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INSIDE

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The Emerging Nightmare of *C. difficile*

SPECIAL FEATURE

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Dr. Nanavaty reports no financial relationships related to this field of study.

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NOSOCOMIAL INFECTIONS ARE UNFORTUNATELY COMMON IN intensive care units all across the United States. Although a wide variety of guidelines and treatment options exist for common types of nosocomial infections, such as catheter-related bloodstream infections or the ventilator-associated pneumonia, much less importance is given in critical care to *Clostridium difficile* infections. Although infection with this organism is not necessarily nosocomial, it is more often acquired during hospitalization. Several reports of severe *C. difficile*-associated disease (CDAD) due to a hyper-virulent strain have appeared recently,[1-3] including the report from Canada in which CDAD was associated with high short- and long-term mortality and approximately 10 extra days of hospitalization per case.[4] Therefore, I review the literature on this existing infection, as I am certain that the readers are much more likely to see and treat a case of severe CDAD in the future than any of the emerging infections that we hear about from the scientific and lay press.

The Organism

C. difficile is a Gram-positive bacillus that can form spores. Although it is uncommon to find the organism in the stool of healthy adults (< 3%), carriage rates increase with increasing age, with antibiotic therapy, and with hospitalization or hematological malignancies. The organism can live in spore form in the hospital room from weeks to months after the infected patient has been discharged. It produces toxins that cause severe inflammation and cell death in the colonic mucosa. Although the organism was first described in 1930s, its pathogenic role in pseudomembranous colitis was established only in the 1970s.

The organism is difficult to culture, hence the name difficile. Enzyme assay to detect *C. difficile's* toxin A or toxin B is the most rapid way to make a clinical diagnosis. The assays have high sensitivity and specificity, although a negative test does not necessarily rule out an infection. Care must be taken to submit the specimen within 2 hours of collection, as the toxin rapidly degenerates at room temperature, giving rise to a false-negative test. Tests based on *C. difficile's* ability to induce cytotoxicity are very specific but take longer time and, hence, are not routinely used in clinical practice.

Spores of this organism are ingested and, when bowel flora is altered in susceptible individuals, the organism assumes a vegetative form in the colonic mucosa. The organism can exist in both forms in the colonic mucosa. In recurrent CDAD, it is often difficult to assess if the organism grew from the colonic mucosa (relapse) or if a new organism was acquired (recurrence).

The Epidemiology

Antibiotic exposure is clearly the most important factor in the development of CDAD. Although practically any antibiotic can cause CDAD, cases and outbreaks have been reported more frequently after clindamycin, third-generation cephalosporins, broad-spectrum penicillins, and fluoroquinolone use. CDAD accounts for approximately 15-25% of antibiotic-associated diarrhea, and the majority of cases of pseudomembranous colitis.

The incidence of CDAD is clearly on the rise. As estimated by the Centers for Disease Control and Prevention,[1] CDAD as a diagnosis during hospital stay was reported at an estimated rate of 31 cases per 100,000 population in 1996, which subsequently doubled to an estimated rate of 61/100,000. The highest rate of infection occurs in the age group older than 65 years. This age group tends to get affected about 7 times as much as the next age group of 45-64 years. Thus, age seems to be an important risk factor in development of CDAD. The majority of cases occur in patients who have received antibiotics, although cases have been reported as long as 3 months after stopping antibiotics. Hematological malignancy and prolonged hospital stay are also associated with increased risk of CDAD.

CDAD is associated with variable mortality. In one of the largest outbreaks reported from Quebec, Pepin and colleagues reported a mortality rate of 23% at 30 days in patients who had CDAD, compared to 7% among matched controls.[3] In the most severe cases where surgery is considered an option, mortality may be as high as 50%. It is estimated that each case of nosocomial CDAD caused 10.7 additional days of hospitalization. It is also estimated that CDAD costs $1.1 billion dollars in annual healthcare costs in the United States alone.

