

# CRITICAL CARE ALERT®

*A monthly update of developments in critical care and intensive care medicine*

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## Femoral Lines and Venous Thrombosis

ABSTRACT & COMMENTARY

This study was performed to determine the incidence of deep venous thrombosis (DVT) associated with the use of femoral venous catheters. Joynt and colleagues at the Chinese University of Hong Kong conducted a prospective, controlled, observational cohort study of all patients in their medical-surgical intensive care unit (ICU) who had femoral lines inserted during a 26-month period. Patients with previous DVT, hypercoagulable state, pelvic or abdominal trauma, prior femoral vein catheterization, or lower extremity ischemia were excluded, as were those who survived less than 24 hours after catheter insertion. All patients were studied with compression and duplex Doppler ultrasound of both femoral veins, before catheter insertion, then daily until catheter removal, and then one and seven days following removal. Routine DVT prophylaxis was not used.

A total of 124 patients qualified for the study, had femoral lines inserted, and had complete data. The right femoral vein was used in 105 patients and the left in 19. The mean age of the patients was 53 years and 41% of them were women. Approximately half had medical diagnoses; 25% were general surgery patients, 13% neurosurgery patients, and 8% trauma patients. Twelve percent of the cohort had known malignancy. The median APACHE II score for the group was 21 (range, 9-38).

Fourteen of the 124 patients (11.3%) developed DVT; this was in the leg with the femoral line in 12 (9.6%; relative risk 6.0, 95% CI 1.5-23.5;  $P = 0.011$ ). There was no difference in DVT incidence between right and left legs, and neither the size nor the length of the catheter was related to incidence. Leg swelling was not appreciated more often in patients with DVT, and no patient in the study had clinically suspected pulmonary thromboembolism. Most of the catheters were heparin-bonded, but the incidence of DVT was not discernibly different with non-heparin-bonded catheters. The number of insertion attempts, inadvertent arterial punctures, whether a hematoma developed, the number of days the line was in place, and catheter colonization at removal were not related to the occurrence of DVT.

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Joynt et al conclude that although the femoral route is convenient and has potential advantages for intravenous access and monitoring, the incidence of DVT is increased by the use of this route. (Joynt GM, et al. *Chest* 2000;117:178-183.)

■ **COMMENT BY DAVID J. PIERSON, MD, FACP, FCCP**

The most commonly used sites for venous access in critically ill patients are the subclavian and internal jugular veins. Use of these sites has complications, including pneumothorax with the subclavian route (reported in 1-5% of patients) and arterial puncture when the internal jugular is used (0.1-4%) (Agee KR, Balk RA. *Crit Care Clin* 1992;8:677-686). The femoral site has the advantages of no risk for pneumothorax, the ability to directly tamponade bleeding, and relatively straightforward anatomy, which decreases the risk for nerve damage and other complications.

It is common knowledge in critical care practice that use of the femoral route for venous access increases the likelihood of catheter-related infections, since the inguinal area is harder to keep clean than the upper thorax and neck. However, there is a paucity of actual data

on this, and no randomized studies of infection risk at different venous sites have been published. One study of radial vs. femoral arterial catheterization found no differences in the incidence of infectious complications (Russell JA, et al. *Crit Care Med* 1983;11:936-939).

Joynt et al excluded patients with several conditions that would be expected to increase the likelihood of DVT. Still, about one in 10 patients who had a femoral line developed a DVT on the side with the catheter. These results raise several questions: How many, if any, of the observed DVTs were clinically important? Clearly, documented development of a DVT in a patient who did not have one before catheterization is an important potential problem. What is the incidence of DVT with other central line sites when studied with the same methods? Most likely, it is lower. Would the use of DVT prophylaxis have decreased the incidence? Probably. Still, the main observation of this study remains, and clinicians need to realize that the potential advantages of the femoral site for vascular access are accompanied by real disadvantages. ❖

## Cardiac Synchronized Jet Ventilation Fails to Increase Cardiac Output

ABSTRACT & COMMENTARY

**Synopsis:** Comparing synchronized jet ventilation (SJV) with conventional mechanical ventilation (CMV), no significant effects on cardiac hemodynamics were seen in 20 patients following cardiac revascularization surgery. This was also true in those patients with reduced cardiac ejection fraction.

**Source:** Romand JA, et al. *Anesthesiology* 2000;92:24-30.

Some patients with severe ventricular failure have been shown to have increased cardiac output when ventilated with high-frequency jet ventilation timed and synchronized with the cardiac ejection cycle compared to conventional ventilation. These preliminary observations were seen with high jet pressures producing large ventilation volumes and marked hyperventilation. This study was designed to evaluate the effect of synchronization of jet ventilation compared to conventional ventilation on cardiac output when gas exchange was normal.

