AHC Media

Vol. 20, Issue 11, February 2013
www.ahcmedia.com

Critical Care [ALERT]

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

SPECIAL FEATURE

Life After the ICU: Improving Decision Making About Chronic Critical Illness in the Acute Care Setting

By Betty Tran, MD, MS

Assistant Professor of Medicine, Pulmonary and Critical Care Medicine, Rush University Medical Center, Chicago

Dr. Tran reports no financial relationships relevant to this field of study.

In their 1985 article "The Chronically Critically Ill: To Save or Let Die?," Girard and Raffin created the term "chronically critically ill" to describe patients admitted to an ICU who survived their acute insults but remained dependent on intensive care therapies.[1] It is estimated that more than 100,000 such patients exist in the United States at any point in time, and this number is projected to increase over the coming years. Respiratory failure necessitating prolonged dependence on mechanical ventilation is invariably a key component of chronic critical illness (CCI). A consensus conference recommended a formal definition of prolonged mechanical ventilation (PMV) as ≥ 21 consecutive days on the ventilator for ≥ 6 hours/day, although many studies have also included patients who have undergone tracheotomy placement after ≥ 4 days of mechanical ventilation for an expected prolonged ventilator weaning course.[2] Current evidence, however, suggests that CCI is a larger syndrome comprised of additional comorbidities such as profound neuromuscular weakness, brain dysfunction, endocrinopathy, malnutrition, increased vulnerability to infection, skin breakdown due to anasarca, incontinence, prolonged immobility, and symptom distress.[3]

Although prognosis for patients with CCI is dismal, this group uses a disproportionate amount of health care resources, and studies have revealed that both surrogate decision makers and physicians are overly optimistic about long-term outcomes. This special feature aims to present

Financial Disclosure: *Critical Care Alert*'s editor, David J. Pierson, MD, nurse planner Leslie A. Hoffman, PhD, RN, peer reviewer William Thompson, MD, executive editor Leslie Coplin, and managing editor Neill Kimball report no financial relationships relevant to this field of study.

[INSIDE]

Critical Care [ALERT]

Critical Care Alert,
ISSN 1067-9502, is published monthly by AHC Media, a division of Thompson Media Group LLC, 3525 Piedmont Road, NE Building 6, Suite 400 Atlanta, GA 30305.

POSTMASTER: Send address changes to Critical Care Alert, P.O. Box 105109, Atlanta, GA 30348.

SUBSCRIBER INFORMATION
1-800-688-2421
customerservice@ahcmedia.com

Editorial E-Mail:
neill.kimball@ahcmedia.com

Subscription Prices
United States
1 year with free AMA Category 1 credits: $319
Add $17.95 for shipping & handling. (Student/Resident rate: $120).

Multiple Copies: Discounts are available for group subscriptions, multiple copies, site-licenses or electronic distribution. For pricing information, call Tria Kreutzer at 404-262-5482. 1-9 additional copies: $215 each; 10 or more copies: $191 each.

Back issues: $40 Missing issues will be fulfilled by customer service free of charge when contacted within one month of the missing issue's date.

Canada: Add GST and $30 shipping. Elsewhere: Add $30 shipping.

GST Registration Number: R128870672. Periodicals Postage Paid at Atlanta, GA, 30304 and at additional mailing offices.

ACCREDITATION
AHC Media is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

AHC Media designates this enduring material for a maximum of 25 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

AHC Media is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation. This activity has been approved for 13.3 nursing contact hours using a 60-minute contact hour. Provider approved by the California Board of Registered Nursing, Provider # 14749, for 13.3 Contact Hours. This CME activity is intended for critical care physicians and nurses. It is in effect for 36 months from the date of the publication.

a current overview of CCI from economic and ethical perspectives and discuss strategies for improving discussion about CCI in the acute ICU setting.

CHRONIC CRITICAL ILLNESS: THE COSTLY FEW

Although only 5-10% of patients transition from acute to CCI with PMV, these patients generate 13% of all hospital costs in the United States, a figure that exceeds $20 billion per year.[4] In one study, the provision of PMV costs $82,411 per quality adjusted life-year saved when compared to comfort care.[4] Notably, these estimates do not include average 1-year costs accrued after discharge from an acute care setting related to hospital readmissions, interfacility transportation, and outpatient care, as well as the significant direct costs to families caring for patients with CCI in terms of lost productivity and work days.