The Clinical Spectrum of CDAD in Critical Care

In most cases, CDAD presents as mild diarrhea. In the majority of the cases that I have seen personally in critical care settings, patients present with severe watery diarrhea associated with a peculiar smell and dehydration. Abdominal pain is not typical unless colonic perforation develops. Abdominal distension is often seen in patients presenting with CDAD. Diarrhea may be absent, and patients may present with toxic megacolon or an ileus-type picture. Sepsis and septic shock are often the presenting diagnosis, sometimes developing before the obvious diarrhea that raises suspicion for CDAD. Laboratory tests are characterized by elevated leukocyte counts, often in the leukemoid range. Renal failure develops in severe cases. Abdominal exam should be carefully followed in the ICU, as patients may develop toxic megacolon or colonic perforation days after starting appropriate treatment.

The clinical diagnosis is often suspected with the peculiar smell of CDAD and the previous history of antibiotic therapy. A freshly collected stool specimen should be sent for *C. difficile* toxin assay. Bedside sigmoidoscopy or colonoscopy is also often helpful, especially if the toxin assay is negative, as it can demonstrate the pseudomembrane formation and show patchy necrosis or colitis. Rarely, only the right side of the colon may be involved. If this is suspected, a more complete endoscopic examination may be necessary. CT scan often demonstrates thickened bowel wall and colonic dilatation, and can help rule out perforation or alternative diagnosis.

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Treatment of CDAD

Patients with severe CDAD require rapid volume resuscitation for severe dehydration. Septic shock may require vasopressor therapy. If patients are on antibiotics, careful attention needs to be given to limiting the duration of antibiotics as much as possible. Stopping of the offending agent(s) is one of the first steps toward improving the chances of clearing this organism. Patients who continue to stay on the antibiotics that resulted in CDAD have higher chances of developing recurrence and severe CDAD.

Most cases of CDAD respond initially to antibiotic therapy. Oral metronidazole, in a dose of 250 to 500 mg every 8 hours for 10 to 14 days, is the most preferred therapy. If the patient is unable to take this agent (eg, pregnancy) or to tolerate it, oral vancomycin is equally effective at 125 mg 4 times a day dosing. Increasing the dose of oral vancomycin does not offer any additional advantage and, in general, the cost of this drug is substantially higher than that of metronidazole. I am not aware of any randomized, controlled trial of the combination of vancomycin and metronidazole. The intravenous form of metronidazole has been shown to be effective. However, vancomycin is not very well secreted in colonic mucosa to be effective via the intravenous route.

A novel concept, especially in patients with recurrent or relapsing CDAD, is to use pulse doses of oral vancomycin or metronidazole. The antibiotic is given in usual doses but at increasing intervals, with the hope that as the interval of antibiotic administration increases, the remaining spores will germinate and be killed by the next dose. Such regimens are continued for up to 3 weeks.[4]

Additional antibiotics have been tried but are not commonly used. Teicoplanin, fusidic acid, and bacitracin have been tried in one or more randomized studies. Rifampicin has been reported to help patients with recurrent or relapsing CDAD, but only in a total of 8 patients in the literature. Similarly, very limited case series data exist for use of intravenous gamma globulin (IVIg), a very expensive and limited resource, in CDAD.

Patients with CDAD should be isolated to prevent the spread of the organisms. Gloves should be worn while touching the patient or any surface in the patient's room, as they may have the spores of organism on them. If close contact with the patient's bed is expected, gowns should be worn as well. Although an alcohol hand wash is often adequate, if the institution is experiencing a high rate of CDAD, hand washing is often recommended after taking care of CDAD patients, as the spores may not be eradicated with alcohol-based hand sanitizers.

Probiotics are cultures of microorganisms that are administered orally to populate the colonic mucosa to reduce the severity or prevent development of CDAD. *Saccharomyces boulardii* and Lactobacillus species have been used, more often for prevention of CDAD.[5] The role of probiotics in severe CDAD is not clear but, in my opinion, they are worth trying. Rare case series have reported use of human stool enemas to populate the colonic mucosa as a treatment of severe CDAD. Severe cases may require total parenteral nutrition to provide nutritional support until resolution of diarrhea. In the reported literature, diarrhea due to recurrence or relapse can last for as many as 55 days.

