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INSIDE

Management of Type B Aortic Dissection

ABSTRACT & COMMENTARY

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This article originally appeared in the November 2008 issue of Clinical Cardiology Alert. *It was peer reviewed by Rakesh Mishra, MD. Dr. Mishra is Assistant Professor of Medicine, Weill Medical College, Cornell University; Assistant Attending Physician, NewYork Presbyterian Hospital. Dr. Mishra reports no financial relationships relevant to this field of study.*

Source: Chang CP, et al. The role of false lumen size in prediction of in-hospital complications after acute type B aortic dissection. *J Am Coll Cardiol*. 2008;52:1170-1176.

Uncomplicated type B aortic dissection (origin distal to left subclavian artery) is usually treated medically. However, early mortality is 10%-12%, and is due to complications. The ability to predict who will develop complications could help reduce mortality by permitting earlier interventions. Thus, Chang et al from Taiwan assessed CT scans in 55 consecutive type B dissections to see if there were anatomical clues to subsequent complications. Complications were defined as death due to dissection; progression of dissection; rupture of the aorta; and end-organ hypoperfusion. Of the 55 patients, 31 had a stable in-hospital course and 24 had complications. CT measurements included maximum aortic diameter, maximal false lumen area (MFLA), minimal true lumen, number of branch vessels involved (BVI), and total longitudinal length of the dissection. MFLA was significantly larger in the complications group (1,899 vs 558 mm^2, $p < .001$), and BVI was higher (3.3 vs 1.0, $p < .001$). Only MFLA and BVI were independent predictors of complications on multivariable analysis. An initial MFLA > 922 mm^2 or a BVI of two or more were associated with a higher incidence of in-hospital complications. Chang et al concluded that a large initial MFLA and higher BVI by CT are predictors of a complicated hospital course in type B aortic dissection.

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■ COMMENTARY

The management of type B aortic dissection is problematic. Most patients do well with medical therapy, but some have complications which are often fatal. In this consecutive series, 44% had complications, of which 17% died in the hospital. If these patients could be intervened upon earlier, especially with stent-grafts, prognosis may be improved. In this series and others, clinical features did not predict outcomes, but aortic characteristics on CT scans do. Prior studies have shown some relation between aortic size and outcomes, but this study focused on the two lumens in a dissection and came up with more powerful predictors. All the CT aortic measures made were univariate predictors of complications, but two, MFLA and BVI, were independent predictors of any complication. MFLA was a robust predictor of all complications, but BVI predicted organ hypoperfusion and progressive dissection better than rupture. This makes sense because if the thin-walled false lumen continues to expand, it would be reasonable to predict rupture, progressive dissection, and eventual organ under perfusion. So the false lumen size seems to be the key variable. Chang et al suggest that if the MFLA is greater than around 900 mm^2, one should consider an intervention to prevent complications. This is a small trial, and this hypothesis will need to be tested prospectively, but until that is accomplished, this seems to represent good advice for the management of acute type B aortic dissection. ■

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Non-invasive Ventilation in Acute Cardiogenic Pulmonary Edema

ABSTRACT & COMMENTARY

By Dean Hess, PhD, RRT

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Dr. Hess reports no financial relationship to this field of study. This article originally appeared in the November 2008 issue of Critical Care Alert. *It was edited by David J. Pierson, MD, and peer reviewed by William Thompson, MD. Dr. Pierson is Professor, Pulmonary and Critical Care Medicine, Harborview Medical Center, University of Washington, and Dr. Thompson is Staff Pulmonologist, VA Medical Center; Associate Professor of Medicine, University of Washington. Drs. Pierson and Thompson report no financial relationships relevant to this field of study.*

Synopsis: *In patients with acute cardiogenic pulmonary edema, CPAP or NIV produces a more rapid improvement in respiratory distress and arterial blood gases than standard therapy.*

Source: Gray A et al. Noninvasive ventilation in acute cardiogenic pulmonary edema. *N Engl J Med.* 2008;359:142-151.