Twenty patients with normal or only moderately depressed left ventricular function and no evidence of

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chronic obstructive pulmonary disease or right ventricular dysfunction were studied following coronary bypass surgery. Patients were sedated with midazolam and morphine, ventilated at 12 breaths per minute with 8-10 mL/kg tidal volumes to achieve a PaCO<sub>2</sub> of 40 mmHg. Positive end-expiratory pressure (PEEP) was set at 5 cm H<sub>2</sub>O, and inspired oxygen fraction was adjusted to maintain SaO<sub>2</sub> greater than 93%. Pulmonary capillary wedge pressure was maintained at 10 mmHg with continuous infusion of normal saline and boluses as needed. A continuously reading oximetric pulmonary artery catheter was used to monitor mixed venous oxygen saturation (SVO<sub>2</sub>). Immediate changes in SVO<sub>2</sub> were used to identify the effect on cardiac output and to optimize jet timing while changing the jet firing throughout the cardiac cycle. Jet ventilation was delivered with no entrainment and passive exhalation, via an Accutronic AMS 100 ventilator (Jona, Switzerland).

After two hours to confirm stability, patients were studied during five sequential 30-minute periods of ventilation: CMV, SJV, CMV, SJV, and return to CMV. The first SJV period was used to optimize the timing of the jet ventilation by dividing the electrocardiographic R-R interval into 10 parts, moving the delivered jet to each point and observing the effect on SVO<sub>2</sub>. The second period was the test period using the triggering determined during the first period. Thermodilution cardiac output measurements, determined in triplicate, were compared during SJV and CMV, with each patient serving as his or her own control. The cardiac hemodynamic effects in patients with ejection fractions greater and less than 45% were grouped and compared.

No systematic differences were identified in cardiac output during any form of ventilation. This was also true in the 10 patients with low ejection fractions (EF = 35 ± 6%). Heart rate averaged 86 ± 15 beats/minute, venous admixture was 27%, oxygen extraction was 40%, and cardiac index averaged 2.5 L/min/m<sup>2</sup> under all conditions.

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

From this small study, it appears that synchronized jet ventilation offers no hemodynamic advantage in patients with modestly reduced cardiac function. There are several limitations to generalizing the conclusion that SJV offers no advantages. While Romand and colleagues attempted to maintain the same blood gases during the test periods, the PaCO<sub>2</sub> was lower during SJV than during CMV (32 compared to 35 mmHg). This may have counteracted any advantage of SJV on cardiac ejection by altering venous return and cardiac muscle function.

Another limitation was the relatively low filling pressure goal, 10 cm H<sub>2</sub>O. This could have made the effects

of airway pressure on cardiac ejection less apparent. The fact that others have seen increased cardiac output with SJV in severe heart failure suggests that perhaps an effect on ventricular filling may be more important in improving cardiac function as the presumed effect on cardiac ejection.

An interesting sidelight of this study is the way jet timing was optimized using the immediate effects on the SVO<sub>2</sub>. By observing the immediate change in the continuously monitored SVO<sub>2</sub>, the effects of changes in cardiac output were rapidly identified. This method can be used to optimize vasoactive drug infusions and arteriovenous (A-V) pacing intervals, as well as ventilation changes. While several factors determine SVO<sub>2</sub> (for example, hemoglobin level, oxygen consumption, hemoglobin oxygen affinity, and cardiac output), only changes in cardiac output can cause the rapid response observed in the seconds following an intervention. Thus, continuously monitoring SVO<sub>2</sub> allows hemodynamic optimization of many interventions in real time.

In conclusion, while this well-designed and executed study increases our understanding of the effects of synchronization of ventilation on cardiac function, it leaves many unanswered questions. ❖

## How Often Should HMEs be Changed?

ABSTRACT & COMMENTARY

**Synopsis:** *No overall deterioration in the effectiveness of humidification or heat conservation was observed when heat and moisture exchangers were used for seven days, although the devices had to be replaced before seven days in three patients with COPD because of inadequate humidification detected in the course of the study.*

**Source:** Ricard JD, et al. *Am J Respir Crit Care Med* 2000;161:104-109.

Ricard and associates performed a prospective observational cohort study of the efficiency and safety of heat and moisture exchangers (HMEs) in medical intensive care unit (ICU) patients requiring mechanical ventilation for more than 48 hours. They sought to determine whether HME use could be extended to seven days without deterioration of the device's humidification function or increased bacterial colonization.

During a nine-month period, all patients admitted to the ICU who were judged likely to require ventilatory

support for more than 48 hours were considered for the study. Excluded were individuals with initial core temperatures less than 33°C, poisoning by ingestion of hydrocarbons (which would be eliminated via exhalation), or bronchopleural fistula. The same hydroscopic and hydrophobic HME (Hygrobac-Dar; Mallinckrodt) was used in all patients. Placed vertically between the endotracheal tube and the Y-piece of the ventilator circuit, the HME was changed every seven days.