Role of Surgery in Severe CDAD

If the patient presents with an acute abdomen or develops toxic megacolon, or has refractory diarrhea and does not seem to respond in 4-5 days of conservative treatment, total colectomy with ileostomy may be a life saving option. In one of the largest reported series, Longo and colleagues reported 67 cases from a Department of Veterans Affairs database that required colectomy as therapy of CDAD.[6] Of these cases, 54% had acquired CDAD in the hospital, whereas 46% had acquired it in community settings. Thirty-seven percent of cases did not have diarrhea, and 64% presented as a surgical abdomen. Eighteen percent of cases had negative stool studies for *C. difficile*, but all had pathological changes of CDAD in colon. Perforation and infarction were found in 58 out of 67 cases. Overall mortality was 48% in this case series. Thus, surgery is often the last resort in the most severe cases of CDAD.

Conclusion

Overall, severe CDAD is a life-threatening nosocomial infection that requires careful contact isolation, judicious use of antibiotics, and close monitoring for development of complications. Although there are not many reports of severe CDAD in hospital medicine literature, mortality is high, especially if complications develop that require surgical intervention. As more and more care gets bundled, careful unbundling of the broad spectrum antibiotics will be required to reduce the incidence and to prevent further spread of this fastidious organism. ■

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When Patient and Provider Disagree: Letting Patients Make Bad Choices

SPECIAL FEATURE

By Allison Mechem Weaver

Allison Mechem Weaver reports no financial relationships relevant to this field of study. This article originally appeared in the April 2006 issue of Medical Ethics Advisor.

If you ever find yourself struggling with the ethical implications of permitting a patient to make a bad medical decision, maybe you should think semantics before you weigh ethics.

Courts rule tirelessly that competent patients have the ability to make their own decisions, regardless of consequences. That being a given, do physicians really permit patients to make choices? And who decides whether that choice is bad?

At what point does the physician surrender to patient autonomy and be satisfied that he or she has fulfilled his or her ethical obligations?

"It's my observation that the mere description of a patient's decision or choice as unwise indicates that the caregiver and the patient have different values and/or the caregiver doesn't fully understand the patient's reasons for making a decision viewed as inappropriate," points out Paul B. Hofmann, DrPH, FACHE, president of Hofmann Healthcare Group in Moraga, CA.

"Similarly, talking about permitting a patient to make an unwise choice is value-laden because the word permitting is used rather than the word respecting."

According to Frankfort, IL, attorney and physician William Sullivan, DO, JD, many court cases have been dismissed when the patient has suffered a bad outcome after not listening to the physicians' advice.

"The problem is that the decision a patient makes must be informed," Sullivan says. "The legal issues that arise when such cases are litigated are whether the patient was competent and whether the patient was given enough information to make an informed decision. The ethical question that arises is, 'At what point are patients responsible for adverse effects of the decisions they make?'"

Being comfortable that a patient is making an informed decision and being comfortable with the decision itself, most agree, can be 2 very different things.

Patient choice impacts patient well-being

Hofmann says the decisions patients must make range from the innocuous (what to eat, what to wear for comfort) to the very serious (whether to abandon life-sustaining care or pursue possibly futile treatment).

"The choices or decisions by patients range from mundane to the very vital decisions that have profound impact on their well-being," such as when a pregnant woman elects to proceed with a pregnancy when all tests indicate the likelihood of harm to the mother and unlikelihood of the fetus surviving make that decision irrational, he says.

"The reason disagreements occur among patients, family members, or caregivers is often a failure to understand the underlying rationale for the patient's choice," Hofmann explains.

"Probably the most common explanation is that the caregiver—a nurse or physician—has not taken the time or made the investment to really understand the basis for what he or she perceives to be an inappropriate, unwise choice."

One obstacle to that understanding is language, and Hofmann says this doesn't just mean 2 people speaking different languages.

"The fact is that caregivers use relatively technical and almost unintelligible—from the patient's perspective—language, so the patient may misunderstand what the caregiver says in regard to treatment options," he says. "This can be a problem with the caregiver not providing a clear explanation of the issues involved in making a decision."