Non-invasive ventilation (NIV) and continuous positive airway pressure (CPAP) have been shown to be of benefit in the treatment of patients with acute cardiogenic pulmonary edema (CPE). Gray et al conducted this study to determine whether NIV or CPAP reduces mortality in this patient population. This was a multicenter, open, prospective, randomized controlled trial. Patients were assigned to standard oxygen therapy, CPAP (5-15 cm H2O), or NIV (inspiratory pressure, 8-20 cm H2O; expiratory pressure, 4-10 cm H_2O). The primary endpoint was death within seven days after the initiation of treatment.

Of 1,069 patients enrolled, 367 were assigned to standard oxygen therapy, 346 were assigned to CPAP, and 356 were assigned to NIV. There was no significant difference in seven-day mortality between patients receiving oxygen therapy (9.8%) and those receiving NIV (9.5%, $p = 0.87$). There was no significant difference in the combined endpoint of death or intubation within seven days between the patients who were assigned to NIV (11.1%) and those assigned to CPAP (11.7%, $p = 0.81$).

Compared to oxygen therapy, NIV was associated with greater improvements at one hour after the beginning of treatment in patient-reported dyspnea ($p = 0.008$), heart rate ($p = 0.004$), pH ($p < 0.001$), and hypercapnia ($p < 0.001$). There were no treatment-related adverse events. Gray et al concluded that, in patients with acute CPE, NIV induces a more rapid improvement in respiratory distress and metabolic disturbance than standard oxygen therapy, but has no effect on short-term mortality.

COMMENTARY

Over the past 10 years, there has been increasing use of NIV in patients with acute respiratory failure. Many randomized, controlled trials have been published, and these have been combined into several meta-analyses. In fact, meta-analyses have reported benefit for NIV and CPAP for acute CPE, concluding that this therapy reduces the risk of intubation.

The first meta-analysis was by Pang et al in 1998.[1] They found that CPAP (three studies) was associated with a decrease in the need for intubation (risk difference, -26%; 95% confidence intervals [CI], -13% to -38%) and a trend for a decrease in hospital mortality (risk difference, -6.6%; 95% CI, +3% to -16%) compared with standard therapy alone. In this meta-analysis, there was insufficient evidence to comment on the effectiveness of NIV compared with either standard therapy or CPAP and standard therapy.

The second meta-analysis was published in 2005 by Masip et al.[2] In the combined analysis of CPAP and NIV, there was a significantly reduced mortality by nearly 45% compared with conventional therapy (RR, 0.55; 95% CI, 0.40-0.78; $p < 0.001$). Although mortality was reduced for CPAP (9 studies; RR, 0.53; 95% CI, 0.35-0.81; $p = 0.003$), this was not the case for NIV (6 studies; RR, 0.60; 95% CI, 0.34-1.05; $p = 0.07$). Both CPAP and NIV showed a significant decrease in intubation compared with conventional therapy; CPAP (RR, 0.40; 95% CI, 0.27-0.58; $p < 0.001$), NIV (RR, 0.48; 95% CI, 0.30-0.76; $p < 0.001$), and together (RR, 0.43; 95% CI, 0.32-0.57; $p < 0.001$).

A third meta-analysis by Gray et al reported that CPAP was associated with a significantly lower mortality rate than standard therapy (12 studies; RR, 0.59; 95% CI, 0.38-0.90; $p = 0.015$).[3] There was a non-significant difference in mortality for the comparison between NIV and standard therapy (7 studies; RR, 0.63; 95% CI, 0.37-1.10; $p = 0.11$). The need for intubation was reduced with CPAP (RR, 0.44; 95% CI, 0.29-0.66; $p = 0.0003$) and with NIV (RR, 0.50; 95% CI, 0.27-0.90; $p = 0.02$), compared with standard therapy.

