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Delays in Transfer for Primary PCI in STEMI

AbStrAct & commentAry

By Andrew J. Boyle, MBBS, PhD

Assistant Professor of Medicine, Interventional Cardiology, University of California, San Francisco

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

This article originally appeared in the December 2011 issue of clinical cardiology Alert. *It was edited by Michael H. Crawford, MD, and peer reviewed by Ethan Weiss, MD. Dr. Crawford is Professor of Medicine, Chief of Clinical Cardiology, University of California, San Francisco, and Dr. Weiss is Assistant Professor of Medicine, Division of Cardiology and CVRI, University of California, San Francisco. Dr. Crawford reports no financial relationships relevant to this field of study, and Dr. Weiss is a scientific advisory board member for Bionovo.*

Source: miedema m, et al. causes of delay and associated mortality in patients transferred with St -segment-elevation myocardial infarction. *Circulation* 2011;124:1636-1644.

Most patients with ST-elevation myocardial infarction (STEMI) present to hospitals that are not capable of percutaneous coronary intervention (PCI). Rapid transfer to PCI-capable facilities for primary PCI may result in earlier reperfusion of the infarct artery and better clinical outcomes. However, delays in transfer may diminish the mortality benefit achieved with primary PCI in STEMI. The specific reasons for and the clinical impact of delays in transfer for primary PCI are unknown. Accordingly, Miedema and colleagues prospectively studied 2034 patients with STEMI transferred to their institution for primary PCI and determined the causes of delay in transfer, as well as the clinical outcomes associated with these delays.

Between 2003 and 2009, 2034 patients suffering STEMI were transferred with the intent of primary PCI. All patients with ST-elevation or new left bundle branch block and chest pain of < 24

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hours duration were included. There were no exclusion criteria. The time from first hospital contact to reperfusion (overall door-to-balloon time) was recorded and was also divided into three segments: referring center door-in-to-door-out time, transport time, and PCI receiving center door-to-balloon time. The total door-to-balloon time goal was 120 minutes and the segment goals were 45, 45, and 30 minutes, respectively. Reasons for delay were prospectively collected.

Patients with delayed overall door-to-balloon times (from arriving at referring center to balloon inflation at PCI center > 120 minutes) were older (64 vs 61 years, $P < 0.001$), were more likely to be non-smokers (63% vs 58%, $P = 0.02$) and diabetics (18.4% vs 14.4%, $P = 0.02$), and were more likely to be in cardiogenic shock (12.9% vs 9.6%, $P = 0.04$) than those who had no delay. Patients with delay to PCI had higher in-hospital mortality than those with no delay (6.4% vs 4.1%, $P = 0.02$), but this difference was no longer statistically significant at 30 days. The authors then examined where the delay occurred and its effect on mortality.

Delay at the referral center (door-in-to-door-out time > 45 minutes) occurred in 64% of cases. The most common reason for delay was waiting for transportation. The longest delays were for diagnostic dilemma, followed by non-diagnostic electrocardiogram (ECG), then cardiac arrest/shock, emergency department delay, and other. In-hospital mortality associated with delays was highest for those with cardiogenic shock (31%) and lowest in those with non-diagnostic ECG (0%).

Delays in transport (> 45 minutes) were less common (13%). These were usually due to weather or distance (some referral hospitals were up to 210 miles away). There was no excess mortality attributable to transport delays.

Delays at the PCI center (door-to-balloon time > 30 minutes) occurred in 16%. The most common reasons for delay were catheterization lab team delay and complex procedure. The longest delays were due to diagnostic dilemma. The highest mortality was in those with cardiogenic shock/cardiac arrest (44%). The authors conclude that treatment delays occur even in efficient systems for STEMI care, and that the clinical impact of the delay varies according to the cause of the delay.