The high costs for long acute care stays have created financial incentives for early transfer of patients with CCI to post-acute care facilities, such as long-term acute care hospitals (LTACs) where the mean length of stay is ≥ 25 days, and for further ventilator weaning, physical rehabilitation, and other intensive care therapies. This has resulted in a rapid increase in the number of LTACs (8.8% per year) and LTAC beds (5.9% per year) from 1997 to 2006.[5] In contrast to acute care hospitals, however, LTACs have the ability to select their patient population for admission, are not governed by laws requiring treatment regardless of ability to pay, and often operate at high profit margins, all factors that can contribute to disparities in terms of access. Furthermore, the overall cost "savings" associated with LTACs may be offset by higher Medicare payments and the trend of earlier transfer to LTACs of increasingly sicker patients who may ultimately require subsequent readmission to acute care hospitals.[3,6] Notably, the expansion of the LTAC model of care has yet to be supported by evidence that such venues improve patient outcomes.

Data from retrospective cohort studies have also revealed racial and insurance differences with regard to LTAC utilization. Patient-level hospitalization data from the Medicare Provider Analysis and Review files reveal a higher age-adjusted incidence of LTAC transfers for male and black individuals, the latter of which had more than twice the transfer rates as white individuals.[5] Whether this observation reflects the preference among black patients for more aggressive care at the end of life, a higher incidence of CCI among black individuals, or greater accessibility given a high concentration of LTACs in urban areas is yet to be determined. In contrast, a separate study using data from the Pennsylvania Health Care Cost Containment Council found no race effect in patients aged ≥ 65 years of age (nearly all of whom have Medicare as their payor), but did find that for patients < 65 years of age, black race was significantly associated with a decreased odds of transfer to an LTAC, an observation that was attributed to insurance status (black patients were more likely to have Medicaid or be uninsured) and hospital-level effects (hospitals that tend to discharge to LTACs had a higher proportion of white patients).[7] Given that LTACs have the freedom to select their patients based on criteria such as their ability to pay and may have special relationships with the referring acute care hospital, these findings are not surprising, although the disparities this can create are disturbing.

GREAT EXPECTATIONS: SURROGATE AND PHYSICIAN PREDICTIONS IN CHRONIC CRITICAL ILLNESS

Recent studies have revealed significant weaknesses in the process of decision making regarding life support and prognostication in CCI. One-year outcomes for patients with PMV are grim: 56% are alive, only 27% report a good quality of life, and a mere 9% are at home and independently functioning.[8] The

average patient with PMV spent 74% of all days alive either in a hospital, a post-acute care facility, or at home with paid home care.[8] Patients who reported a "good" quality of life based on ratings in areas of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression tended to be younger, have fewer comorbid conditions, be admitted for trauma, and have private insurance.[8]

Given these dismal figures, would patients or their surrogates opt for aggressive care? If not, why is the incidence of CCI and LTAC utilization increasing? Unfortunately, data show that we are doing a poor job in the acute care hospital setting discussing CCI with patients and surrogates. Based on surrogate and physician interviews at the time of tracheotomy and 1-year follow-up, only 26% of surrogates reported that physicians discussed the patient's prognosis for survival, functional limitations, quality of life, and expected caregiver needs.[9] The majority of surrogates expected the patient to be alive (93%), have no major functional limitations (71%), and have a good quality of life (83%) at 1 year.[9] This contrasted significantly with physicians' expectations. Although 44% of physicians had expectations for patient survival at 1 year, only 6% expected patients to be free of major functional limitations and only 4% believed patients would have a good quality of life.[9] The degree of concordance among physicians' and surrogates' expectations as well as the accuracy of their outcome predictions were low overall. These single-center findings are also supported by similar data at other centers, and are concerning as they imply that surrogate decisions regarding life-prolonging treatments are oftentimes not appropriately informed.[10]

STRATEGIES FOR IMPROVING COMMUNICATION IN CCI

Several strategies for improving communication during acute critical illness have been studied. An "intensive communication intervention" at a single center consisting of multidisciplinary meetings with patients and families within 72 hours of ICU admission resulted in a significantly decreased median length of ICU stay, mainly in the group of patients with the highest acuity, by allowing them earlier access to palliative care without an overall increase in ICU mortality.[11] This proactive communication intervention covered four main objectives during the formal meeting: 1) a review of medical facts and treatment options, 2) a discussion of patients' perspectives on death, chronic dependence, loss of function, and acceptability of critical care, 3) an agreement on a care plan, and 4) an agreement on criteria by which success or failure of the plan was to be judged.[11] An intervention with similar objectives but conducted by separate ethics teams at multiple centers was also associated with reductions in hospital and ICU stays, mainly in patients who did not survive to discharge, also without differences in overall mortality.[12] Although many centers are now relying on specialized palliative care teams to hold such discussions, studies of communication training reveal that clinicians can be taught the necessary skills involved in giving bad news and discussing transitions to palliative care with sustained improvements.[13]

