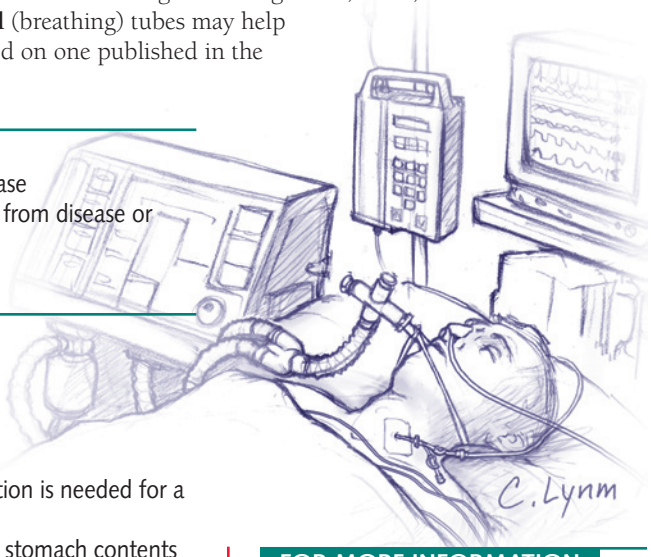
Ventilator-Associated Pneumonia

Ventilator-associated pneumonia, defined as **pneumonia** (infection of the lung) occurring in a person who is being assisted by mechanical ventilation (a breathing machine), is a serious and life-threatening infection. Because individuals who contract ventilator-associated pneumonia are already critically ill (requiring mechanical ventilation), the death rate from ventilator-associated pneumonia is high. The August 20, 2008, issue of *JAMA* includes an article reporting that silver-coated **endotracheal** (breathing) tubes may help prevent ventilator-associated pneumonia. This Patient Page is based on one published in the April 11, 2007, issue of *JAMA*.



RISK FACTORS

- Longer duration of mechanical ventilation
- Advanced age
- Depressed level of consciousness
- Preexisting lung disease
- Immune suppression from disease or medication
- Malnutrition

PREVENTION

- Hand-washing procedures before and after any patient contact
- Avoiding endotracheal intubation, if possible
- Maintaining the bed at a 30-degree head-up position
- Minimizing the duration of mechanical ventilation
- Conversion to **tracheostomy** (hole in the throat) tube when ventilation is needed for a longer term
- Proper endotracheal tube cuff pressures to prevent regurgitation of stomach contents
- **Enteral** (through the intestinal tract) feedings instead of **parenteral** (through the veins) nutrition
- Careful blood sugar control in patients with diabetes

DIAGNOSIS AND TESTING

Development of fever, increased white blood cell count, and new or changing lung infiltrate on chest x-ray are all signs of ventilator-associated pneumonia. Diagnosis can be challenging because other lung diseases can have similar signs and chest x-rays may not be conclusive. Cultures of **tracheal aspirate** (samples from the windpipe) show which bacteria (or fungus) are responsible for ventilator-associated pnuemonia. Sometimes **bronchoscopy** (looking directly at the trachea and bronchi with a special flexible lighted instrument) is necessary to get better samples. In rare cases, open lung biopsy to obtain lung tissue may be done.

TREATMENT

- Antibiotics remain the cornerstone of therapy for ventilator-associated pnuemonia. Choice of antibiotic is guided by bacteria culture results.
- Because ventilator-associated pnuemonia occurs in hospitalized persons, it may be caused by bacteria that are resistant to multiple antibiotics. Treatment may require specialized antibiotics.
- Supportive care, including prolonged mechanical ventilation and intensive care, may be necessary.

FOR MORE INFORMATION

- National Heart, Lung, and Blood Institute
  www.nhlbi.nih.gov
- Centers for Disease Control and Prevention
  www.cdc.gov
- American Lung Association
  www.lungusa.org

INFORM YOURSELF

To find this and previous JAMA Patient Pages, go to the Patient Page Index on *JAMA*'s Web site at www.jama.com. Many are available in English and Spanish. A Patient Page on diagnosing and treating pneumonia was published in the February 9, 2000, issue.

Sources: National Heart, Lung, and Blood Institute; Centers for Disease Control and Prevention; Society of Critical Care Medicine; American Lung Association

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