Ricard et al measured absolute and relative humidity, using a psychrometric method, along with tracheal temperature, within the first 48 hours and then daily from day 3 until day 7. They recorded the daily number of tracheal suctionings and instillations, and peak airway pressures (daily mean of every-6-hour measurements, as an indicator of airway obstruction). HME resistance to airflow was measured daily on one-third of the patients. For these assessments, data were reported as comparisons between findings on day 0 and day 7. In addition, bacterial colonization of the HMEs was assessed at the time of removal from the circuit at seven days.

Data were collected on 33 patients, whose mean age was 67.3 years, 15 of whom were women. Ten patients were ventilated because of chronic obstructive pulmonary disease (COPD), 13 because of other pulmonary diseases, four postoperatively, and six because of other conditions. The 33 patients were ventilated a total of 377 days. Twelve patients provided more than one seven-day study period.

The HMEs performed well in terms of humidification and maintenance of airway temperature, without detectable deterioration during the seven-day observation periods. No incidents of endotracheal tube occlusion occurred. However, absolute humidity was significantly lower in patients with COPD than in the other patients, and three HMEs required replacement because of insufficient absolute humidity. Mean airway resistance was not different on day 0 vs. day 7. There were no statistically significant differences in number of suctionings or instillations between the two observations. Bacteriological studies showed that 20 of the HMEs were sterile, while the other 13 had negligible numbers of coagulase-negative staphylococci (in 11 instances), *Candida albicans* (1), and *Bacillus* sp. (1). Similar bacteriological results were obtained from cultures of the Y-piece.

Ricard et al conclude that mechanical ventilation can be safely conducted in non-COPD patients using an HME changed only once per week. They estimate that a yearly cost savings of \$110,000 could be realized if this practice were adopted in all the university-affiliated hospitals in Paris. However, they recommend that HMEs continue to be changed every 48 hours in patients with COPD.

#### ■ COMMENT BY DAVID J. PIERSON, MD, FACP, FCCP

Although HMEs humidify the airways slightly less effectively during mechanical ventilation than heated humidifiers, they are substantially less costly in terms of both parts and labor. The slightly reduced humidification is probably of no clinical importance for the majority of patients requiring ventilatory support, and there has been increased use of these devices over the last decade. This study shows that, for medical ICU patients who do not have COPD, there is no appreciable deterioration in the function of the HME used over the first seven days. It might be argued that even the COPD patients were acceptably managed with an HME, since there were no clinical obstructions and the diminished humidification prompting replacement of the device in three instances was detected because of the study and likely would not have been noticed during usual patient care.

HMEs probably should not be used when ventilating certain categories of patients. The patients in this study were medical patients with a mean ventilatory requirement of 9 or 10 L/min. The efficiency of an HME declines with minute volumes substantially exceeding 12-15 L/min, and they are not used in most centers for patients with trauma, sepsis, and other conditions associated with a high minute ventilation requirement. In addition, the presence of copious secretions may necessitate more frequent HME changes because of accumulation and obstruction, thus decreasing or eliminating any cost savings. However, the majority of patients who require mechanical ventilation can be managed more economically and without a clinically important loss of humidity or airway temperature through the use of an HME, even when ventilatory support is necessary for several days. ❖

### *Special Feature*

## **The Structure of Intensive Care: If You've Seen One ICU, You've Seen One ICU**

*By Gordon D. Rubinfeld, MD, MSc*

Measuring the quality of a complex service such as critical care that combines the highest technology with the most intimate caring is a challenge. Donabedian proposed a framework for thinking about the quality of medical care that separates quality into three components: structure, process, and outcome.<sup>1</sup> There is a debate about which of these measurements is the most important measure of quality. A compelling argument

can be made for considering patient outcome as the only important measure of medical care quality. Several attempts have been made at judging the quality of intensive care based on an important outcome—severity-adjusted mortality.<sup>2</sup> Nevertheless, structure is an essential aspect of critical care and it, along with process, are the means by which we effect change in outcome.

Studies of ICU structure are complicated by the variable nature and elusive definition of critical care. One must decide whether one is studying the structure of the ICU as a geographic location (as all existing studies have done) or of critical care as a service to a particular patient population. Are patients on prolonged ventilatory support in a nursing home in an ICU? Are patients being weaned in a post-anesthesia care area after cardiac bypass surgery receiving intensive care? Is the emergency department an “intensive care unit” when critically ill patients are cared for there for various periods? The answers to these questions will determine which special care areas and which processes of care constitute critical care.

The Society of Critical Care Medicine (SCCM) has published a number of guidelines on ICU structure.<sup>3,4</sup> The American College of Surgery’s criteria for trauma center designation contain explicit recommendations for the organization of critical services.<sup>5</sup> This detailed document includes specific structural criteria for human and material resources as well as their organization.

With one or two important exceptions, there is little evidence linking ICU structure to specific outcomes and therefore most recommendations are not evidence based. An understanding of the complex domains of ICU structure is facilitated by breaking it up into components (*see Table 1*).