In addition to strategies to improve face-to-face communication, other studies have shown benefits such as decreased post-traumatic stress disorder, depression, anxiety, improved comprehension and subsequent satisfaction among family members with distribution of printed material with or without a proactive approach to family conferences.[14,15] One such brochure had information on the basic operation of the ICU, including names and essential contact information, a diagram of the ICU room, names of all the devices in the room, and a glossary of commonly used ICU terms.[15] In another study, a 14-page decision aid on PMV given to surrogates resulted in lower surrogate-physician discordance, greater comprehension, and improved quality of communication without differences in overall ICU mortality.[16] This decision aid aimed to provide medical information, elicit surrogate understanding of patient preferences and role in decision making, and guide surrogate deliberation and decision making with specific examples.[16] Although we do not know the effects of these interventions on long-term resource utilization or their widespread applicability to populations of varying ethnicities, cultural, and religious beliefs, these findings are encouraging.

PREDICTING MORTALITY IN PROLONGED MECHANICAL VENTILATION

Another contributing factor to suboptimal conversations surrounding continuation of life support is physician uncertainty about the long-term outcomes of individual patients with CCI. Although the prognosis for CCI overall is known to be poor, predicting which patients will fare better after discharge from an acute care hospital is difficult. Recently, a mortality prediction model (ProVent) was developed using patient data from five academic tertiary care centers to help identify patients requiring PMV who are at high risk for 1-year mortality with good results. The ProVent

score assigns points to four different variables (age, platelet count, need for vasopressors, hemodialysis) obtained on day 21 of mechanical ventilation with the range of possible scores being 0-5. Higher scores are associated with increasing mortality. This ProVent categorical probability model had an area under the receiver operator curve (AUC) of 0.77.[17] For comparison, the Acute Physiology and Chronic Health Evaluation III score in common use has an AUC of 0.63.[17] An additional benefit of the ProVent model is that it is based on objective data rather than subjective assessments. The investigators are quick to affirm that such a model is not meant to replace clinical judgment, but hope that in conjunction with medical judgment, it may increase clinicians' abilities to discuss likely outcomes and enhance patient-centered care.

CONCLUSION

Advances in critical care have enabled more patients to survive their acute ICU admissions, but have also created a growing population of patients with CCI with a myriad of comorbidities. The care of these patients is fraught with ethical and economical issues, and evidence-driven care in this area has not kept pace with trends in clinical practice. However, while we hone our ability to prognosticate effectively, data on long-term outcomes in this population are available, and we do our patients and their families a disservice if this information is not communicated along with a thorough discussion of the values, preferences, and goals of the patient and surrogate with regard to continuation of life-sustaining treatment in the setting of CCI. ■

REFERENCES

1. Girard K, Raffin TA. The chronically critically ill: To save or let die? *Respir Care* 1985;30:339-347.
2. MacIntyre NR, et al. Management of patients requiring prolonged mechanical ventilation: Report of a NAMDRC consensus conference. *Chest* 2005;128:3937-3954.
3. Nelson JE, et al. Chronic critical illness. *Am J Respir Crit Care Med* 2010;182:446-454.
4. Cox CE, Carson SS. Medical and economic implications of prolonged mechanical ventilation and expedited post-acute care. *Semin Respir Crit Care Med* 2012;33:357-361.
5. Kahn JM, et al. Long-term acute care hospital utilization after critical illness. *JAMA* 2010;303:2253-2259.
6. Kahn JM, et al. Effectiveness of long-term acute care hospitalization in elderly patients with chronic critical illness. *Med Care* 2013;51:4-10.
7. Lane-Fall MB, et al. Insurance and racial differences in long-term acute care utilization after critical illness. *Crit Care Med* 2012;40:1143-1149.
8. Unroe M, et al. One-year trajectories of care and resource utilization for recipients of prolonged mechanical ventilation. *Ann Intern Med* 2010;153:167-175.
9. Cox CE, et al. Expectations and outcomes of prolonged mechanical ventilation. *Crit Care Med* 2009;37:2888-2894.
10. Nelson JE, et al. Communication about chronic critical illness. *Arch Intern Med* 2007;167:2509-2515.
11. Lilly CM, et al. An intensive communication intervention for the critically ill. *Am J Med* 2000;109:469-475.
12. Schneiderman LJ, et al. Effect of ethics consultations on nonbeneficial life-sustaining treatments in the intensive care setting: A randomized controlled trial. *JAMA* 2003;290:1166-1172.
13. Back AL, et al. Efficacy of communication skills training for giving bad news and discussing transitions to palliative care. *Arch Intern Med* 2007;167:453-460.
14. Lautrette A, et al. A communication strategy and brochure for relatives of patients dying in the ICU. *N Engl J Med* 2007;356:469-478.
15. Azoulay E, et al. Impact of a family information leaflet on effectiveness of information provided to family members of intensive care unit patients: A multicenter, prospective, randomized, controlled trial. *Am J Resp Crit Care Med* 2002;165:438-442.
16. Cox CE, et al. Development and pilot testing of a decision aid for surrogates of patients with prolonged mechanical ventilation. *Crit Care Med* 2012;40:2327-2334.
17. Carson SS, et al. A multicenter mortality prediction model for patients receiving prolonged mechanical ventilation. *Crit Care Med* 2012;40:1171-1176.