Finally, a meta-analysis by Winck et al showed a 22% absolute risk reduction (ARR) in intubation (95% CI, -34% to -10%; $p < 0.001$) and 13% in mortality (95% CI, -22% to -5%; $p = 0.003$) for CPAP compared to standard therapy (10 studies).[4] For six studies of NIV compared to standard medical treatment, there was an 18% ARR in intubation (95% CI, -32% to -4%; $p = 0.01$) and 7% in mortality (95% CI, -14% to 0%; $p = 0.06$).

Meta-analyses have also compared CPAP with NIV. Masip et al reported no differences in intubation or mortality rates in the analysis of studies comparing the 2 techniques.[2] Comparing NIV to CPAP, Peter et al found no difference in mortality risk ($P = 0.38$) or intubation rate ($p = 0.86$).[3] Winck et al found a nonsignificant 3% ARR in intubation (95% CI -4% to 9%) and 2% in mortality (95% CI, -6% to 10%) with NIV compared to CPAP.[4] Ho et al conducted a meta-analysis specifically comparing NIV and CPAP.[5] From 7 studies, intubation (RR, 0.80; 95% CI, 0.33-1.94; $p = 0.62$) and hospital mortality (RR, 0.76; 95% CI, 0.32-1.78; $p = 0.52$) were similar between patients treated with CPAP and those treated with NIV.

Following the study by Mehta et al,[6] there was concern about the safety of NIV, specifically for new myocardial infarction, in patients with acute cardiogenic pulmonary edema. However, this has not emerged as a significant concern in subsequent studies or meta-analyses.

How should this new study by Gray et al be viewed in the context of these meta-analyses? First, the intubation rate was extremely low in the Gray study: 0.8% in the standard therapy group; 0.3% in the CPAP group; and 1.1% in the NIV group. It's hard to imagine how any therapy can improve on the need for intubation when the overall intubation rate of the enrolled patients is so low. This suggests that the patients in this study were less acutely ill than those in previous studies included in the meta-analyses. The absence of a mortality benefit in this study is consistent with the meta-analyses described above, most of which failed to report a mortality benefit for NIV. This may be related to the relatively low mortality in this patient population. In the Masip meta-analysis,[2] for example, the overall mortality was 15%. A quick-power analysis reveals that a sample size of more than 1,500 patients (about 700 in each group) is required to detect a reduction in mortality from 15% to 10% with a power of 0.8. So, it should be no surprise that a meta-analysis, let alone a single study, is unlikely to show a mortality benefit in this patient population.

Given the results of prior studies, many of us have adopted the use of NIV or CPAP as first-line therapy in patients presenting with acute CPE. This is supported not only by the results of randomized, controlled trials, but

also by a sound underlying physiology. Increasing the intrathoracic pressure with NIV or CPAP reduces preload and afterload, which supports the failing heart while definitive therapies are administered. This should translate into improvements in heart rate, respiratory rate, dyspnea, and arterial blood gases. In fact, these benefits were reported in the study by Gray et al.

The study by Gray et al should not change the recommendation for CPAP of NIV as a first-line therapy in patients presenting with acute CPE. Similar outcomes are likely with CPAP or NIV; this is probably more of an academic than a practical point, given that the same equipment is used for either therapy in modern practice. CPAP or NIV produces a more rapid improvement in respiratory distress than standard therapy alone. CPAP and NIV reduce the need for intubation in patients sick enough to be at risk for intubation, which is supported by several meta-analyses. ■

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IV Thrombolysis 3-4.5 Hours after Stroke: Time for a Change?

ABSTRACT & COMMENTARY

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Dr. Segal reports no financial relationships relevant to this field of study. This article originally appeared in the November 2008 Neurology Alert. *It was edited by Matthew Fink, MD, and peer reviewed by M. Flint Beal, MD. Dr. Fink is Vice Chairman, Professor of 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. Drs. Fink and Beal report no financial relationships relevant to this field of study.*

Synopsis: *Intravenous thrombolysis is safe and effective for the treatment of ischemic stroke in the time window of 3-4.5 hours after the onset of symptoms.*