**Table 1**  
**Domains of ICU Structure**

Material Resources	
•	Physical layout
•	Technology
Human Resources	
•	Physicians
•	Nurses
•	Nonphysician clinicians
Organizational Structure	
•	Admission policy—closed vs. open
•	Governance style
•	Specialty units and teams

### Material Resources

**Physical Layout.** There have been two sets of recom-

mendations by the Society of Critical Care Medicine for the layout and resources necessary for an ICU.<sup>3,4</sup> Many of the recommendations come from common sense and basic concepts of human performance engineering. Of equal importance to the effect of the ICU on providers is the effect of the room, its layout, and design on the patient and visitors. In fact, ICU designers must consider a variety of users who spend time in the ICU. Therefore, it is essential that design of new units or modification of existing units be a collaborative process.

**Technology.** Perhaps nothing defines the modern ICU more than its armamentarium of sophisticated technology for monitoring, supporting, and changing human physiology, as well as organizing and displaying the collected data. The SCCM guidelines recommend, at a minimum, “the analysis and display of one or more electrocardiographic leads, at least two fluid pressures, and direct or indirect measures of arterial oxygen levels.”<sup>6</sup>

Technology has a profound effect on the organization and process of care in the ICU. Theoretically, sophisticated “smart” alarms would allow one nurse to care for more patients. Unfortunately, while it seems intuitive that trading technology for human labor will result in lower costs, there is little evidence that substituting technology for nurses can result in significant cost savings. The effect of advanced technology on patient outcome is itself a controversial area.<sup>7,8</sup> Some studies suggest that having advanced technology available leads to better outcome, but other studies do not.<sup>9</sup> Curiously, and perhaps not unexpectedly, one study found that higher levels of technologic availability were associated with a decreased ability to meet family needs, raising the possibility that a focus on technology may lead ICU providers to neglect the human needs of their patients.<sup>9</sup>

### Human Resources

In addition to physicians and nurses, a large number of nonphysician clinicians, allied health personnel, and support staff contribute to the care of critically ill patients. Workforce issues related to critical care are extremely important.<sup>10</sup> Recent health care reforms in the United States have had a profound effect on the deployment of human resources throughout the health care delivery system.<sup>10</sup>

**Physicians.** Although there are a great deal of data on the effect of the organization of the ICU on outcome, there are relatively few data on the effect of subspecialty physician training on knowledge, process of care, or outcome in the ICU. Studies evaluating patient outcome and physicians’ knowledge in cardiology and AIDS care show benefit of specialty training and the same might be expected in critical care.<sup>11,12</sup>

**Nurses.** In many ways, intensive “care” is intensive “nursing care.” The education and allocation of nursing staff in an ICU is an important job for ICU leaders. There are relatively few data available to guide clinicians to the optimal nurse:patient ratio for critically ill patients. In one study, the nurse:patient ratio was not associated with outcome or efficiency of ICU care.<sup>9</sup> It may be that the actual nurse:patient ratio has less of an effect on care than how the patient’s needs are assessed, how tasks are assigned, and that this process be collaborative.

**Other Nonphysician Clinicians.** A number of non-physician clinicians participate in the care of critically ill patients. These include physicians’ assistants, nurse practitioners, advanced practice nurses, respiratory therapists, and pharmacists. These providers have demonstrated efficacy in a number of practice areas outside of the ICU. There is some experience using nonphysician clinicians to replace housestaff in intensive care.<sup>13,14</sup> Experience within the adult ICU is limited and a recent ICU survey suggests that less than 10% of adult ICUs use physician assistants or nurse-practitioners.<sup>15</sup> Finally, although virtually every ICU in the United States employs respiratory therapists, relatively little is known about the organization and delivery of respiratory care in ICUs.<sup>16</sup>

The role of pharmacists in critical care deserves special mention. A recent report on the effect of medical errors on patient outcomes identified adverse drug events as a major component of preventable hospital mortality and morbidity.<sup>17</sup> There is a compelling body of evidence that routine use of pharmacists in the ICU and computerization of drug ordering can reduce these negative outcomes.<sup>18</sup>

## Organizational Structure

Organizational structure is a less tangible concept than either human or material resources. It describes how the individual pieces of the ICU interact to form a whole. Business schools recognize the importance of organizational structure, and entire courses and texts are devoted to this topic. Two texts focus on organizational management issues in critical care.<sup>19,20</sup> For the purposes of this review, organizational structure in the ICU will be considered in three general categories: admission policies, governance style, and specialization.

**Admission Policy.** While most ICUs have a physician medical director, the responsibility of this person for the actual care of patients varies considerably in different ICUs.<sup>21</sup> Although there is no standard terminology, admission policies to ICUs are described as “open” (physicians admit their own patients to the ICU and direct their care), “closed” (admission to the ICU is restricted, and physicians must transfer primary care of

their patients on admission to a designated ICU team that is responsible for order writing), or “semi-closed” (patients receive mandatory consultation from a select group of physicians, but primary care of the patient is not transferred). Obviously, these are points along a continuum and a variety of intermediate models exist. In some hospitals, different units will be run under different admitting policies.<sup>21</sup>

Because there is no standard set of terms to describe these policies in ICUs, it is difficult to compare results from different studies and therefore difficult to understand what the admitting policies are in various ICUs around the world; however, considerable variation in ICU size and admitting policies has been observed (*see Table 2*).