ABSTRACT & COMMENTARY

Using Natriuretic Peptide to Guide Fluid Management During Ventilator Weaning

By Eric C. Walter, MD, MSc

Pulmonary and Critical Care Medicine, Northwest Permanente and Kaiser Sunnyside Medical Center, Portland

Dr. Walter reports no financial relationships relevant to this field of study.

SYNOPSIS: **A protocol using daily natriuretic peptide measurements to guide fluid management during ventilator weaning led to a more negative fluid balance and earlier extubation.**

SOURCE: Dessap AM, et al. Natriuretic peptide-driven fluid management during ventilator weaning: A randomized controlled trial. *Am J Respir Crit Care Med* 2012;186:1256-1263.

This multicenter, randomized controlled trial compared daily B-type natriuretic peptide (BNP) measurements as a way to guide fluid management with usual care in patients undergoing weaning from mechanical ventilation. Patients mechanically ventilated for > 24 hours with $SpO_2 \geq 90\%$, $FiO_2 \leq 50\%$, and PEEP ≤ 8 cm H_2O were included. Exclusion criteria were strict and aimed to maximize patient safety. Pregnancy, age < 18 years, allergy to study medications, tracheostomy, cerebral edema, acute hydrocephalus, and some neurologic illnesses were absolute exclusion criteria. Temporary exclusion criteria included acute right ventricular failure, renal insufficiency (renal replacement therapy, plasma urea > 25 mmol/L, plasma creatinine > 180 µmol/L, creatinine clearance < 30 mL/min, or > 25% increase in plasma creatinine over the past 24 hours), iodinated contrast injection within 6 hours, sodium > 150 mEq/L, potassium < 3.5 mEq/L, or arterial pH > 7.5. If temporary criteria were corrected, patients could then be enrolled. Weaning was performed in all patients via an automatic weaning system. A computerized system within the ventilator gradually decreased pressure support and performed a spontaneous breathing trial (SBT). When an SBT was passed, the computer sounded an alert. If patients also met other safety criteria for extubation (not overly sedated, no excessive secretions, etc.), they were immediately extubated.

At the start of weaning, all patients had a daily BNP measured. Patients in the intervention arm (n = 152) had fluid and diuretic management guided by BNP results. If BNP was ≥ 200 pg/mL, fluid intake was restricted and furosemide was administered with a goal urine output of 1.5 to 3 mL/kg/hour. BNP results for patients in the control arm (n = 152) were not available to the treatment team and fluid and diuretic management were at the treatment team's discretion.

The primary endpoint was time from randomization to successful extubation (alive and without reintubation for 72 hours). Time to extubation was approximately 16 hours shorter in the BNP-guided group than the control group [median 42.4 (20.8-140.6) vs 58.6 (23.3-139.8); $P = 0.034$]. The BNP-guided group also had more ventilator-free days (9.7 vs 12.0) and a greater negative fluid balance during weaning (-2320 mL vs -180 mL). There were no significant differences in cardiovascular function, metabolic abnormalities, or renal function between groups. During weaning, fewer patients in the BNP-guided group had respiratory deterioration, ventilator-associated pneumonia, or needed continuous sedation than in the control group. A priori subgroup analyses suggested that the treatment effect was most pronounced among patients with left ventricular dysfunction and less so among patients with chronic obstructive pulmonary disease.

COMMENTARY

Strengths of this study include the multicenter design, excellent follow-up, and the use of a simple, once daily diagnostic test. Furthermore, the use of an automated weaning protocol should have helped to minimize differences in weaning techniques. This trial provides additional strong support for the idea that a negative fluid balance is helpful for ventilator weaning and extubation success. Previous studies have shown that a negative fluid balance shortens mechanical ventilation time,[1] and a positive fluid balance is associated with extubation failure.[2]

It is unlikely that BNP itself is a biomarker specific to weaning success. Rather, the act of measuring BNP may have stimulated the treatment team to react to volume overload and aggressively diurese. Since more than two-thirds of patients in both groups had at least one BNP ≥ 200, most patients were in need of diuresis. Interestingly, the observed difference in ventilator-free days at day 28 (2.6 days) was nearly identical to that seen in the Fluids and Catheters Treatment Trial ([FACTT] 2.5 days).[1] The advantage of BNP would seem to be the use of a single daily lab measurement vs the complex algorithm requiring invasive measurements described in FACTT. As in previous studies, aggressive diuresis was shown to be safe. Weaknesses of this study include the strict exclusion criteria, which may limit generalizability. Furthermore, since the study was not blinded, it is possible that the final decision to extubate was biased by knowledge of the patient's study arm.

