In the Literature

Ventilator-Associated Tracheobronchitis (VAT)

Palmer LB, Smaldone GC, Chen JJ, et al. Aerosolized antibiotics and ventilator-associated tracheobronchitis in the intensive care unit. Crit Care Med 2008; 36:2008–13.

Patients who receive mechanical ventilation frequently develop an increase in the volume of purulent respiratory secretions, often in association with fever and peripheral leukocytosis, despite an absence of radiographic evidence of pneumonia. These findings are consistent with the presence of acute tracheobronchitis. Although cases may occasionally have nonbacterial etiologies, such as herpes simplex virus, most are likely bacterial in origin. This complication may represent an intermediate state in a continuum that begins with airway colonization and progresses to development of VAT and then to ventilator-associated pneumonia (VAP)—although the latter may occur without intervening clinical evidence of tracheobronchitis. Consistent with the belief that tracheobronchitis serves as a way station on the path to pneumonia is the observation that a significant increase in bacterial density in bronchoalveolar lavage specimens is evident 2 days before evidence of VAP [1]. In addition, it can be hypothesized that, even if VAP is already present, concomitant airway infection may contribute to adverse outcomes and that direct application of antibiotics to the Airways may improve outcomes, over and above the benefits associated with systemically administered antibiotics.

Palmer and colleagues randomized adults with VAT who had undergone mechanical ventilation for a minimum of 3 days to receive either antibiotics or saline placebo by aerosolization for a planned 14 days. The diagnosis of VAT required production of >2 mL of respiratory secretions over a 4-h period, as well as bacteria visualized on a Gram-stained smear of the secretions. Vancomycin (120 mg) and/or gentamicin (80 mg) were administered every 8 h, depending on the Gram stain results for persons randomized to receive aerosolized antibiotics. Most patients (32 of 43) already had VAP and were already receiving systemic antibiotics at the time of randomization.

The administration of aerosolized antibiotics was associated with statistically significant improvements in indices of respiratory infection, using both the Centers for Disease Control and Prevention–National Nosocomial Infections Surveillance System criteria for diagnosis of VAP and the clinical pulmonary infection score, as well as improvements in the WBC count and in the frequency of newly administered systemic antibiotic therapy. The bacterial density in tracheal aspirate specimens was significantly reduced, and antibiotic resistance emerged less frequently. Weaning from mechanical ventilation was more frequently successful for persons who received aerosolized antibiotic therapy.

Interpretation of the results of this study is complicated by the coexistence of VAP and the systemic antibiotic administration in most patients. Sorting out the therapeutic and prophylactic effects of aerosol and systemic antibiotics is difficult. A meta-analysis of 8 comparative trials concluded that prophylactic administration of antibiotics directly into the respiratory tract was associated with a significant reduction in the incidence of pneumonia acquired in the intensive care unit [2]. On the other hand, a small study that examined administration of systemic antibiotics to patients with VAT, none of whom had VAP at entry, was discontinued prematurely because of apparent excess mortality among patients who had been randomized to receive no antibiotic therapy [3]. Systemic antibiotic therapy was associated with other favorable outcomes, including a reduction in the number of subsequent cases of VAP, but the study suffered from numerous shortcomings, as outlined by Craven [4] in an accompanying editorial commentary.

Nonetheless, the approach described here appears to be promising, but it requires confirmation in larger studies. Such studies will require an unequivocally validated definition of VAT and will need better and clearer differentiation between VAT and VAP. This includes evaluation of the possibility that some patients with normal chest radiograph findings have pulmonary infiltrates that could be detected by CT. The etiology of infiltrates must be clearly defined, both at study entry and in persons who develop such changes during the study. Such study would be difficult, but the results would provide information critical to case management.

References

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Bladder Catheters and Infection: We Can Do Better

Wals HL, Ma A, Bratzler DW, Kramer AM. Indwelling urinary catheter use in the postoperative period. Analysis of the National Surgical Prevention Project data. Arch Surg 2008; 143:551–7.