Larger hospitals with larger ICUs, academic hospitals, medical (as opposed to surgical) units, and ICUs with predominantly managed care patients all tend to have or be closed units.<sup>15,21</sup> These data suggest that the impediments to an organized critical care service may be due to insufficient ICU activity to support a full-time service, reimbursement strategies that provide incentives to care for one’s own patients in the ICU, and the reluctance of operating surgeons to relinquish control over care of their patients.

At least 16 studies have tackled, in one form or another, the question of the effect of admitting policy and authority on ICU outcome. Although the admitting policies in these studies and the methods are too heterogeneous to allow a formal quantitative meta-analysis, some general themes emerge. Generally, the studies show an improvement in outcome with a reduction in mortality with a closed ICU run by an intensivist. None of the studies show worsening mortality with a move toward a controlled admission policy. Almost all of the studies show some improvement in the way the ICU is used: reductions in monitor-only patients, reduction in length of stay, or reduction in ineffective treatments.

**Governance Style.** Older, hierarchical models of medical care, where a single physician autocratically determines management, are no longer tenable. As medicine becomes more complex and interdisciplinary, newer, collaborative models of governance are required.<sup>22</sup> Modern quality improvement techniques rely on empowering all workers to identify novel solutions and work toward improving the process of care. Critical care epitomizes team-based, multidisciplinary care, and it seems fairly obvious that teams that communicate well, that empower all members to contribute ideas, and where responsibility is shared, will provide better care.

**Specialty Units and Teams.** One of the most reproducible observations in health services research is called

Table 2

## Structure of U.S. and Western European ICUs

	U.S. 1992 <sup>21</sup>	U.S. 1998 <sup>15</sup>	Western Europe 1992 <sup>27</sup>
Affiliation			
University or university affiliated	31%	43%	49%
Community	69%	57%	51%
Size	Average 11.7 beds	48% > 10 beds 40% 6-10 beds 12% < 6 beds	25% > 10 beds 57% 6-10 beds 18% < 6 beds
Mixed Medical Surgical	45%	66%	74.4%
Closed unit	22%	29%	NR
24-hr critical care specialist available	5%	NR	71.7%

the “volume-outcome” relationship.<sup>23</sup> Across a broad range of medical treatments, the more experience a provider or hospital has with a particular disease or procedure, the better the outcomes appear to be. Two models have been explored: 1) bringing the patient to the experienced providers (specialized ICUs) and 2) bringing the experienced providers to the patient (special consult teams within a general ICU). Regionalization of critical care has been proposed as a way to improve outcomes by funneling critically ill patients to large-volume centers.

### The Future

Technological innovation and changes in reimbursement may have profound effects on the organization of critical care over the next decade. These may lead to novel structures for ICUs or may lead to the dissolution of the ICU as we currently know it. In most hospitals, patients are moved to the ICU when they become critically ill. In the future, the technology may be brought to the patient or telemedicine may bring a distant doctor to the bedside.<sup>24,25</sup>

Thus far, we have dealt with the ICU as a structural entity in isolation. However, there are important organizational issues in how the ICU relates to the rest of hospital care and, more broadly, how critical care is incorporated into a regional health care system. Hospitalists, a new specialty of physician, have been proposed in part to meet the specialized needs of an increasingly complex and severely ill population of hospitalized patients.<sup>26</sup> How hospitalists and intensivists will share responsibility for critically ill patients as they move from the emergency room, operating room, or hospital ward to the ICU and back again has not been carefully worked out.

### Conclusion

The modern ICU is a structural entity. In it are focused

specific human and material resources organized to deliver care to critically ill patients. While some improvements in ICU structure have face value and may not merit extensive empiric validation, many questions about the optimal structure of critical care remain. Studies demonstrating an effect of ICU structure on process of care or outcome are challenging because they do not lend themselves to randomized controlled trials; they present hierarchical data analysis problems, and their findings may not generalize beyond the ICU in which they were carried out.