Avoiding fluid overload with aggressive diuresis leads to earlier extubation without significant adverse events. It appears this goal can be achieved with either invasive monitoring, or now, with measurement of BNP. Both appear to serve as reminders to clinicians of the importance of diuresis. In the future, it may be that neither is absolutely necessary as long as clinicians have a fundamental understanding of this concept and apply it to patient care. ■

REFERENCES

1. Wiedemann HP, et al. Comparison of two fluid-management strategies in acute lung injury. *N Engl J Med* 2006;354:2564-2575.

2. Frutos-Vivar F, et al. Risk factors for extubation failure in patients following a successful spontaneous breathing trial. *Chest* 2006;130:1664-1671.

ABSTRACT & COMMENTARY

Organizational Factors Contribute to Adoption of ICU-Care Management Protocols

By Linda L. Chlan, RN, PhD

Dean's Distinguished Professor of Symptom Management Research, The Ohio State University College of Nursing

Dr. Chlan reports that she receives grant/research support from the National Institutes of Health.

SYNOPSIS: While many ICUs have protocols to guide care of complex patients, organizational, facility-specific factors such as closed units, full-time respiratory therapy coverage, and multidisciplinary rounds promote their existence and implementation based on current evidence.

SOURCE: Ellis SM, et al. Use of mechanical ventilation protocols in intensive care units: A survey of current practice. *J Crit Care* 2012;27: 556-563.

The purpose of this study was to determine which protocols guiding the management of mechanical ventilation are incorporated into practice and to determine if any organizational characteristics of hospitals are associated with the adoption of protocols using evidence-based treatments. The investigators were particularly interested in protocols for low-tidal-volume ventilation (LTVV) and spontaneous breathing trials (SBTs). Other variables of interest included hospital type, open vs closed intensivist staffing, number of ICU beds, patient-to-physician ratio, 24/7 respiratory therapist coverage, and presence of daily multidisciplinary rounds. Ellis and colleagues surveyed all hospitals in Ontario, Canada, that provided both invasive and non-invasive mechanical ventilation. The survey was developed by the investigators in consultation with respiratory therapists and critical care physicians at their institution. Respiratory therapy department leadership was the target for survey completion.

Seventy of 97 potential hospitals responded to the survey (72.2%). A majority of the respondents were respiratory therapists (91%) from a community hospital (60%). Number of ICU beds ranged from 5-26 (median number of beds, 16). Most of the ICUs had open intensivist staffing (58%) with 79% having a 1:1 nurse-to-ventilated-patients staffing ratio. A majority of the ICUs reported daily multidisciplinary rounds (68%) consisting of physicians, nurses, respiratory therapists, clinical nutritionists, clinical pharmacists, physiotherapists, social workers, pastoral/spiritual/religious care, and speech language pathologists. Full-time respiratory therapist coverage was reported in 69% of the hospitals; 3% reported no respiratory therapist coverage. Written ICU care protocols existed in 97% of the hospitals, with mechanical ventilation protocols being the most common (71%). Sedation and analgesia administration was guided by protocol in 64% of the hospitals. LTVV was incorporated into 54% of the mechanical ventilation protocols. SBTs were present in 80% of the ICU protocols.

Findings from survey respondents indicate that larger ICUs with closed intensivist staffing models, daily multidisciplinary rounds, and 24/7 respiratory therapist coverage were more likely to have mechanical ventilation protocols. There was no association with type of hospital (community or academic) or the presence of mechanical ventilation protocols. There were no significant factors contributing to the presence of SBTs in the ICU care protocols in this study.

COMMENTARY

Many articles have been published on the development of protocols to guide the care and management of complex ICU patients. This Canadian survey findings report by Ellis et al makes an additional contribution to this literature by articulating those organizational factors that favorably influence the development and implementation of protocols for LTVV and SBTs that utilize the current best available evidence. Most prominently, these factors include 24/7 respiratory therapist staffing, closed intensivist staffing models, and multidisciplinary patient-care rounds. The actual adherence to protocols to guide LTVV and SBTs was not assessed in this study. The findings from this study may not be directly applicable to all ICUs in the United States. However, the organizational factors of 24/7 respiratory therapist coverage and multidisciplinary rounds can be emulated to promote the adoption of protocols.