Another impediment to good decision making—meaning, informed decision making—is the impact of illness, trauma, depression, dementia, and/or medications, Hofmann says. Busy caregivers may fail to recognize or appreciate the consequence these conditions or medications may have on the patient's ability to make a clear, informed decision.

"When a patient makes what is perceived to be an unwise or inappropriate choice, one possible explanation is that he or she does not have what might legally be

defined as full decision-making capacity—either temporarily or on a long-term basis," he says. "The amount of medications he or she is receiving, the level of depression he or she may be experiencing because of trauma and illness, the impact of the trauma or illness itself, and temporary or progressive dementia all can complicate and may interfere with what caregivers believe to be a problem in terms of the decision-making process."

Caregiver's emotions affect decisions

Anger, guilt, and other emotional factors can influence a patient's choices, but Hofmann is quick to point out that that doesn't just mean the patient's emotional state.

Surrogates acting on behalf of the patient can be influenced by their feelings, as can caregivers.

"I was meeting with a task force that is working to improve end-of-life in the intensive care unit, and I am really proud of the work this group has done; they've done marvelous work, but the fact is that this hospital still has physicians who are in denial when it comes to conceding that there's nothing they can do to extend the life expectancy and improve the quality-of-life in some of their patients who are terminally ill," Hofmann says.

"And that is reflected in their unwillingness to even talk with a patient or his or her family about a DNR [do not resuscitate] order, because they view death as defeat, as failure. They believe, especially the subspecialists, that if 'I can keep the patient's lungs going, or if I can keep the patient's kidneys going, or his heart pumping. . .' They say, 'I can reverse this problem.' But if a patient has cancer that has metastasized and multiple organ failure, you might be successful in your limited scope [heart, lungs, kidneys] but the patient's well-being is being compromised because of one or more physicians who are unwilling to let go.'"

Finally, the health care provider and the patient might simply have legitimate, deep differences in values. Those need to be acknowledged, Hofmann says, and it's up to the caregiver to say "our differences are too great, so we need to arrange for you to be in the care of someone else."

Ethics committee helps minimize dilemmas

Ethics committees are valuable resources for minimizing and even preventing patients from making uninformed choices, and in addressing situations in which patients and their caregivers are at odds over those choices.

"The staff should be trained to be both culturally competent, not just culturally sensitive," suggests Hofmann. "They need to recognize the tendency of caregivers to push for decisions in a shorter time frame than many patients or surrogates are comfortable accepting, and they need to allow more time to pass to avoid the possibility of forcing premature decisions being made."

Often, he says, in dealing with end-of-life decisions, staff members have difficulty understanding why a patient or surrogate is having difficulty making a decision about withholding life-sustaining treatment.

A way to help ensure patients and surrogates have balanced information when it comes to making end-of-life decisions is for health care providers to emphasize —before those decisions have to be made, if possible— that if it becomes necessary to enforce a DNR order, that the patient is not abandoned at that point.

"I think that it is not emphasized enough, when a painful conversation is held about a DNR order, that if the conversation is held in a way that emphasizes that the patient won't be abandoned, will be made comfortable, the likelihood of what the caregiver believes to be the most appropriate choice is greater," says Hofmann.

Again, understandable communication is key. Hofmann says conventionally, end-of-life conversations between physicians and family members or surrogates begin with the physician telling the family what the diagnosis and prognosis are; instead, he says, physicians should start by asking the family what they understand the diagnosis and prognosis to be.

"Listening to and learning where the patient and surrogates are creates a crucial context for the physician's presentation and discussion," he explains. "If they listen to where the patient or surrogate is along the continuum of understanding, the greater the likelihood that the physician will be able to convey the information that he or she was intending to convey.

"By not inviting them to describe where they are [in understanding the patient's condition], the physician makes some very inappropriate assumptions and raises the likelihood that there will be tense conflicts over choices."

Another example: asking, when a surrogate is approached about withdrawing or withholding a ventilator, "What do you want us to do?"

That question puts the decision in the context of what the surrogate wants, rather than what the patient would want, when the choices might not be the same; if the surrogate is the patient's child, for example, he or she might not want the parent to die, whereas the parent's wish would be to avoid the ventilator.

