comfortably together.

“There’s a kind of moveable wall where one is primary and where the other becomes primary,” Thompson says. “I think that’s probably pretty commonplace in many communities.”

Nelson agrees, pointing out that hospitals with an increasing number of ICU beds may not find a parallel increase in the number of critical care trained physicians. He says studies that show critical care physician leadership is valuable don’t mean you should exclude everybody else.

“I think there are any number of good ways to organize care in the ICU,” Nelson says. “But it will be hard to do with a history of excluding everyone who lacks specialized training in ICU care.”

Steinhorn says almost any competent, meticulous medical physician or surgical physician can take care of a large number of patients who are admitted to an ICU. But developing and maintaining critical care skills mandates spending a lot of practice time in a mentored ICU setting.

“Having someone point out what you’re seeing may avoid your having to spend 3 years learning it for yourself,” Steinhorn says. “That’s where the role of competent, qualified mentorship during critical care training is vital.”

However, Steinhorn says it isn’t realistic for family practitioners or general internists to manage the most complex and sickest patients in the ICU without obtaining consultation and input from people who have dedicated their practice to critical care.

“Two-thirds of our patients can be managed with some degree of competence by meticulous, well-trained physicians,” Steinhorn says. “The problem arises when you misjudge your capabilities with a patient in that one-third of more complex patients, and what you’ve done with the ventilator during the first day or two of intensive care has boxed you into a corner on day 4 or 5 of care.”

What About More Training for Noncritical Care Personnel?

The shortage of both hospitalists and critical care

trained ICU personnel looms large on the horizon. “The ideal is to have people who are trained and present,” Harvey says. “But with our manpower shortage, we’re not going to have enough to fulfill either one of those requirements.”

Not every physician or nurse who wants to work in an ICU can afford the time and money to acquire 2 or 3 more years of training. Is there an educational path that can provide at least a partial solution?

Steinhorn says that a general internist or family practitioner is unlikely to develop critical care skills unless they spend most of their training time in the intensive care setting.

“I would say that one could at best provide general insights and guidelines for the initial stabilization and management of patients,” he says. “But it’s beyond the scope of a conventional general medicine or family practice or OB-GYN training program to give all of the insights and expertise one gains with 3 years of further specialized training.”

“You can’t create critical care nurses in a short amount of time,” Harvey says. “If all the ICU nurses left the ICU for 4 hours, the mortality rate would be incredible.” Harvey says the shortage is a huge problem that requires a large infusion of funds for recruiting, training, and retaining critical care nurses.

“All of the organizations are trying hard to get Congress’s attention,” she says. “I’m hopeful about current legislation being passed, but not about having enough critical care physicians or nurses in the next 10-20 years.”

In the pediatric realm, Steinhorn says insights and expertise general pediatricians receive in managing very sick patients has been increasingly compromised, perhaps because most general pediatric practices are unlikely to have more than 1 or 2 ICU patients a year.

However, he notes, it is unrealistic to not increase the duration of training programs as the knowledge of the base increases. “Those of us who do pediatric intensive care need to do a minimum of 8-10 weeks a year of nothing but ICU to maintain expertise and insights,” he says. “As intensive care has become more specific in therapeutic interventions available and our understandings of disease pathogenesis and how to modify the course of diseases, it has become as specialized as cardiology is from nephrology.”

However the training issue shakes out, Thompson says that the person with the greatest expertise from training should be the one who has the greatest input into management of the critically ill patient.

“Cooperation and collaboration are absolutely

essential,” she says. “When we fight over these things it doesn’t benefit anyone. We need to figure out ways to work well together rather than to struggle over whose space it is.” ❖

Failure to Ease Pain Brings Large Jury Award

CA doctor hit with \$1.5 million judgment

A San Francisco jury awarded \$1.5 million to a family of a deceased cancer patient who died while experiencing severe pain. The jurors agree that Wing Chin, MD, failed to adequately address the patient’s pain, but it did not rule that he acted with malice or had intentionally caused emotional distress, so there was no award of punitive damages.

In a trial that became a forum for the debate over how pain is treated in American medicine, an Alameda County jury on June 14 found that the internist committed elder abuse and reckless negligence by not giving enough pain medication to William Bergman, who died in 1998.

The case is a major victory for patients’ rights advocates who argue that many doctors don’t treat pain adequately, said Barbara Coombs Lee, president of Compassion in Dying, a Portland, OR, advocacy group that provided legal assistance for the lawsuit.

“It’s a good day for us,” she said. “This case was against all odds. . . . This is a precedent-setting case because, to our knowledge, never before has under-treating pain been defined as elder abuse.”

The suit was brought by Beverly Bergman, 45, the daughter of the retired railroad detective. ❖

Certified Palliative Medicine Physicians on the Rise

835 are now credentialed

The American Board of Hospice and Palliative Medicine (ABHPM) granted certification to an additional 56 physicians as of July 1, bringing the total to 835 physicians certified worldwide in the specialty of hospice and palliative medicine.

The medical specialty of palliative medicine is devoted to achieving the best possible quality of life for patients and their families faced with a life-threatening

or terminal illness. Physicians who achieve certification from ABHPM are recognized as experts in the practice of palliative medicine.

“The art and science of care for patients who are not likely to be cured has always been an important part of the physician’s role,” says Ronald Schonwetter, MD, chairman of the ABHPM. “Unfortunately, for the last generation of physicians, training in palliative care was not considered important. Physicians had to keep up with all of the technological advances in curative medicine. But all patients die eventually. And unless the physician is skilled in providing pain control, symptom relief, and working with a palliative care or hospice team, patients generally will not have the opportunities for comfort, dignity and closure that they deserve. ABHPM diplomates are the physicians helping medicine realize the importance of high quality end-of-life care.”

Eligibility requirements for certification from ABHPM are significant. Applicants for certification must have received prior major specialty certification, have practiced at least 2 years following residency, have worked as a member of an interdisciplinary team for at least 2 years and have directly participated in the active care of at least 50 terminally ill patients in the preceding 3 years. Applicants who meet these requirements are then permitted to sit for the annual certifying examination, which covers pain in cancer and noncancer patients, management of non-pain symptoms, hospice and palliative approach to care, ethical and legal decision making at the end of life, death and dying, and communication and team work.

ABHPM will offer the certifying examination again on Oct. 13. Applications to sit for the examination must be received by Aug. 31.

(Editor’s note: A handbook for examination applicants as well as other information on the American Board of Hospice and Palliative Medicine may be obtained from the web site at www.ABHPM.org or by calling 301.439.8001.) ❖

Readers are Invited. . .

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