

Ventilator-Associated Pneumonia

Ventilator-associated pneumonia (VAP) is the most common infection in the intensive care unit and a significant source of morbidity and mortality. Prevention and treatment of VAP is therefore, not surprisingly, a major emphasis of hospitals, mobilizing a multidisciplinary team to confront the problem. Any successful program of VAP prevention, diagnosis, and treatment requires that all participants have a thorough understanding of pathogenesis and source of nosocomial organisms. A complicating factor is that many issues regarding VAP, from ventilator circuits to antibiotic treatment, are fraught with dogma and misconceptions. It may come as a surprise then that the Journal has never dedicated a conference to this topic, an oversight that this and the following issue resolve.

A group of experts in VAP from North America and Europe met in Cancún to review the state of the art in VAP pathogenesis, diagnosis, prevention, and care. We were delighted by the number of thought leaders from around the world who agreed to participate and who provide the material for this and the next issue of *RESPIRATORY CARE*. As co-chairs, we appreciate the work by the authors, the Journal staff, and the American Association for Respiratory Care office in bringing the proceedings of this important conference to our readers.

Marin Kollef began the conference with a table-setting presentation that reminded us why we were there. His presentation on "What Is VAP and Why Is It Important?" detailed the multi-factorial issues related to VAP and how a multi-faceted, multi-disciplinary approach must be undertaken to tackle the problem. Kollef provided an overview of the morbidity and mortality of VAP, the associated costs, and also a sobering look at the future problems of multiple-drug-resistant pathogens. Our second presentation, by Dennis Maki, "The Pathogenesis of VAP: Its Relevance to Developing Effective Strategies for Prevention," covered the factors that predispose patients to VAP. As important as the review by Kollef, Maki's lecture reminded us all of a critical point regarding VAP: that being, any strategy developed to prevent VAP can be successful only if it is based upon a sound understanding of pathogenesis. This was important to our further discussions of both techniques and equipment in their relationship to VAP. David Park capped the morning with a review of "The Microbiology of VAP," demonstrating the variety of organisms capable of causing pulmonary infection. Park's review reminded the group of the importance of antibio-

grams (understanding the pathogens common in your facility and the antibiotic resistance patterns) in choosing appropriate treatment.

Neil MacIntyre began the next group of presentations with a thought-provoking discussion of "VAP: The Role of Ventilator Management Strategies." While most clinicians agree that injurious ventilation of the patient with VAP may result in systemic infection, MacIntyre made a cogent argument that injurious ventilation patterns may also predispose the lung to infection. Our first foray into the role of technology in VAP was presented by Rich Branson, who presented "The Ventilator Circuit and VAP." This presentation reviewed the role of ventilator circuits, humidifiers, condensate, and other equipment (nebulizers, manual resuscitators) in the prevention and pathogenesis of VAP.

The afternoon session provided 2 presentations with opposing viewpoints—a mini point-counterpoint. Michael Niederman presented "The Clinical Diagnosis of VAP," extolling the virtues of patient assessment over microbiologic evaluation. Jean Chastre followed with "The Invasive (Quantitative) Diagnosis of VAP," arguing eloquently that VAP diagnosis requires microbiologic evaluation of organisms obtained from distal pulmonary specimens. Both presentations allowed for brisk discussion and outlined an important issue in the routine diagnosis of VAP. Dennis Maki then returned for an excellent review of "The Role of the Intensive Care Unit Environment in the Pathogenesis of VAP." Maki's experience and dedication to this issue were clear during the presentation, and his exhortations regarding barrier precautions were heeded by the group.

The last presentations of the day returned to technology, with Dean Hess reviewing "Patient Positioning and VAP," and Jordi Rello discussing "VAP: Issues Related to the Artificial Airway." Hess provided his typical well reasoned presentation, providing a series of meta-analyses to review the literature regarding specialty beds. In a recurring theme, Hess presented both evidence and cost issues, extolling semi-recumbent positioning; although it may not have Grade A evidence, its simplicity and low cost suggest routine application. Rello presented the evidence regarding supra-glottic suctioning, silver-coated endotracheal tubes, and a host of other airway issues developed to combat biofilm formation and reduce both colonization and VAP. His experience in this arena was obvious, and his delivery was lyrical.

The second day began with an excellent review of "The Gastrointestinal Tract and VAP," by Rich Kallet. Kallet was given the task of deciphering the contentious issue of selective decontamination of the digestive tract and did an impressive job of sifting through the literature for evidence amid the emotion. Dean Hess then provided an additional argument for increased use of noninvasive ventilation with the topic "Noninvasive Positive Pressure Ventilation and VAP." Hess brought up the point that the ventilator has long gotten a bad rap, that it is the endotracheal tube that is responsible for pneumonia. Discussion of VAP versus TAP (tube-associated pneumonia) ensued, with no resolution.

David Park presented "Antimicrobial Treatment of VAP," detailing the importance of choosing appropriate antibiotics, limiting antibiotic use, reducing antibiotic treatment times, and early appropriate antibiotics in VAP therapy. Joseph Solomkin provided a presentation, "Cost-Effectiveness Issues in VAP," which proved to be both enlightening and disheartening. Solomkin detailed the difficulties in measuring cost-effectiveness in the intensive care unit and the statistical procedures utilized for cost-effective analysis. He reviewed the case-controlled literature and pointed out a number of shortcomings in our current approach. Jordi Rello presented the final lecture, on "Clinical Approach to the Patient With Suspected VAP," a lecture that combined many facets from the previous day. His presentation of algorithms for decision making provided an appropriate close to the day's proceedings.

Jean Chastre gave the Conference Summary. Following most Journal Conferences, the summarizer reviews the important points of each presentation and attempts to separate the wheat from the chaff. For this conference, Chastre provided an eloquent and complete review of the problems facing clinicians dealing with VAP and outlined directions for further research. His summary was a masterful presentation that clearly demonstrated his command of the subject from all viewpoints.

VAP is and will continue to be an important clinical condition that requires our attention and respect. Understanding VAP prevention and diagnosis requires a firm grasp of the pathogenesis of VAP by all members of the health care team. From the simple but effective issues of hand hygiene to complex issues of bacteriology and resistance, we must be vigilant and aware. A multi-disciplinary approach, including barrier precautions, appropriate use of equipment, diagnostic techniques, and pharmacotherapy, is the hallmark of a successful VAP therapy program.

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