Sources: Hacke W, et al. Thrombolysis with alteplase 3 to 4.5 hours after acute ischemic stroke. *N Engl J Med*. 2008;359:1317-1329; Wahlgren N, et al. Thrombolysis with alteplase 3-4.5 h after acute ischemic stroke (SITS-ISTR): an observational study. *Lancet*. 2008 Sept 12 [E pub ahead of print]

INTRAVENOUS RECOMBINANT TISSUE PLASMINOGEN activator (tPA) for acute ischemic stroke benefits a tiny minority of patients due to its strict limitation to a three-hour period following symptom onset. Until now, attempts to extend this narrow time window have failed. Clinical trials enrolling patients between 3-6 hours have produced negative results, and protocol violations (notably, "late" treatment) contribute to increases in hemorrhagic complications. Even under three hours, there is more benefit (nearly double) for tPA in the 0-90 minute than in the 90-180 minute time interval. As each moment elapses following stroke, our ability to help patients diminishes.

Despite these data, there has been a growing body of evidence that three hours may not be as strict a line in the sand as previously thought. In pooled analysis of the NIH tPA trial, the European ECASS trials, and two ATLANTIS trials, Hacke et al[1] showed that the odds ratio for benefit from tPA was 1.4 in the 180-270 minute time period. Although this was not as profound as for 0-90 minutes (OR 2.8) or for 90-180 minutes (OR 1.6), it was superior to the group treated between 270 and 360 minutes. Patients treated beyond 4.5 hours showed no benefit, but had increased hemorrhage and mortality rates.

Wahlgren et al reported findings from the SITS-ISTR registry that examined 664 patients in the 3-4.5 hour

range, and showed that these patients were equivalent to 0-3 hour patients, spanning multiple endpoints, including clinical outcome, mortality, and hemorrhage rates. Of note, the patients treated in the SITS-ISTR "late" group were three years younger and had milder strokes (1 point lower on NIH-SS) than those treated early. Also, half of the patients treated late were actually treated only 15 minutes after the three-hour window. Even more striking was that the 3-3.5 hour time window comprised 72% of SITS-ISTR patients, compared with 20% in the 3.5-4 hour period and only 8% in the final 30 minutes (4-4.5 hours).

Now, Hacke et al, reporting for the ECASS III trial, provide randomized data to support the use of tPA in the 3-4.5 hour time period. ECASS included 821 patients assigned to tPA compared to placebo. A favorable outcome (defined as a score of 0-1 on the Rankin scale) was found in 52% of tPA-treated patients compared with 45% for placebo, for a statistically significant odds ratio of 1.34 (CI 1.02 to 1.76). Interestingly, this odds ratio nearly exactly matches that found in the previous pooled analysis for patients in this time period — a modest, but nevertheless meaningful difference. The incidence of total hemorrhages in the tPA arm was 27%, compared with 17.6% for placebo; however, importantly, symptomatic hemorrhage rates in tPA-treated patients were only 2.4%. Although this was 10-fold higher than symptomatic hemorrhages in placebo-treated patients (0.2%), it was lower than the 6% symptomatic hemorrhage rate found in the NINDS study. Mortality did not significantly differ between tPA and placebo patients.

Patients with severe stroke (NIH Stroke Scale > 25) were excluded from this study, differentiating this study from the NINDS cohort and producing an overall milder stroke population. Mean NIH Stroke Scale in ECASS III was approximately 11, compared with 14 in NINDS. Overall rates of favorable outcomes were more than 10% higher in ECASS III tPA patients compared with NINDS, and this difference was nearly 20% in the placebo group.

■ COMMENTARY

As both the ECASS III study and its accompanying editorial emphasize,[2] these data are not an invitation to relax our efforts to trim door-to-needle times to the shortest possible time frame, or to forget that "time is brain" and every minute counts. To paraphrase Hacke et al and the great Yogi Berra, "having more time does not mean we have more time." The true excitement of ECASS III is that we can hopefully extend the benefit of IV tPA for acute ischemic stroke to a larger cohort of patients.