Regardless of these limitations, ample data exist to convince us that the structure of health care has a profound effect on both process of care and outcome. Identifying which structural and organizational improvements apply in different ICU settings, and linking these to specific patient outcomes, are great challenges for future investigation. ❖

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## CME Questions

- 10. Compared with subclavian and internal jugular locations, the use of the femoral site for venous access has been proven to result in:**
  - a. more line-associated infections.
  - b. an increased incidence of pneumothorax.
  - c. deep venous thrombosis in 10% of patients.
  - d. pulmonary embolism in 4% of patients.
  - e. None of the above
- 11. Compared to conventional ventilation, synchronized jet ventilation:**
  - a. increases the risk of pneumothorax.
  - b. depresses myocardial contractility.
  - c. improves cardiac output.
  - d. decreases time to extubation.
  - e. achieves comparable hemodynamics.
- 12. When heat and moisture exchangers were left in place for seven days:**
  - a. airway resistance progressively increased.
  - b. colonization of the HME progressively increased.
  - c. suctioning was required more often.
  - d. All of the above
  - e. None of the above
- 13. Each of the following is an aspect of ICU structure except:**
  - a. the number of ventilators the ICU owns.
  - b. the nurse-to-patient ratio.
  - c. the risk-adjusted mortality of the patients.
  - d. who is allowed to admit to the ICU.
  - e. whether the nurses and doctors work collaboratively.
- 15. Which of the following statements about U.S. ICUs is true?**
  - a. All ICUs have an on-site 24-hour intensivist.
  - b. All ICUs have a step-down unit available.
  - c. All ICUs have at least six beds.
  - d. All ICUs are capable of performing continuous veno-venous hemofiltration.
  - e. None of the above

### **Technology: A Critical Care Blessing, and a Malpractice Curse**

*By Julie Crawshaw*

**A**dvances in life-saving and life-extending technology are obviously a boon to critical care medicine. But they also can put critical care physicians on the hot seat in malpractice trials.

Simply stated, if you don't use the best and latest medical devices—despite their cost—a plaintiff's attorney is likely to use them against you and your institution in a lawsuit.

"The ... problem in ICU is that it's a very expensive area of medicine for the hospitals," says Jeffrey S. Raynes, a malpractice lawyer in San Bernardino, CA. He points out that keeping ICU patients alive, often on life support, is costly. How much neuromonitoring are physicians permitted to do? How do they know whether they have cerebral oxygenation? Are they judging cerebral oxygenation from a pulse oxymeter or are they actually testing brain oxymetry, which probably costs about \$100 for the electrodes?

"You can't do everything that's possible, but if a jury hears there were things available that would have given the CCU doctor good information they don't much care that those things would have added to the cost.

"You have to remember," Raynes says, "that generally you are in court because you had a catastrophic result. To get on the stand and say 'Well, we can't do this in every case because it would be financially negative' doesn't sell well to juries."

In other words, it's easy for administrators to look at the bottom line in critical care, but if you have one patient who comes out hypoxic or ischemic you'll wish you'd had cerebral oxymetry.

Raynes sees this as being one reason there's so much new medicine occurring today. For example, heart surgeons are beginning to look at doing more beating heart surgery without the heart-lung pump. "They're looking at it not only because it's safer, but because it's much less expensive," he says. "With that in mind, it's hard to justify not using all the safeguards and precautions you possibly can."

In critical care, Raynes says, lawyers need to realize that the first evaluation is the distinction between a poor medical result and poor medical management. "Any patient in the ICU has a good chance of having a poor result," he says. "When families come to me after having bad experiences in CCU, I tell them the first thing we need to do is understand that some people die on the table. It doesn't have to mean anyone did anything wrong—in fact, the care could have been heroic."

Impeccable charting is the best preventive medicine against malpractice suits, and Raynes says that good charting practice doesn't require that everything be written down. However, the physician who charts positives but not negatives will have a poor outcome in trial.

"They don't win against any quality attorney," Raynes says. "Defeating them is as simple as asking 'Weren't you taught in school to chart all significant findings, both positive and negative?' If they don't answer that affirmatively, an expert witness will."

He strongly counsels physicians to remember that it's as important to chart that a patient has a normal temperature as it is to chart an abnormal one. The information is meaningful either way.

“You’d be shocked at the number of lawsuits we see where physicians don’t chart negative findings and then ask us to assume that they did everything and it was all normal,” Raynes says.

Raynes accurately observes that not every ICU patient comes in from open-heart surgery. “It’s much more common now to get critical care patients through the emergency department. They come in drug-overdosed, HIV-positive, with systemic illnesses, diabetic, hypertensive.” He noted that when lawyers look at these cases it’s important for them to realize how much easier it is to evaluate ICU cases after the fact. “While the trauma is occurring, it’s not easy to keep these people alive. I’m very careful with critical care cases,” he says.

Communication is also a key factor—communication between doctor and patient, between doctor and doctor, between doctor and nursing staff, between doctor and the patient’s chart.

“Generally speaking,” Raynes says, “the higher the level of communication, the better the level of care and the lower the risk of a malpractice lawsuit. Oftentimes, whether a case is or isn’t filed depends on the chart. The more information on patient care that needs to be supplied verbally, the harder it is to defend the case.”

Malpractice defense attorney Thomas A. Packer from San Francisco concurs. “Many successful plaintiffs got that way because of poor chart keeping. The adage is, if you didn’t chart it, you didn’t do it.” Packer knows whereof he speaks. As vice chairman of the Medical Liability Committee of the Defense Research Institute (DRI) and a partner in the San Francisco-based law firm of Gordon Rees, he’s had plenty of experience in counseling and defending physicians accused of malpractice.