■ Commentary

Current treatment guidelines emphasize the importance of rapid reperfusion in the treatment of patients with STEMI. While PCI is a more effective reperfusion strategy than fibrinolysis when both are offered with little delay in clinical trial settings, delays at any stage of the process can prolong the ischemic time, increase myocardial damage, and reduce the benefit of PCI. Developing systems of rapid patient transfer for primary PCI are challenging, but should be a priority under the latest guidelines. The higher mortality in those with overall door-to-balloon times > 120 minutes confirms the importance of rapid reperfusion. This study defines the reasons for delay within these authors' system, which is an experienced high-volume primary PCI transfer system. Delays were very frequent at the referring hospital (64% of cases), and infrequent at the PCI center (16%). These data may inform other STEMI transfer systems that are being developed. Importantly, the reason for the delay was more important than the delay itself. Delay for an initially non-diagnostic ECG, for example, was associated with very low in-hospital mortality and this may represent a lower-risk patient group.

This study is observational in nature, and therefore a direct cause and effect relationship between the reason for delay and mortality rate cannot be assumed. It is an association. Furthermore, we are not told of the pharmacological strategies employed in their patients (how many received thienopyridines, glycoprotein IIb/IIIa inhibitors?), the procedural details (culprit lesion location, stent type, use of intra-aortic balloon pumps), or the bleeding rates. All of these may contribute to the outcomes in these patients.

Despite these limitations, this study underscores the importance of rapid transfer protocols, highlights the frequency of delays despite a rapid transfer protocol, and suggests that the reason for the delay may be more important than the delay itself. ■

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Questions & Comments
Please call Russ Underwood, Executive Editor, at (404) 262-5521 or e-mail at russ.underwood@ahcmedia.com.

Hospital Organizational Characteristics Associated with Use of Daily Sedation Interruption in Mechanically Ventilated Patients

AbStrAct & commentAry

By David J. Pierson, MD

Professor Emeritus, Pulmonary and Critical Care Medicine, University of Washington, Seattle

This article originally appeared in the December 2011 issue of critical care Alert. *It was peer reviewed by William Thompson, MD. Dr. Thompson is Associate Professor of Medicine, University of Washington, Seattle. Drs. Pierson and Thompson report no financial relationships relevant to this field of study.*

Synopsis: *In a nationally representative sample of U.S. hospitals, reported routine use of daily interruption of sedation for mechanically ventilated patients was associated with the presence of a leadership emphasis on safety culture, receptivity of the staff to practice change, and participation in a collaborative to prevent health care-associated infections. There was no association with the number of hospital beds or with the presence of a medical school affiliation.*

Source: miller mA, et al. organisational characteristics associated with the use of daily interruption of sedation in US hospitals: A national study. *BMJ Qual Saf* 2011; Sep 22. [e pub ahead of print]

Miller and colleagues conducted a survey of daily interruption of sedation (DIS) in U.S. hospitals and sought to determine whether organizational features were associated with DIS use. The survey was mailed to a stratified random sample of non-federal U.S. acute-care hospitals with more than 50 beds. The investigators sent their survey to each hospital's identified lead infection control professional. Respondents were asked whether DIS was routinely used in managing mechanically ventilated adult patients in their institution (using a scale of 1 [never] to 5 [always]), and responses were dichotomized to 1-3 vs. 4-5. Other questions dealt with the respondents' perceptions that the hospital had a leadership-driven safety culture, whether the staff was receptive to change, and whether the respondent would feel safe as a patient in the institution — all reported according to a 1-5 Likert scale — as well as whether the hospital participated in a collaborative to prevent health care-associated infections. Hospital size was taken from the 2007 annual survey database of the American Hospital Association (dichotomized into < 250 beds vs > 250 beds), and survey respondents were asked whether the hospital had an academic affiliation.