The authors state that upwards of 70% of the survey respondents indicated the protocols

were developed by a multidisciplinary team. However, the composition of these teams was not articulated. To get support and buy-in, it is important that all voices be heard and that all constituencies be at the table, or a protocol risks being relegated to the status of just another piece of paper. As a nurse, I would be remiss if I did not comment on the fact that the authors did not involve nurses in the development of the survey nor as survey respondents. If ICU care is going to be delivered in a truly multidisciplinary model, all voices must be heard and contribute equally. ■

ABSTRACT & COMMENTARY

Time Spent in Handoff Discussions was Longer for Patients Discussed First, Regardless of Complexity

By Leslie A. Hoffman, RN, PhD
Professor Emeritus, Nursing and Clinical & Translational Science, University of Pittsburgh

SYNOPSIS: Disproportionately longer time was allocated to ICU patients discussed early in attending physician handoff sessions, regardless of complexity or severity of illness.

SOURCE: Cohen MD, et al. The earlier the longer: Disproportionate time allocated to patients discussed early in attending physician handoff sessions. *Arch Intern Med* 2012;172:1762-1764.

Handoffs have been extensively examined as a potential source of communication failure. Such studies typically focus on how to best share details of care when patient responsibility is transferred from one clinical care team to another. In contrast, this study analyzed the handoff process in regard to the order of discussion and, in particular, time spent discussing individual patients. Video recordings were made of 23 end-of-week handoff sessions in a 21-bed ICU located in a tertiary medical center. The ICU was staffed by two teams, each led by an outgoing attending physician who handed off to an incoming attending. The procedure followed in this unit was to discuss patients in "bed-list" order. With frequent admissions and discharges, the discussion of patients was therefore effectively randomized, making severity of illness or other patient characteristics unrelated to discussion order. For the 262 sessions recorded, mean session duration was 142 ± 98 seconds. The average time allocated to each patient declined steadily from the first to last patient discussed. First-discussed patients received about 50% more time than those discussed last in a handoff session.

■ COMMENTARY

This article presents an interesting perspective regarding the content of handoff sessions. Time spent discussing patients "first on the list" was disproportionately longer than that spent discussing those later in the session, regardless of acuity, complexity, time of admission, or other factors. To confirm findings, the authors used three statistical approaches, all of which produced highly similar estimates. Through patient handoffs, responsibility, authority, and information about patients are exchanged between care providers. If incomplete or quickly verbalized, the information shared can impact the quality of patient care, predispose patients to unnecessary procedures/tests, and increase risk of adverse events.

A recent systematic review identified 18 articles analyzing characteristics of handoffs conducted in hospital settings.[1] Studies identified in this review analyzed outcomes regarding a wide range of factors believed to influence subsequent care: use or non-use of a handoff sheet/mnemonic to standardize topics discussed, team behavior, clinician characteristics, patient characteristics, etc. None of these articles included consideration of "place in line." Findings of this study suggest a simple-to-implement, no-cost solution that can improve the transfer of information during handoffs, i.e., discussing the most complex, most unstable, or new admissions first and/or setting blocks of time for return to cases that require further discussion. ■

REFERENCE

1. Foster S, Manser T. The effects of patient handoff characteristics on subsequent care: A systematic review and areas for future research. *Acad Med* 2012;87:1105-1124.

CME/CNE Questions

1. Which of the following statements about patients with chronic critical illness is true?

a. This population is increasing.
b. They have chronic medical comorbidities, including problems with malnutrition, infection, and neuromuscular weakness.
c. Their overall survival is poor.
d. Few are functionally independent at 1 year.
e. All of the above

2. In physician and surrogate discussions about the care of patients with chronic critical illness, studies have shown that:

a. physicians consistently provide information about patient prognosis and quality of life to surrogate decision makers.
b. both physicians and surrogates tend to overestimate patient survival at 1 year.
c. physician and surrogate expectations of patient survival, functional limitations, and quality of life tend to correlate.
d. printed material does not improve communication about chronic critical illness or surrogate satisfaction.
e. predicting mortality is dependent on many immeasurable factors and is not feasible.

3. For patients in the treatment arm of the study of BNP and weaning, if the BNP was ≥ 200 pg/mL, which of the following was performed?

a. No changes in fluid management.
b. Fluid intake was minimized and furosemide was administered.
c. A bolus of normal saline was given.
d. The patient was immediately extubated.
e. A pressure support trial was started.

4. BNP-guided fluid management appeared to be most useful in patients with:

a. chronic obstructive pulmonary disease.
b. renal dysfunction.
c. left ventricular dysfunction.
d. acute right ventricular failure.
e. hydrocephalus.