"The right question is, 'What do you believe the patient would want?' and, it's a huge distinction, because it allows the surrogate to demonstrate respect for the patient's wishes," he says. "It feels different to say, 'My mother would want this' than to say, 'I want this.' It's a huge difference in acknowledging and respecting the patient's wishes."

Finally, Hofmann says, ethics trainers should make extensive use of role-playing to help ethics committees

and others become more aware of effective ways to mediate and resolve complex ethical dilemmas that arise at the end of life.

"When a patient's decision is at variance with what the physician would do, you have to recognize the triumph of autonomy," Hofmann points out. Lingering doubt about a patient's choice is one reason that such conflicts demand an ethics consult.

"That's why these multidisciplinary resources have been established, because irreconcilable differences occur—so how might they be reconciled and mediated in a way to bring resolution in such a manner that the legitimate needs of the participants are met," he explains. "I think if we are oblivious to the crucial needs of the caregivers [when conflicts arise] in a naïve attempt to be completely responsive to patients and families, we do great disservice to the caregivers on whom patients and family members depend for their well-being. We have a moral imperative to be sensitive to the needs of the caregivers, and I see the ethics consult as part of that." ■

Stroke vs Stroke Mimics: Diagnosis at the Bedside

ABSTRACT & COMMENTARY

By Dana Leifer, MD

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Dr. Leifer reports no financial relationship related to this field of study.

This article originally appeared in the April 2006 issue of Neurology Alert. *It was edited by Matthew Fink, MD, and peer reviewed by M. Flint Beal, MD. Dr. Fink is Vice Chairman, Professor of Clinical Neurology, Weill Cornell Medical College, Chief of Division of Stroke and Critical Care Neurology, NewYork Presbyterian Hospital, and Dr. Beal is Professor and Chairman, Department of Neurology, Cornell University Medical College, New York.*

Synopsis: *This prospective study demonstrates that clinical features such as focal deficits, a clear time of onset, and absence of non-neurological signs distinguish a stroke diagnosis from other diagnoses at the bedside.*

Source: Hand PJ, et al. Distinguishing Between Stroke and Mimic at the Bedside: The Brain Attack Study. *Stroke*. 2006;37:769-775.

The availability of a growing number of therapeutic options for acute stroke patients makes rapid and reliable diagnosis of stroke at the bedside more important than ever. Modern technology, such as CT and MRI, can often diagnose stroke and rule out other conditions but, to avoid wasting time and resources, accurate diagnosis must be made efficiently by emergency medical personnel in the field and by physicians and nurses in the emergency room.

Hand and colleagues prospectively studied 336 consecutive patients with suspected stroke. Patients were identified by emergency room personnel as soon as possible after arrival and by review of admission registers from the emergency room, stroke unit, and neurology ward. Clinical evaluations were performed by neurology or internal medicine residents, and final diagnoses were determined by the consensus opinion of a panel of experts.

With 350 acute events in 336 patients, the final diagnosis was stroke in 241 cases and stroke mimic in 109, which included 44 episodes that were considered possible stroke or transient ischemic attack. Sixty-two of the stroke mimics were seen within 6 hours. This is an important group because it includes most patients eligible for intravenous thrombolysis or intra-arterial interventions. In this group, seizures accounted for 29% of the diagnoses, syncope in 14.5%, sepsis in 9.7%, toxic/metabolic changes in 9.7%, acute mononeuropathy in 6.5%, space-occupying lesions in 4.8%, acute confusion in 4.8%, vestibular dysfunction in 4.8%, dementia in 3.2%, and migraine in 3.2%. In patients presenting after 6 hours, seizures and syncope were less common and accounted for only 10.6% and 2.1%, respectively, but sepsis and space-occupying lesions were more frequent, accounting for 17.0% and 14.9%, respectively.