Complete responses were received from 386 hospitals (69.4% response rate), of which 33.5% had more than 250 beds and 26.4% had a medical school affiliation. Two-thirds of the hospitals were involved in a collaborative to reduce health care-associated infections. DIS for ventilated patients was reported to be used "always" or "almost always" in 79%. Although 75% of the hospitals reported having a leadership focus on safety culture, only 43% reported that the staff were receptive to changes in practice. A total of 77% of the respondents reported that they would feel safe as a patient in their own institution. Hospital size and whether there was an academic affiliation were not associated with DIS use. Three surveyed factors were, however, statistically significantly associated with increased reported use of DIS: a leadership emphasis on safety culture, staff receptivity to change, and involvement in an infection-control collaborative.

■ Commentary

The use of DIS in this random sample of U.S. hospitals, as reported by the hospitals' lead infection control professionals, was associated with three organizational characteristics of the institutions, including emphasis on safety on the part of hospital leadership, perceived receptivity to practice change on the part of the staff, and participation in a multiinstitutional infection-control collaborative. The study thus identifies features whose associations can be studied further and could potentially be modified. Of note is the finding that DIS use did not vary with hospital size or academic affiliation.

For a study of ICU practice related to mechanical ventilation, one might wonder why infection control personnel were selected as survey respondents. This was done because of the multidisciplinary nature of both infection-control practices (such as prevention of central line infections) and DIS, which necessarily involve buy-in and participation by physicians, nurses, and others. The authors point out that DIS requires collaboration between medical teams and nursing staff that is analogous to that necessary to maximize the utilization of maximal sterile barrier precautions for central line placement, studies on which have typically been coordinated by hospital infection control staff.

Like all surveys, this study determined what the respondents said happened in their institutions rather than what was actually done, which would have required direct observation. This feature may have led to overestimation of regular DIS use (which was claimed by four-fifths of the hospitals), and the study may or may not accurately reflect the staff's true preferences and attitudes. However, the authors acknowledge and discuss the study's limitations, and point out the need for a multicenter prospective study linking actual compliance with DIS with organizational characteristics of the individual institutions. This study also focuses attention on the importance of leadership emphasis on safety culture, staff receptivity to change, and institutional involvement with a collaborative to prevent health care-associated infections — all of them important in more aspects of critical care than just DIS during mechanical ventilation. ■

A Wide Tachycardia of Uncertain Cause

eCG review

By Ken Grauer, MD, *Professor Emeritus in Family Medicine, College of Medicine, University of Florida*

Dr. Grauer is the sole proprietor of KG-EKG Press, and publisher of an ECG pocket brain book.

This article originally appeared in the November 15, 2011, issue of Internal medicine Alert. *It was edited by Stephen Brunton, MD, and peer reviewed by Gerald Roberts, MD. Dr. Brunton is Adjunct Clinical Professor, University of North Carolina, Chapel Hill, and Dr. Roberts is Assistant Clinical Professor of Medicine, Albert Einstein College of Medicine, New York, NY. Dr. Brunton serves on the advisory board for Amylin, Boehringer Ingelheim, Novo Nordisk, and Symbiotix; he serves on the speakers bureau of Boehringer Ingelheim, Novo Nordisk, and Teva. Dr. Roberts reports no financial relationship to this field of study.*

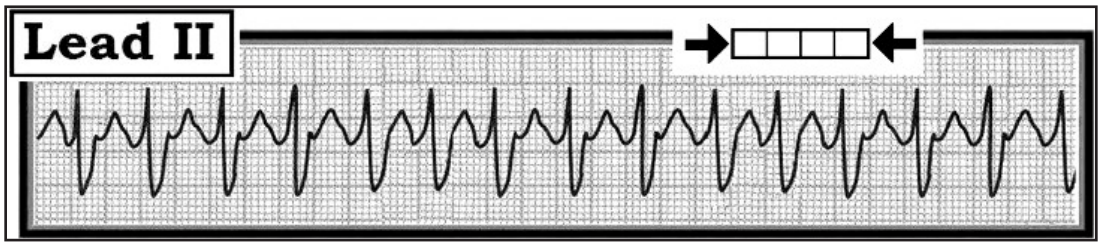

Figure 1 — Lead II rhythm strip from a patient with palpitations? What would you do?