5. Which of the following is a factor associated with the adoption of spontaneous breathing trials?

a. High patient-physician ratios
b. Highly trained ICU nurses
c. Full-time respiratory therapy coverage
d. Presence of assistive personnel
e. All of the above

6. In the study of ICU organizational factors and protocol adoption, which of the following is true regarding the survey respondents?

a. Most were physicians
b. Most were respiratory therapists
c. Most were nurse managers
d. Most were clinical pharmacists
e. Most were clinical nutritionists

7. When attending physicians discussed ICU patients during handoffs:

a. transfer of information improved when a structured process was used.
b. transfer of information improved when a mnemonic was used.
c. interdisciplinary rounds produced the best outcome.
d. team behavior changed when the most acutely ill patients were discussed.
e. average time spent declined steadily from the first to last patient discussed.

8. Which of the following aspects of patient handoffs have been found to affect subsequent care?

a. Use or non-use of a handoff sheet or mnemonic to standardize the topics discussed
b. Team behavior
c. Patient characteristics
d. Clinician characteristics
e. All of the above

CME/CNE Objectives

Upon completion of this educational activity, participants should be able to:

- identify the particular clinical, legal, or scientific issues related to critical care;
- describe how those issues affect physicians, nurses, health care workers, hospitals, or the health care industry; and
- cite solutions to the problems associated with those issues.

[IN FUTURE ISSUES]

Aerosolized colistin for VAP

PHARMACOLOGY WATCH

Supplement to *Clinical Cardiology Alert, Clinical Oncology Alert, Critical Care Alert, Hospital Medicine Alert, Infectious Disease Alert, Internal Medicine Alert, Neurology Alert, OB/GYN Clinical Alert, Primary Care Reports.*

FDA Approves Apixaban for Patients with Nonvalvular AF

In this issue: Apixaban approval; new dental clinical practice guideline; apixaban for VTE; aspirin resistance; tamoxifen treatment; and FDA actions.

Apixaban superior to warfarin in trial

The FDA has approved apixaban — the long-awaited third novel oral anticoagulant (NOAC) — for the prevention of stroke and systemic embolism in patients with nonvalvular atrial fibrillation (AF). The drug follows dabigatran (Pradaxa) and rivaroxaban (Xarelto) for this indication, which has been traditionally treated with warfarin. The safety and efficacy of apixaban was demonstrated in the 18,000 patient ARISTOTLE trial, which showed that in patients with nonvalvular AF, apixaban was superior to warfarin in preventing stroke and systemic embolism, caused less bleeding, and resulted in lower mortality than warfarin. The FDA will likely allow the manufacturers of apixaban to market the drug as "superior to warfarin." Apixaban is dosed twice a day, similar to dabigatran; rivaroxaban is dosed once a day. Apixaban and rivaroxaban are factor Xa inhibitors, while dabigatran is a direct thrombin inhibitor. No head-to-head studies have been done among the three NOACs, which are expected to compete aggressively for this lucrative market that is worth billions of dollars in sales. All three lack a reversal agent, which could potentially increase the risk of serious bleeding. Apixaban is marketed as Eliquis by Bristol-Myers Squibb and Pfizer. ■

New dental prophylaxis guideline

The American Academy of Orthopedic Surgeons (AAOS) and the American Dental Association (ADA) have jointly published a clinical practice guideline regarding dental prophylaxis in patients with orthopedic implants. The recommendations, which are based on very limited evidence, state that, "the practitioner might consider discontinuing the practice of routinely prescribing prophylactic antibiotics for patients with hip and knee prosthetic joint implants undergoing dental procedures." The guideline further states that they are unable to recommend for or against topical oral antibiotics in patients with implants, but they do recommend that patients with joint implants should "maintain appropriate oral hygiene," even though there is no evidence regarding this recommendation. This guideline does little to settle the debate between orthopedic surgeons, who often recommend lifetime dental prophylaxis, and infectious disease specialists who generally recommend against dental prophylaxis after 1 year. This rather weakly worded guideline is probably not the guidance most primary care physicians were hoping for, since they are generally responsible for prescribing prophylactic antibiotics and are responsible for possible adverse effects. The full guideline is available at www.aaos.org/research/guidelines/PUDP/dental_guideline.asp. ■

Length of treatment for VTE

How long should we treat patients with venous thromboembolism (VTE)? VTE includes deep-vein thrombosis and pulmonary embolism. Current

This supplement was written by William T. Elliott, MD, FACP, Chair, Formulary Committee, Kaiser Permanente, California Division; Assistant Clinical Professor of Medicine, University of California-San Francisco. In order to reveal any potential bias in this publication, we disclose that Dr. Elliott reports no consultant, stockholder, speaker's bureau, research, or other financial relationships with companies having ties to this field of study. Questions and comments, call: (404) 262-5404. E-mail: neill.kimball@ahcmedia.com.