It is likely that not every patient in the 3-4.5 hour time window will be an ideal candidate for IV tPA. Patient age will be a factor. Although IV tPA has been deemed safe for patients who are 80+ in observational studies, ECASS III did not include patients older than age 80; the oldest patient enrolled in SITS-ISTR was 73. Stroke severity also will be important. Milder strokes might not justify the risk, while large strokes (such as complete middle cerebral artery syndromes), which were excluded from ECASS III, will still most optimally be treated with endovascular therapies such as mechanical clot extraction. Advanced imaging with MRI diffusion-perfusion or CT perfusion also might be helpful in defining patients who have an ischemic penumbra. Diabetes may be an additional limitation. Hyperglycemia has been shown to cause more complications among patients treated with tPA. ECASS III excluded patients with a prior history of diabetes and stroke, and thus had a lower incidence of diabetes than did NINDS.

It can be expected that the American Stroke Association and other governing bodies (such as the FDA) will modify recommendations for the treatment of stroke based on these data and that the labeling for IV tPA will change in the coming months. It is not completely clear at this time what exact conclusions will be drawn. In the interim, it is quite certain that the three-hour time window should no longer be an inviolable rule. Should Cinderella have a stroke at 9 p.m., the stagecoach should not be expected to turn into a pumpkin at 12:01 a.m. ■

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A Pathogen to Consider More Broadly in Patients with Pneumonia: Legionella

ABSTRACT & COMMENTARY

By Brian G. Blackburn, MD

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Dr. Blackburn reports no financial relationships relevant to this field of study. *This article originally appeared in the November 2008 issue of* Infectious Disease Alert. *It was edited by Stan Deresinski, MD, FACP, and peer reviewed by Connie Price, MD. Dr. Deresinski is Clinical Professor of Medicine, Stanford University; Associate Chief of Infectious Diseases, Santa Clara Valley Medical Center, and Dr. Price is Assistant Professor, University of Colorado School of Medicine. Dr. Deresinski serves on the speaker's bureau for Merck, Pharmacia, GlaxoSmithKline, Pfizer, Bayer, and Wyeth, and does research for Merck, and Dr. Price reports no financial relationships relevant to this field of study.*

Source: Neil K, Berkelman R. Increasing incidence of legionellosis in the United States, 1990-2005: changing epidemiologic trends. *Clin Infect Dis*. 2008;47:591-599.

Synopsis: *The incidence of legionellosis in the United States increased significantly in 2003-2005 compared to previous years. This was due mostly to an upsurge of cases in the northeastern and southern United States and a shift of disease from elderly to middle-aged adults. Legionellosis should be considered as a potential cause of pneumonia in a broad range of patients, rather than a small subset with specific risk factors.*

LEGIONELLA SPP. ARE GRAM-NEGATIVE BACTERIA found primarily in freshwater environments; they cause disease (including outbreaks) often linked to man-made water systems.[1] They primarily cause two clinical syndromes: a self-limited, influenza-like illness known as Pontiac fever, and a form of serious bacterial pneumonia. Traditionally accepted risk factors for legionellosis include older age, alcohol use, smoking, diabetes, chronic lung disease, renal failure, and immunosuppression.[1]

An increase in the incidence of legionellosis has been noted in the United States since 2003. To investigate this recent increase, the authors analyzed legionellosis cases reported to the CDC from 1990-2005. These data were obtained through the voluntary National Notifiable Diseases Surveillance System. Both confirmed and probable cases were included from 1990-2003, but only included confirmed cases from 2004-2005.

In 2003, the number of reported legionellosis cases in the United States increased by 70%, compared to 2002 (from 1,310 cases to 2,223). This increase was sustained through 2005 (the last year for which complete data were available), with > 2,000 annual cases reported in 2005.

During 1990-2002, the mean annual legionellosis case count was ~ 1,270, whereas for 2003-2005, the yearly mean was ~ 2,200 cases, a significant increase. The population-based US incidence rate of legionellosis increased 65%, from 0.45 cases per 100,000 in 2002 to 0.75 in 2003.