Scenario: The lead II rhythm strip shown above was obtained from a woman with new-onset palpitations. How would you interpret this tracing? *How certain are you of your answer?* Clinically — what would you do?

Interpretation: The rhythm is fast and fairly (*but not completely*) regular. The QRS looks to be wide (i.e., *more than half a large box*) and there are *no* definite P waves. Thus, this appears to be a wide complex tachycardia (WCT) of *uncertain* etiology.

The key piece of information that we have *not* been told is whether the patient in this case is hemodynamically stable. If she was having chest pain, shortness of breath, mental confusion, *and/or* was hypotensive at the time this tracing was recorded — then immediate synchronized cardioversion would be indicated as the most time-efficient means for converting her out of a potentially life-threatening tachyarrhythmia. On the other hand, if the patient was alert, normotensive and asymptomatic, then there is at least a moment of time to devote to rhythm diagnosis.

By far, the most common cause of a regular WCT of uncertain etiology is ventricular tachycardia. That said, QRS widening with supraventricular tachycardia may result from either preexisting bundle branch block and/or aberrant conduction. Obtaining a 12-lead ECG *during* tachycardia may prove invaluable for suggesting atrial activity in other leads, as well as providing a look at QRS morphology. In this case, QRS morphology during the WCT was identical to that seen in previous tracings when this patient was in sinus rhythm. As a result, an IV bolus of adenosine was given. The result (*shown below in Figure 2*) confirmed that the rhythm was atrial flutter with 2:1 AV conduction, with QRS widening due to the preexisting conduction defect. Retrospectively in Figure 1, one can see regular *negative* deflections at about 300/minute occurring just before and just after the T wave. This case highlights how definitive rhythm diagnosis is *not* always known at the time treatment is begun. ■

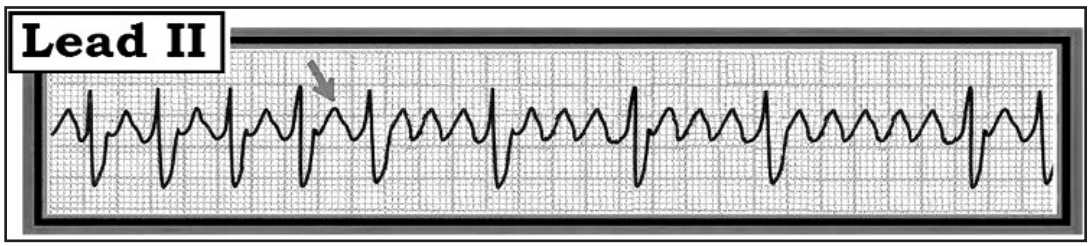

Figure 2 — Treatment with adenosine (*arrow*) results in slowing of the ventricular response. This reveals atrial flutter as the underlying diagnosis.

Dengue Outbreak in Kenya: Sign of a Larger Issue?

o Ut b r e AK An D UPDAt e

By Michele Barry, MD, FACP, and Brian Blackburn, MD

Dr. Barry is Senior Associate Dean for Global Health at Stanford University; Dr. Blackburn is a Clinical Assistant Professor in the Division of Infectious Diseases and Geographic Medicine at Stanford University.

Dr. Barry is a retained consultant for the Ford Foundation and has received research or grant support from Johnson & Johnson Corporate Foundation, the Doris Duke Foundation, and the National Institutes of Health.
Dr. Blackburn reports no financial relationship to this field of study.
This article originally appeared in the December 2011 issue of t ravel medicine Advisor. *It was edited by Frank Bia, MD, PHD, and peer reviewed by Lin Chen, MD. Dr. Bia is Professor (Emeritus) of Internal Medicine (Infectious Disease and Clinical Microbiology); Yale University School of Medicine, and Dr. Chen is Assistant Clinical Professor, Harvard Medical School; Director, Travel Medicine Center, Mt. Auburn Hospital, Cambridge, Mass. Drs. Bia and Chen report no financial relationships relevant to this field of study.*

Synopsis: *An outbreak of dengue fever in northeastern Kenya has recently sickened at least 5,000 people.*

Source: Promed Archive n umber 20111004.2985; o ct. 4, 2011.