guidelines recommend 3-6 months of anticoagulation for unprovoked VTE — usually low-molecular weight heparin followed by warfarin. A new study suggests that an additional year of the factor Xa inhibitor apixaban (recently approved for stroke prevention in nonvalvular atrial fibrillation, see page 1) may be beneficial for these patients. In an industry-sponsored study, patients with VTE who had completed 6-12 months of anticoagulation therapy were randomized to an additional 12 months of apixaban (2.5 or 5 mg twice a day) or placebo. Nearly 2500 patients were included in the intention-to-treat analysis. Recurrent VTE or death from VTE occurred in 73 of 829 patients randomized to placebo (8.8%) compared to 14 of 840 patients on 2.5 mg of apixaban (1.7%) and 14 of 813 patients on 5 mg of apixaban (1.7%; $P < 0.001$ for both comparisons). The rates of major bleeding were 0.5% in the placebo group and 0.2% and 0.1% in the apixaban 2.5 mg and 5 mg groups, respectively. The rate of death from any cause was 1.7% in the placebo group and 0.8% and 0.5% in the apixaban 2.5 mg and 5 mg groups, respectively. The authors conclude that extended anticoagulation with apixaban at either a treatment dose (5 mg bid) or thromboprophylactic doses (2.5 mg bid) reduced the risk of recurrent VTE without increasing the rate of major bleeding (*N Engl J Med* published online Dec. 8, 2012. doi: 10.1056/NEJMoa1207541). In this study, the majority of patients were younger than age 75 without other comorbities such as low body weight or renal impairment. It is also unknown if the results of this study are applicable to other approved anticoagulants such as rivaroxaban. ■

Aspirin resistance and enteric coating

Could "aspirin resistance" be due to enteric coating? The concept of aspirin resistance is very controversial with some experts suggesting that it does not exist. A new study suggests that enteric coating of aspirin may be partially responsible for "pseudoresistance." Researchers recruited 400 healthy volunteers who were then screened for their response to a single, oral dose of 325 mg immediate-release or enteric-coated aspirin. Variable absorption caused nearly half of those taking enteric-coated aspirin to have apparent resistance (49%), while this was not seen in any of the subjects taking immediate-release aspirin. On re-exposure, all of those with variable absorption responded to aspirin. The authors conclude that the study failed to identify a single case of true aspirin resistance, but pseudoresistance, reflecting delayed and reduced drug absorption, complicates enteric-coated but not immediate-release aspirin (*Circulation* published online Dec. 4, 2012. doi: 10.1161/CIRCULATIONAHA.112.117283). This study seems to contradict the concept that up to 40% of the population is "aspirin resistant." There is a suggestion that the concept of aspirin resistance has been touted by the manufacturers of expensive brand-name aspirin substitutes. This study may question the wisdom of the routine use of enteric-coated aspirin, especially given that enteric coating has very little benefit with regard to gastrointestinal protection. ■

Is 10 years of tamoxifen better?

Ten years of tamoxifen may be better than the standard 5 years for women with estrogen receptor (ER)-positive breast cancer, according to a new study from the United Kingdom. Researchers randomized about 6800 ER-positive women with early breast cancer who had completed 5 years of adjuvant tamoxifen to another 5 years of treatment or stopping therapy. There were 617 recurrences in the 3428 women who took tamoxifen for 10 years vs 711 in 3418 women who stopped at 5 years ($P = 0.002$). There was also a lower death rate (331 vs 397, $P = 0.01$) and reduced overall mortality (639 vs 722, $P = 0.01$) in the 10-year group. There were higher rates of endometrial cancer (relative risk [RR] 1.74, 95% confidence interval [CI], 1.30-2.34) and pulmonary embolism (RR 1.87; CI, 1.13-3.07) in the 10-year group, but no higher rate of stroke and a lower risk of ischemic heart disease (RR 0.76; CI, 0.60-0.95). The authors suggest that 10 years of tamoxifen in ER-positive patients can approximately halve breast cancer mortality during the second decade after diagnosis (*Lancet* published online Dec. 5, 2012. doi.org/10.1016S0140-6736(12) 61963-1). ■

FDA actions

The FDA has approved pasireotide diaspartate injection for the treatment of Cushing's disease in patients who are not candidates for surgery or for whom surgery has not worked. The drug is considered an orphan drug. The safety and efficacy were evaluated in a trial of 162 patients with Cushing's disease who were randomized to one of two doses of the drug. About 20% of participants had normal urine cortisol levels within 6 months. Side effects included increased blood sugar levels and liver injury. The drug is administered subcutaneously twice a day. It is marketed by Novartis as Signifor. In February 2012, the FDA approved mifepristone (Korlym) for the treatment of Cushing's syndrome. ■