Although the 65- to 74-year-old age group had the highest mean number of reported annual cases from 1990-1999, the 55- to 64-year-old age group had the highest mean annual case count from 2000-2005, followed by the 45- to 54-year-old age group; males comprised 61% of the case-patients in the more recent years.

Overall, the Northeast region reported the largest percentage of cases (31.5%), followed by the Midwest (30.6%), the South (26.7%), and the West (11.2%). The increase in legionellosis cases after 2002 was mainly attributable to an increase in states east of the Mississippi River. The Northeast and Southern regions showed the greatest increase (104% in the Northeast and 113% in the South); there was little increase in the Midwest and almost none in the West. Regional population-based incidence rates revealed similar findings. Overall, legionellosis cases were most frequently reported in the fall and summer, although in the West there was little monthly variation.

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These data support the hypothesis that the incidence of legionellosis in the United States increased significantly beginning in 2003, and that this increase has been sustained since that time. Other data suggest that this trend has continued through at least 2006.[2] The data presented in this study suggest the increase in legionellosis has been driven, in part, by a change in the epidemiology of this disease. Although legionellosis was previously regarded as occurring most commonly in the elderly or debilitated, the trend since 2000 indicates that younger, otherwise healthy persons now comprise the majority of the cases.

Middle-aged men are now the most commonly diagnosed patients with legionellosis. Data from Europe similarly suggest the need to consider legionellosis as a cause of community-acquired pneumonia in all hosts.[3]

Intriguing geographic data from this study suggest that Legionella spp. thrive particularly well in the Northeastern and Southern United States. Not only are incidence rates highest in these regions, but the increase in the post-2002 period was driven largely by higher rates there. Previous work has suggested that increasing Legionella incidence may be related to higher average monthly rainfall.[4] However, in some areas, Legionella incidence subsequently continued to increase despite decreased rainfall, or even drought, calling into question the relationship between monthly rainfall totals and Legionella incidence. Other data suggest the relationship between climate and legionellosis may be more complex, as a study in Philadelphia identified an overall association between Legionella incidence and increased temperature

(with most cases occurring in summer), but most notably, increased case clustering occurred 6-10 days after heavy rainfalls and with increased humidity.[5] Although further study is needed, it seems possible that the increase in legionellosis is related, in part, to climactic changes that we are only beginning to understand.

Although the data in this report are subject to the inherent biases of a passive reporting system, there did not appear to be ascertainment bias from year-to-year, nor from region-to-region, to explain the findings. Overall, these data provide provocative insights into the regional and demographic trends surrounding the recent increase in reported Legionella cases, and suggest the need to consider this pathogen in all patients with pneumonia. ■

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When is the Best Time to Obtain Blood Cultures from My Potentially Septic Patient?

ABSTRACT & COMMENTARY

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Dr. Baron reports no financial relationships relevant to this field of study. This article originally appeared in the November 2008 issue of Infectious Disease Alert. *It was edited by Stan Deresinski, MD, FACP, and peer reviewed by Connie Price, MD.*

MANY PHYSICIANS HAVE FOLLOWED THE HISTORICAL practice of ordering blood cultures to be drawn as close as possible to the time of the peak of the febrile episode (fever spike).[1-5] In the absence of prescient knowledge of this moment, physicians order blood cultures to be drawn at intervals ranging from 30 minutes to 2 hours. A paper by Jaimes et al suggested that many factors, other than fever, such as shaking chills, WBC counts, hypotension, and more were needed to better predict whether a patient was experiencing bacteremia.[3]

For many years, the only data comparing the yield of blood cultures in relationship to the patient's fever was from a study that was presented as an abstract but never officially published. Dr. Richard Thomson performed the study when he was a new microbiology laboratory director in Akron, Ohio, soon after leaving his post-doctoral fellowship at the Mayo Clinic.[6] The results were presented in the abstracts of the 1989 American Society for Microbiology Annual Meeting and included in an American Society for Clinical Pathology Check Sample exercise distributed in 1991.[6] Only a few contemporary microbiologists ever even had a copy of the report. Thomson et al looked at numbers of clinically relevant positive blood cultures obtained during four different time periods relative to a patient's fever spike.