An outbreak of dengue fever in northeastern Kenya was first reported in September 2011, and is believed to be spreading rapidly, with at least 5,000 people infected within the first weeks of this outbreak. The Kenyan Ministry of Public Health reported four confirmed deaths, but with only one public hospital and a few private clinics in the epicenter (Mandera, near the border with Ethiopia and Somalia), the toll was likely higher.

Another recent, large epidemic of dengue occurred on the Cape Verde Islands off the West African coast in March 2010, with more than 21,000 suspected cases and 6 deaths reported by the U.S. Centers for Disease Control and Prevention; almost 60 cases were also reported by ProMed in nearby Senegal. Unfortunately, poor diagnostic capabilities in these West African countries likely adversely affected the accuracy of the surveillance data obtained during that outbreak.

■ Co mme n t a r y

Dengue fever, an arboviral disease with a typical incubation period of 4-7 days, is caused by four circulating serotypes of dengue virus. This disease is not usually considered a major threat to travelers to Africa. Although this outbreak in remote northeastern Kenya did not occur near areas frequented by tourists, dengue fever does pose a threat to travelers and relief works in Africa. Of 24,920 returned travelers seen at GeoSentinal clinics from March 1997 to March 2006, 28% cited fever as a chief reason for seeking care. Dengue was the cause of fever for 6%, although this diagnosis was made less frequently than malaria (21% of febrile travelers) and diarrheal illness (15% of febrile travelers).[1] Although dengue was diagnosed in only 1% of the febrile travelers who had been to sub-Saharan Africa in this study, the poor surveillance for dengue in the region undoubtedly contributed to the low reported numbers. In a large review of ill returned travelers, dengue fever was primarily found in travelers returning from southeast Asia (especially in June and September), south Central Asia (especially in October), South America (especially in March), and the Caribbean (especially in August and October).[2] One study estimated the incidence of dengue fever to be nearly 3% in Dutch travelers who spent a median of 1 month traveling in Asia (where travel-related dengue is a more frequent diagnosis) in the early 1990s.[3]

A 1956 retrospective serosurvey suggested that dengue has existed in Africa at least as far back as 1926-1927, when it caused a major epidemic in Durban, South Africa. Despite poor surveillance for dengue in most of Africa, it is clear that fever caused by all four serotypes has increased dramatically since 1980, as multiple outbreaks of dengue have occurred in most regions of Africa over the past three decades.[4] It has been presumed that these outbreaks have most likely been transmitted by *Aedes aegypti*, which is widely distributed in the region.

Because most dengue infections are subclinical or manifest as undifferentiated fever, they are often undiagnosed or are treated as malaria or other febrile illnesses endemic to a given area, such as typhoid or leptospirosis. Chikungunya is another viral infection that mimics dengue and also circulates in sub-Saharan Africa. Given the recently documented outbreaks of dengue in sub-Saharan Africa, this infection may be more of an issue there than currently appreciated, and the relatively low case numbers a product more of poor surveillance rather than low disease burden. Thus, dengue should not be discounted as a possible cause of fever in travelers returning from Africa, and hopefully epidemiological studies will better define the distribution of dengue in Africa in the coming years.[5] ■

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VTE Prophylaxis in Gynecologic Surgery: Quo Vadis?