Univariate analysis demonstrated that patients with an uncertain time of onset, seizure at onset, loss of consciousness, non-neurologic symptoms, prior cognitive impairment, no lateralizing symptoms or signs, or signs not consistent with symptoms, were less likely to have a stroke. In contrast, an exact time of onset and any focal neurologic sign or symptom (speech difficulty, visual loss, focal weakness or numbness, upper limb ataxia, extensor plantar) predicted a diagnosis of stroke, as did presence of coronary or peripheral vascular disease and hypertension (SBP > 150, DBP > 90). More severe deficits, as measured by the NIH stroke scale (NIHSS), were more likely to be associated with a stroke, as were patients whose syndrome could be classified as a total or partial anterior circulation stroke by the Oxfordshire classification system. Vertigo and leg ataxia were not significant predictors because they occurred frequently in vestibular dysfunction.

Multivariate analysis identified presence of non-neurologic abnormalities and prior cognitive impairment as factors independently predicting that a patient did not have a stroke. Exact time of onset, definite history of focal neurologic symptoms, any abnormal vascular findings (SBP > 150, atrial fibrillation, valvular disease, or absent peripheral pulses), any lateralizing signs, and definite classification by the Oxfordshire system all predicted that a patient had

a stroke. The multivariate analysis also confirmed that chance of stroke increased as the NIHSS score increased. The most powerful predictors were definite history of focal neurologic symptoms and NIHSS greater than 10.

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These results are important because they demonstrate that a few key features make the diagnosis of stroke likely. The results of the study suggest that initial evaluation of potential stroke patients should determine if there is an exact time of symptom onset, any definite history of focal neurologic symptoms, and any lateralizing signs. The key symptoms and signs are straightforward—speech difficulty, visual loss, focal weakness or numbness, arm ataxia. If such symptoms or signs are identified, this study suggests that it is appropriate to activate a rapid protocol for more thorough evaluation by imaging and more detailed clinical evaluation focused on reaching a definite diagnosis and starting treatment.

On the other hand, if focal signs and symptoms are absent or non-neurologic problems are present, diagnoses other than stroke should be considered, and these include potentially serious non-neurologic conditions such as sepsis, syncope, and toxic-metabolic disorders. Although these conclusions may seem obvious to neurologists who have experience with stroke, the study makes a significant contribution because it provides guidelines for non-specialists who may see a stroke patient first, and must recognize that a patient may be having a stroke.

New Trick for Liberation from Mechanical Ventilation?

ABSTRACT & COMMENTARY

By Saadia R. Akhtar, MD, MSc

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Dr. Akhtar does research for Eli Lilly.

This article originally appeared in the April 2006 issue of Critical Care Alert.

It was edited by David J. Pierson, MD, and peer reviewed by William Thompson.

Synopsis: *This prospective observational study suggests that a successful spontaneous breathing trial with pressure support immediately after a failed T-piece trial may predict and allow successful liberation from the ventilator.*

Source: Ezingeard E, et al. Weaning from Mechanical Ventilation with Pressure Support in Patients Failing a T-Tube Trial of Spontaneous Breathing. *Intensive Care Med*. 2006;32:165-169.

Some studies have shown that breathing through an endotracheal tube imposes a small but measurable excess respiratory workload. Although randomized, controlled studies have found no difference between T-piece and pressure support (PS) spontaneous breathing trials (SBTs) as predictors of readiness for extubation, Ezingeard and colleagues suggest that perhaps the excess respiratory workload may be an issue for specific patients. They aimed to evaluate the utility of a PS SBT following a failed T-piece SBT. Their primary outcome was extubation failure rate within 48 hours.

A prospective, observational study was performed in 2 French medical-surgical intensive care units between 2003 and 2004. Over a 17-month period, all patients requiring mechanical ventilation for > 24 hours and ready for a SBT were eligible. Patients with tracheostomies and those with pending decisions about goals of care were excluded. Patients underwent a 30-minute T-piece SBT with extubation if successful. A successful trial was defined as absence of signs of respiratory distress (eg, retractions or agitation), oxygen saturations ≥ 90% on ≤ 50% oxygen, respiratory rate ≤ 35 per minute, and absence of a 20% variation in respiratory rate or blood pressure. If patients failed a T-piece SBT, they were immediately placed on a PS of 7 cm H_2O for 30 minutes. If they met the noted criteria of success, they were extubated. Standard statistical methods were used to compare groups.