Packer’s fellow DRI committee members are attorneys, risk management professionals, insurance representatives, and in-house counsel for health care systems who are all interested in common issues in defense of medical liability claims. “We hold an annual two-day seminar to discuss matters of common interest in defending medical malpractice claims so that they can be more effectively defended and resolved,” Packer says.

DRI was organized in 1960 by attorneys who were concerned that the scales of justice were beginning to weigh too heavily in favor of plaintiffs and that balance in the civil justice system needed to be restored. Since 1976, DRI has held more than 300 continuing legal education seminars throughout the United States on topics ranging from insurance coverage and practice, medical malpractice and environmental and hazardous waste litigation, to employment law, products liability,

and drug and medical device litigation.

One good way to avoid lawsuits is simple: Establish a good rapport with your patients and their families. Raynes and Packer both observe that what often stops people from filing lawsuits is that they’re pleased with their physicians. “A very good, open relationship with a physician will deter a patient from filing a malpractice case to begin with,” Packer says. “Even if a mistake is actually made, if the communication and relationship are good, the patient may well not bring suit.”

Packer notes that there are certainly a large number of claims against health care professionals that are without merit. He always wants his client sitting next to him in court during a trial, to show commitment to the case and so the jury gets to know the defendant. But going to court always takes huge chunks of time away from the defendant’s practice, and there are always delays in trials.

“Many times my physician clients will see patients starting at 6 a.m., get to court by 8:30, maybe see a patient during lunchtime, and then again after 5 p.m. so that they can see their patients and keep their income streams going,” Packer says.

He notes that in any medical malpractice case, the first thing the plaintiff must prove is liability, that the provider acted below the standard of care for the community by doing (or failing to do) something reputable doctors in the community would have done. The second is that the plaintiff sustained harm as a result, and for this the plaintiff bears the burden of proof. ❖

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## Do You Defend Yourself or Settle Out of Court?

*By Julie Crawshaw*

**A** strong defense against a lawsuit is important not just for reasons of justice or finance, but because a verdict or settlement against a physician can have lasting consequences. The reason is the National Practitioners Databank (NPD).

The NPD was created 10 years ago as a private, closed source for information for credentialing and to gather information to improve the quality of medicine. But the NPD has taken on new importance since March, when its files were opened to the public.

The data bank contains information on more than 229,000 malpractice payments and adverse licensure, clinical privileges, and professional association activities taken against some 146,000 physicians and dentists.

Opponents of opening the database point out much of its information, especially malpractice information, may be more misleading than helpful to consumers trying to locate a qualified physician or check their present doctor's background.

These opponents argue that certain medical procedures are riskier and tend to attract more litigation. Plus, insurers often push physicians to settle claims rather than engage in expensive legal battles.

"Some of our country's best physicians are involved in settlements, yet this data bank contains nothing that also reflects their high level of competence," notes AMA President Thomas Reardon, MD.

When a case is settled or there is a judgment against the health care provider, that fact typically has to be reported to the national practitioners data bank.

There are also individual state reporting requirements to medical boards. For example, in California a case settled for \$30,000 or more must be reported to the state medical board, which may choose to investigate the case, taking more of the physician's time and possibly resulting in action against his license.

Thomas A. Packer, a malpractice attorney, says these factors lead to a larger percentage of medical malpractice cases actually being tried as opposed to being settled. The physician who proceeds to trial and wins does not have to report anything to anyone.

Packer says that getting physicians to assent to mediation is always a critical issue. Conversely, sometimes the health care provider does want to settle the case but the insurer providing liability indemnity doesn't. For general damages in a case with more than one defendant, if one defendant is determined to have been 60% responsible and the other is found 40% responsible, then there is only several liability and the defendants are required to pay in proportion to those percentages.

But if one defendant doesn't have enough insurance or is otherwise unable to satisfy the judgment, the plaintiff can't go against the other defendant for what he couldn't collect. However, on the special damages, which is out-of-pocket, loss of wages, medical expenses, defendants are jointly and severally liable and plaintiffs can choose which defendant they want to collect from, or collect from both. A case that involves two or more defendants who are blaming each other can be extremely hard to settle.

If it looks like the plaintiff may prevail in court, it makes sense to settle the case and resolve any differences between the defendants later.

Packer emphasizes that getting a mediator who is respected by both sides and experienced in resolving

cases involving health care providers is essential because of dynamics unique to medical malpractice cases.

"Media exposure typically emphasizes the plaintiff's, not the defendant's point of view," Packer says. "What people don't realize is the negative effect a malpractice suit has on a medical professional's life. These suits can drag on for several years, taking a terrible toll on the defendant's practice and personal life. I think mediators often make the mistake of not empathizing sufficiently with the health care provider, and don't spend enough time one-on-one with the defendant."