AbStrAct & commentAry

By Robert L. Coleman, MD

Professor, University of Texas; M.D. Anderson Cancer Center, Houston

Dr. Coleman reports no financial relationships relevant to this field of study. This article originally appeared in the December 2011 issue of ob/Gyn Alert. *It was edited by Jeffrey T. Jensen, MD, MPH, and was peer reviewed by Catherine Leclair, MD. Dr. Jensen is Leon Speroff Professor and Vice Chair for Research, Department of Obstetrics and Gynecology, Oregon Health & Science University, Portland, and Dr. Leclair is Associate Professor, Department of OB/GYN, Oregon Health & Science University, Portland. Dr. Jensen receives research support from, is a consultant to, and serves on the speakers bureau of Bayer Healthcare/Bayer Schering; he also receives research support from Merck Abbott Laboratories,Wyeth and Warner-Chilcott and is a consultant to Schering Plough. Dr. Leclair reports no financial relationship to this field of study.*

Synopsis: *Venous thromboembolism (VTE) prophylaxis interventions in gynecologic surgery are meritorious, supported by Level 1 evidence and the subject of multiple guidelines, including those published by the American College of Obstetricians and Gynecologists. However, new evidence suggests nearly one-third of women undergoing hysterectomy in this country still receive no VTE prophylaxis, placing thousands of women at unnecessary risk for preventable morbidity.*

Source: Wright JD, et al. Quality of perioperative venous thromboembolism prophylaxis in gynecologic surgery. *Obstet Gynecol* 2011;118:978-986.

The objective of this study was to estimate the use of VTE prophylaxis in women undergoing major gynecologic surgery and to estimate the patient, physician, and hospital characteristics associated with their use. To examine these factors, a validated and regularly audited national commercial database (Perspective®) of inpatient hospital admissions was interrogated for VTE prophylaxis use over an 11-year period (2000 to 2010). VTE prophylaxis was classified as none, mechanical, pharmacologic, or a combination. A total of 738,150 women who underwent major gynecologic surgery were identified. In this study, only abdominal or vaginal hysterectomy with or without salpingo-oophorectomy for benign disease were included. In addition, laparoscopic/robotic procedures were excluded. No prophylaxis was given to 292,034 (40%) women, whereas 344,068 (47%) received mechanical prophylaxis, 40,268 (6%) pharmacologic prophylaxis, and 61,780 (8%) combination prophylaxis. VTE prophylaxis use increased from 54% to 68% over the observation period and was more commonly used in older women, those with Medicare and more comorbidities, Caucasian women, patients treated at rural hospitals, patients treated at teaching facilities, and patients treated by high-volume surgeons and at high-volume centers. Factors associated with use of pharmacologic prophylaxis included advanced age, white race, noncommercial insurance, later year of diagnosis, greater comorbidity, treatment at large hospitals and urban facilities, and treatment by a high-volume surgeon. The survey data highlight that VTE prophylaxis use is substantially underutilized in women undergoing major gynecological surgery, despite clear recommendations from evidence-based guidelines. Hospital, physician, and patient factors influence use.

■ Commentary

There are many things in surgery we can't control: age, preexisting anatomy, preexisting comorbidities, characteristics of disease, and patient compliance, just to name a few. However, there are those factors under our control that should be as automatic as getting informed consent. VTE prophylaxis is one of them! For more than 35 years, Level 1 evidence from randomized clinical trials has clearly demonstrated, in nearly every surgical discipline (including 15 randomized trials in gynecology/gynecologic oncology), that fatal VTE can be prevented by intervention.[1] Initially, unfractionated heparin given before and after surgery was advocated, but concerns for intraoperative and postoperative bleeding ushered in evaluation of alternative pharmacological agents and mechanical devices, such as graded compression stockings and intermittent pneumatic compression devices.[2,3] In addition, risk stratification of patients and procedures (types and lengths) where VTE prophylaxis might be optimized led to well-publicized guidelines in gynecologic surgery by American College of Obstetricians and Gynecologists and the American College of Chest Physicians.[4] With this proviso, it is hard to imagine that in 2010, nearly a third of patients undergoing major gynecologic surgery still were not given any form of VTE prophylaxis.