A total of 118 consecutive patients were enrolled. Of these, 87 were extubated after a 30-minute T-piece SBT. Of the remaining 31 patients, 21 (68%, or 18% of the original cohort) were extubated following a PS SBT. Reintubation rates at 48 hours were not significantly different (13% for T-piece group and 19% for those undergoing PS SBT after T-piece). Patients in the 2 groups were similar in terms of age, chronic medical problems, acute diagnoses, endotracheal tube size, duration of mechanical ventilation, and death. The only difference was in percentage of patients with decompensated COPD in each group: 13% of those successfully liberated from the ventilator after T-piece SBT had decompensated COPD compared to 38% of those successfully liberated after PS SBT. Ezingeard et al note that they adjusted sensitivity and pressurization slope individually for each patient undergoing a PS SBT; they suggest that this allowed for improved patient-ventilator synchronization and thus a successful SBT particularly in those patients with COPD.

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Well designed, large, randomized trials have previously compared weaning strategies (time to extubation and success rates measured by reintubation at 48 hours) and found no significant difference between T-piece

and PS SBTs.[1] Although there may be reasons to think that respiratory failure in patients with COPD differs from respiratory failure in other settings, some studies have even compared these weaning strategies specifically in patients with COPD and found no difference.[2]

Ezingeard et al's work may appear to put these findings into question. However, a direct comparison is difficult since this study assesses immediately consecutive weaning trials (rather than delayed, daily weaning trials). The study is clearly limited by lack of randomization and the number of patients (total and with decompensated COPD); would immediately following up a failed PS SBT with a T-piece SBT lead to similar results? Would this study have revealed more or less striking results in a large group of patients with COPD?

Another concern is that the Ezingeard et al's defined criteria for failure of a SBT may not be those used by other intensivists (a 20% variation in respiratory rate or blood pressure was used but without specific thresholds; respiratory rate > 35 per minute may be too low).[3] This is an important issue, as the majority of patients considered to fail their T-piece SBT did so based on only 1 of the several criteria; the results may have been greatly altered had the criteria varied or failure been defined by not meeting 2 or more of the criteria. Finally, as with many other studies of weaning, criteria for reintubation and failed extubation are not clearly defined, adding considerable potential bias to the primary outcome.

It is essential to continue to evaluate our approach to weaning and to work to avoid unnecessary days on the ventilator. I hope that despite the limitations of this study, Ezingeard et al follow up their interesting hypothesis with a larger randomized trial. Until then, we must continue to consider T-piece and PS SBTs as equals. ■

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CME Questions

7. In the Ezingeard study, patients weaning from mechanical ventilation who failed a 30-minute T-piece spontaneous breathing trial were immediately tested with a 30-minute spontaneous breathing trial on 7 cm H_2O pressure support (PS). The results of the study showed that:

a. the majority of patients passed the first T-piece trial and were extubated.
b. the PS trial was a better method of weaning from mechanical ventilation.
c. reintubation rates were higher for patients extubated after the standard T-piece trial.
d. mortality rates were higher for patients extubated after a subsequent PS trial.
e. the addition of the PS trial was particularly helpful in patients with ARDS.

8. When discussing the withholding or withdrawal of life-sustaining therapies with a patient's surrogate decision-maker, it's important to ask or tell the surrogate:

a. "What do you want us to do for your loved one?"
b. "What do you believe your loved one would want in this situation?"
c. "You must agree with the decision of the hospital's ethics committee."
d. "What do you think is the right thing to do?"
e. "Do you want us to do everything we can for your loved one?

9. All of the following were found to be independent predictors of stroke in patients presenting with a potential stroke, except:

a. Definite time of onset
b. History of prior cognitive impairment
c. Lateralizing signs on examination
d. Presence of abnormal vascular findings
e. Focal neurological symptoms

Answers: 7. (a); 8. (b); 9. (e)

CME Objectives

The objectives of *Hospital Medicine Alert* are to:

• review pertinent safety, infection control, and quality improvement practices;

• discuss diagnosis and treatment of acute illness in the hospital setting; and

• review current data on diagnostic and therapeutic modalities for common inpatient problems. ■