Any mediation is a dynamic, fluid process. In order to be effective, both sides have to really want to mediate the case, not just think about it and go to see what mediation is like. "It always comes down to dollars and cents, and sometimes you can't bridge the gap between what the plaintiff wants and the provider is willing to pay," Packer says. A good mediator will make each side feel insecure about their case, which is what causes them to agree on a settlement.

"Malpractice prevention is good patient care," observes Raynes. For example, does a smoker find out right away that he has a tumor, or does he have to wait a year until it has metastasized into the bones? Raynes says that many physicians misunderstand the term standard of care as what is ordinarily done. It really is what a reputable physician would ordinarily do. "You can't lose sight of the adjective 'reputable.' People who are reputable continue their education, continue their training, and have experience," Raynes says.

Packer says that defendants frequently fear the jury's response to a visibly damaged plaintiff. "The best way for a defense attorney to deal with the shock of a plaintiff's appearance is to be open and frank with the jury, not to try and hide from it," he says.

A brain-injured child, or a disfiguring injury, emotionally charged family members, or a plaintiff who may be rapidly nearing death all create sympathy within the jury. A defense attorney needs to keep them in the open so the jury can put it into perspective and context and ultimately decide the case on the facts and the law. ❖

## Sources

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# Cost-Effective Ways to Get Malpractice Policies

By Julie Crawshaw

Insurance carriers have gotten more sophisticated about underwriting malpractice coverage, says James Walsh, senior editor at Silverlake Publishing Company and contributor to Silverlake's *It's Your Fault*, a bestselling book about finding personal and professional liability insurance in a litigious culture.

"They're doing more homework now, investigating, and asking questions," Walsh says. He notes that while some physicians perceive this as too invasive, careful underwriting makes for more cost-effective coverage across the board. In other words, the thing that annoys them is the very thing that gives them a better bottom line.

"This does make it more difficult for someone who's had problems in the past to obtain coverage, but that's only fair," Walsh says. "What carriers are better able to do today than 10 years ago is penalize people who've had problems. We're not talking one or two problems, but repeated malpractice claims. For the average physician—who may find being investigated a hassle—the overall effect of this deeper level of underwriting is more cost-effective protection."

Walsh points out that medical entities usually buy professional liability insurance as well as general liability insurance for all the professionals in their employ, generally combining layers of risk layoff. In many cases, the coverage is as much a mechanism for financing legal costs as it is for covering judgments. "Sometimes the most important thing professional liability insurance covers is the cost of a defense," Walsh says.

Walsh says that individuals are well advised to have their own coverage, but cautions that a specific individual medical malpractice liability insurance policy is likely to be expensive. "In many cases, if the physician is covered by insurance through the employing entity, he or she will have a general liability through an umbrella policy. That isn't always a good idea," Walsh says. He noted that in most cases, an umbrella liability policy will carve out business-related or professional liability claims, so it's best to have a medical malpractice liability policy that you own.

"Right now, the market is somewhat soft, meaning that it's easier to buy coverage now than it has been at other times, say seven or 10 years ago," Walsh says. He attributes this in part to improved underwriting on the part of liability carriers. But he says it's also related to

larger economic issues that are making the money available to write the coverage.

"There's no question that even for individual coverage the process of structuring layers of coverage has become very sophisticated," he says.

In many cases, a broker will set up even an individual physician with a complex combination of self-insurance, different limits of personal and professional liability insurance, and can structure an umbrella policy that can be surplus over a layer of professional liability insurance.

Essentially, that's just what a broker is supposed to do. You pay the broker to know the marketplace and be able to determine the most cost-effective way to combine different kinds of coverage to equal in total a zero to several-million-dollar blanket of coverage.

How do you find a good broker? Walsh says you can start from the top down or the bottom up. "Smart people use the Internet to go to Johnson and Higgins or AIG or Alexander and Alexander, then work down from those large brokers who specialize in high-end professional liability to a local broker who can do the same," he says. "Others use the old-fashioned method, which is to ask other physicians whom they use as a broker and select one on that basis."

Walsh notes that buying malpractice coverage is a long way from buying auto insurance or a homeowner's policy, which has gotten so easy that anybody can find it. The combinations of coverage required to give the most cost-effective protection really require the services of someone who does this for a living. Walsh says it's possible—but not advisable due to low cost-effectiveness—for an individual professional to contact a managing general agent or carrier directly for coverage, or buy it through a physicians' professional group association. As in any kind of heavily customized marketplace, the cost differential between malpractice insurance packages assembled by different carriers can be quite significant.

The future of the marketplace has a lot to do with health care reform, Walsh says. "A lot of what's in government programs has to do with malpractice liability. The trade-off many physicians favor is limited liability in exchange for heavier government regulation. But at a time when across the industry malpractice insurance is becoming more sophisticated and cost-effective, I wonder if that's a good trade-off." (*Julie Crawshaw is a freelance writer in Salude, NC.*) ❖

## Source

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