A second paper in this issue of *Obstetrics & Gynecology* suggests the quality of data among benign gynecology cohorts in their meta-analysis is not as strong as in others (e.g., oncology patients) and opines that the guidelines are viewed with tepid regard.[5] Nevertheless, it is estimated that VTE occurs in up to 3% of patients following benign gynecologic procedures, which translates into hundreds of preventable cases every year. In the current study, it was reassuring that the proportion has significantly increased in the last decade, and that it is practiced more often in urban training centers with high-volume surgeons and hospitals, as this holds promise that the practice will continue to increase as more residents and operating room staff trainees are exposed to Best Practices and Quality Improvement projects around this topic. Data like these are hard to come by, and as with any voluntary national registry, true compliance with guidelines (dose, duration, and timing of pharmacological prophylaxis and patient compliance with compression devices) is difficult to adjudicate. However, this should serve as a wake-up call to review the guidelines and our compliance in order to provide the best care to our patients. ■

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Early or Late Tracheostomy Placement: Optimal Timing Remains Unclear

Ab St r Ac t & c o mm e n t Ar y

By Linda L. Chlan, RN, PhD
School of Nursing, University of Minnesota
Dr. Chlan reports that she receives grant/research support from the National Institutes of Health.
This article originally appeared in the December 2011 issue of c ritical c are Alert. *It was edited by David Pierson, MD, and peer reviewed by William Thompson, MD. Dr. Pierson is Professor Emeritus, Pulmonary and Critical Care Medicine, University of Washington, Seattle, and Dr. Thompson is Associate Professor of Medicine, University of Washington, Seattle. Drs. Pierson and Thompson report no financial relationships relevant to this field of study.*

Synopsis: *Based on the findings of this meta-analysis of seven randomized controlled trials, early (7 days after intubation) or late (any time after 7 days) tracheostomy placement did not alter clinical outcomes in study patients, including no differences in mortality, incidence of ventilator-associated pneumonia, duration of mechanical ventilation, ICU stay, hospital stay, or sedation.*

Source: Wang F, et al. t he timing of tracheotomy in critically ill patients undergoing mechanical ventilation: A systematic review and meta-analysis of randomized controlled trials. *Chest* 2011;Sep 22. [e pub ahead of print]

This paper presents the findings from a systematic review and meta-analysis of available randomized, controlled trials (RCTs) published through July 2011 and retrieved from a variety of electronic search databases worldwide. The authors followed the reporting guidelines of Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). The quality of the reviewed RCTs followed the methods recommended by the Cochrane Collaboration. The primary outcomes examined included short-term mortality (hospital mortality or mortality within 90 days follow-up) and incidence of ventilator-associated pneumonia (VAP). Secondary outcomes were long-term mortality (mortality between hospital discharge and at least 1-year follow-up), duration of mechanical ventilation, duration of sedation, length of ICU stay, length of hospital stay, and complications such as events that were life-threatening and required intervention or resulted in prolonged hospitalization.

The authors included seven RCTs that met their pre-established criteria; a total of 1044 patients were included in these studies. The RCTs were conducted in North America (3), Europe (3), and North Africa (1), with no representation of Latin American or Asian countries or Pacific nations such as Australia. Tracheostomy procedures included those performed at the bedside and those placed in the operating room. Three of the seven RTCs were multicenter trials. Six of the seven trials reported their specific weaning protocols. Age of patients included in the trials ranged from 40-66 years. The seven trials examined a heterogeneous population including medical, medical-surgical, trauma, head injury, burns, and post-cardiac surgery patients. Two trials were judged to be biased due to one being stopped early after an interim analysis, and the other due to imbalance after randomization. There was no evidence among the trials of publication bias.

The findings from the meta-analysis on the pre-determined primary outcomes concluded that early tracheostomy placement did not reduce short-term mortality or incidence of VAP. Findings on the secondary outcomes demonstrated no difference in long-term mortality. Early tracheostomy did not shorten the duration of mechanical ventilation or sedation. Likewise, early tracheostomy was not associated with shorter ICU or hospital stay. There were no significant differences among the complications examined in the meta-analysis.