Although there was a trend toward more true positive blood cultures being obtained in the period directly before the fever spike, there were no statistically significant differences among the four time periods.

These data served as the basis for most microbiologists' recommendation to obtain all of the blood cultures as soon as a patient becomes febrile, without any time period between draws. A 1994 publication by Li et al basically corroborated the Thomson results.[4] The 1994 study showed that the yield of clinically significant blood cultures performed during a 24-hour period did not vary whether the blood was obtained all at once or over a period of several time intervals. Without stronger data, physicians have continued to pursue their idiosyncratic blood culture ordering practices. By asking phlebotomists to obtain blood cultures at intervals spanning several hours, unnecessary additional time is spent in the process and the overall cost and inefficiency of procuring blood cultures is increased. And if antibiotic therapy is withheld while blood cultures are being obtained, patient care also suffers.

Dr. Gary Doern set out to perform the definitive study to answer the question without nuance. He enlisted the aid of six additional medical centers in addition to his own, University of Iowa. Workers collaborating from Geisinger Medical Center (Danville, PA), VA Boston Healthcare System, Johns Hopkins University School of Medicine, Barnes-Jewish Hospital Washington University School of Medicine (St. Louis), University of Texas Health Science Center in San Antonio, TX, and

the VA Medical Center (Portland) enrolled 1,436 adult patients with clinically significant episodes of bacteremia and fungemia during 2006.5 For each patient enrolled, the workers noted the time at which the highest temperatures were recorded in both the 24 hours preceding and those following the time that the first positive blood culture was obtained, as well as the temperature of the patient recorded closest to the time of that blood culture. Clinical relevance was determined by criteria in place at each medical center. The patients were two-thirds male, average age 59 years, and their blood cultures grew a variety of microorganisms, including 54% gram-positive bacteria such as staphylococci (38%, 42% of which were coagulase negative) and Enterococcus (10%); 38% gram-negative bacteria such as Enterobacteriaceae (> 23%) and Pseudomonas aeruginosa (4%); 3% anaerobic bacteria; and 5% yeast.

The highest recorded fevers, determined as the one of the three temperatures that was 0.5° C higher than the other two, occurred during the time of the blood culture draw in 44% of episodes. It was noted that 10%-31% of maximum fevers occurred before or after the blood draw in the remaining patients. In general, none of the results were statistically significantly different from each other.

In addition, no significant associations were found between temperatures of patients and their genders, white blood counts, or even when organism types were evaluated. Unfortunately, not enough cultures yielded fungi to allow reliable statistical analysis. One caveat was that for patients 18- to 30-years-old, the maximum temperature was significantly more likely to occur one to < 24 hours after the first positive blood culture. For other age groups (majority of patients enrolled), there were no differences.

Riedel et al concluded that the best practices for collecting blood cultures are to obtain enough blood volume (recent studies summarized in the ASM Cumitech and the CLSI guideline on blood cultures have suggested from 40-60 mL), to obtain suitable numbers of separate blood cultures (at least two), and to use stringen-taseptic technique to avoid contamination. ■

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CME Questions

29. Complications of acute type B aortic dissection can be predicted independently by:
a. large false lumen area.
b. large mean aortic diameter.
c. more branch vessel involvement.
d. A & C

30. Which of the following is correct related to the use of CPAP and NIV in patients presenting with acute cardiogenic pulmonary edema?
a. NIV is associated with a more rapid improvement in respiratory distress than standard therapy.
b. Meta-analyses report reduced intubation with the use of NIV compared to standard therapy.
c. Clinical outcomes for CPAP and NIV are comparable.
d. All of the above

31. Which of the following is appropriate for reduction of risk of recurrent stroke?
a. ASA-ERDP
b. Clopidogrel
c. Aspirin
d. Maintenance of blood pressure < 120/80
e. All of the above

Answers: 29. (d); 30. (d); 31. (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. ■