The most frequent site of nosocomial infection is the urinary tract, and the presence of an indwelling bladder catheter is the culprit in the vast majority of cases. Because the risk of infection increases with increasing duration of catheter presence,
it is recommended that, if temporary catheterization cannot be avoided altogether, the duration of temporary catheterization after surgery should be limited to ≤ 48 h. Wals and colleagues queried the National Surgical Prevention Project database to provide a snapshot of perioperative urinary catheter use and its relationship to outcomes in the United States among 35,904 Medicare patients who underwent selected major surgeries at 2965 acute care hospitals during the first 11 months of 2001. Patients undergoing abdominal or vaginal hysterectomy were excluded.

Indwelling bladder catheters were initially placed in 86% of the patients and remained in place in one-half of patients for >48 h. One-fifth of patients had no documented order for catheter removal prior to hospital discharge. The mean duration of catheterization was shortest for patients who underwent orthopedic surgery (2.5 days) and longest for those who underwent gastrointestinal surgery (5.1 days). Urinary tract infection during the hospitalization developed in 3.5% of catheterized patients and occurred twice as frequently among patients whose catheter remained in place for >2 days, compared with persons whose catheters remained in place for shorter durations (9.4% vs. 4.5%; P = .004). In addition to duration of catheterization, other strong predictors of shortened time to urinary tract infection were postoperative sepsis, nursing home residence, dementia, and male sex. Prolonged duration of bladder catheterization was also significantly associated with a decreased likelihood of discharge to home and with an increased 30-day operative mortality rate.

Although the association between prolonged catheterization and the occurrence of urinary tract infection is undoubtedly causal, causality may not necessarily be implicated in other associations, such as a decreased likelihood of discharge to home. In many instances, both discharge to a place other than home and prolonged bladder catheterization may simply be indicators of underlying poor clinical status. Another issue is that the incidence of urinary tract infection was likely underestimated in this analysis, because only cases detected during hospitalization were counted. Furthermore, the authors also counted only cases documented as having led to an antibiotic prescription during the index hospitalization.

One problem with this retrospective analysis was a lack of documentation (e.g., the lack of documentation of an order to remove the catheter). Systems for prospectively monitoring urinary catheterization are lacking in many institutions. In a national survey, 56% of responding hospitals in the United States indicated that they had no system for monitoring which patients had undergone urinary catheterization, and three-fourths of responding hospitals did not monitor the duration of catheterization [1]. That survey led to the conclusion that no strategy for prevention of catheter-associated urinary tract infection was in wide use, and in fact, “reminders” to consider catheter removal were used by <10% of hospitals. Although a recent randomized trial of a catheter “stop order” failed to demonstrate that this strategy resulted in a reduction in the incidence of urinary tract infection [2], the results appear to be an exception, because a number of other studies have demonstrated a significant benefit.

There were 11,780 cases of hospital-acquired catheter-associated urinary tract infection among Medicare recipients in the United States during the fiscal year 2006 [3]. Medicare plans to discontinue reimbursement for these infections in the near future, a move that is sure to get the attention of hospital administrators. Hospitals need to develop systems to track all urinary catheterizations and their duration, as well as consequent urinary tract infections and other complications. They need to educate and develop a systems approach regarding the appropriate and inappropriate use of indwelling bladder catheters. In addition, they must provide feedback to physician and nursing staffs, including reminders to consider catheter discontinuation and, in some instances, automatic stop orders.

References

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Mumps is Back!

Dayan G, Quinlisk MP, Parker AA, et al. Recent resurgence of mumps in the United States. N Engl J Med 2008; 358: 1580–9.

In accord with the national goal of elimination of mumps in the United States by 2010, high rates of mumps vaccination were achieved by 2006, when 89% of preschoolers had received a single dose of mumps vaccine and 87% of adolescents had 2-dose coverage. Despite this level of coverage, the largest outbreak of this viral infection in the past 2 decades, with a total of 6584 reported cases, occurred in that same year, with three-fourths of cases occurring during March–May. The epicenter of the outbreak was Iowa, and 85% of cases occurred in 8 contiguous states in the Midwest. The highest incidence occurred among individuals aged 18–24 years, 83% of whom were attending college. A history of vaccination did not preclude the development of mumps; 63% of all cases and 84% of those among 18–24-year-old persons had received 2 vaccine doses.

The resurgence of mumps has not been limited to the United States. For instance, almost 60,000 cases, mostly among young adults, had been reported in the United Kingdom in the previous year. It is clear that either a new approach, with administration of additional booster doses, or the development of a more effective vaccine is of urgent public health concern.

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