■ Co mm e n t a r y

This well-done systematic review and meta-analysis provides a very coherent presentation on the topic. For those clinicians new to meta-analysis, a review of processes and terms is warranted to inform the reader. Any meta-analysis needs to begin with a thorough, high-quality systematic review. The purpose of a systematic review is to provide a comprehensive summary of literature relevant to a specific topic or research question. Meta-analysis can be defined as the integration of findings across studies. A variety of statistical procedures are used to integrate and summarize these findings depending on the purpose and level of data under consideration (continuous, dichotomous, etc). The authors of this meta-analysis used the relative risk (RR) statistic to report the pooling of results from seven RCTs. RR is the risk of an event occurring given one condition vs the risk of it occurring given a different condition. In this meta-analysis, the findings consistently demonstrated no

difference in the events or clinical outcomes occurring in either group. For the interested reader, many excellent meta-analyses and resources are available on a variety of topics from the Cochrane Collaboration (www.cochrane.org).

Of great importance from this meta-analysis is that there is no consistent definition of early (2-8 days) or late (14-28 days) tracheostomy placement. This lack of agreement and consistent definition makes comparisons among trials extremely challenging. The reader is advised to carefully consider the definitions of early and late tracheostomy reported in individual studies and what types of patient populations and their clinical characteristics are included in the respective trials.

The overall findings of the meta-analysis reported by Wang and colleagues question the perceived benefits of early tracheostomy, particularly in light of the placement procedure not being risk-free. Of great challenge to clinicians is that there is no validated formula to determine which patients might benefit the most from early tracheostomy, despite the belief that tracheostomy should provide some benefit to patients, such as improved comfort. However, given that patient comfort is rarely if ever assessed, clinicians are advised to assess comfort and quality of life in patients requiring long-term ventilatory support to determine if patients themselves receive actual benefit following this procedure. Given that the optimal timing of tracheostomy was not clearly determined by the findings reported in this paper, clinicians are urged to consider factors of importance to patients in their decision making regarding tracheostomy placement. ■

CME Questions

1. **In the study by Wright and associates, what percentage of women undergoing major gynecologic surgery for benign disease did not receive any venous thromboembolism prophylaxis?**

a. 5%
b. 23%
c. 40%
d. 72%

2. **According to the survey conducted by Miller and colleagues, which of the following hospital characteristics were associated with the use of daily sedation interruption in mechanically ventilated patients?**

a. The presence of a leadership focus on a culture of patient safety.
b. Hospital involvement in an infection-control collaborative.
c. Hospital association with an academic medical center.
d. All of the above
e. A and B only

3. **Based on the prospective study by Miedema et al. of patients transferred from an initial hospital to another center for percutaneous coronary intervention (PCI), where did the majority of the delays in overall door-to-balloon times occur?**

a. Delays in transport to the initial (referring) center.
b. Delays at the referring center, mostly commonly due to waiting for transportation.
c. Delays in transport from the referring center to the PCI center due to weather or distance.
d. Delays at the PCI center due to catheterization lab unavailability.

CME/Objectives

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

- discuss pertinent safety, infection control and quality improvement practices;
- explain diagnosis and treatment of acute illness in the hospital setting; and
- discuss current data on diagnostic and therapeutic modalities for common inpatient problems. ■

CME Instructions

1. Read and study the activity, using the provided references for further research.

2. Log on to **www.cmecity.com** to take a post-test; tests can be taken after each issue or collectively at the end of the semester. *First-time users will have to register on the site using the 8-digit subscriber number printed on their mailing label, invoice, or renewal notice.*

3. Pass the online tests with a score of 100%; you will be allowed to answer the questions as many times as needed to achieve a score of 100%.

4. After successfully completing the last test of the semester, your browser will be automatically directed to the activity evaluation form, which you will submit online.

5. Once the evaluation is received, a credit letter will be sent to you. ■