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Recent advances in strategy for prevention and treatment of lung injury; June 2, 2006, Kobe, Japan

Opening remarks

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In the first symposium sponsored by the *Journal of Anesthesia*, the official journal of the Japan Society of Anesthesiologists, it is our great honor to discuss the new strategies for the treatment of acute respiratory failure.

The first mention of acute respiratory distress in adults dates back to 1967, in *The Lancet*, where 12 patients were reported as having adult respiratory distress syndrome (ARDS). The patients had manifested with acute onset of tachypnea, hypoxemia, and loss of compliance after a variety of stimuli, and they did not respond to the usual methods of respiratory therapy. The etiology of this syndrome was discussed, and it was pointed out that most patients had a combination of extrapulmonary insults, such as shock, fluid overload, acidosis, prior hypoxemia, trauma, aspiration, and viral infection. In view of the similar response of the lung to a variety of stimuli, a common mechanism of injury was postulated. The loss of lung compliance, refractory cyanosis, and microscopic atelectasis point to alveolar instability as a likely source of trouble. The value of positive end-expiratory pressure (PEEP) was noted to improve blood gases, but it was pointed out that PEEP did not clear the underlying lesion. The value of corticosteroids was also suggested, probably based on their anti-inflammatory and anti-edema effects.

With this report as a turning point, various treatment strategies have since been developed. Low-tidal-volume ventilation surely slows the onset of ARDS, but it affects only some causes of ARDS. The prone position raises Pa_{O_2}, but the safety of this position is a problem during management. High PEEP does not improve the mortality rate. High-frequency ventilation is theoretically superior to regular-frequency ventilation for pulmonary protection, but its suitability for use in ARDS is not proven. No pharmacotherapy has been reported to improve the mortality rate. Surfactant infusion improves blood gases, but does not improve the mortality rate or lessens the period of artificial ventilation. There is no positive evidence of the benefit of low level-NO inhalation. Part liquid ventilation is effective for the young patient, but further investigation of the method

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is necessary. Regardless of the 40 years of studies of ARDS, there are no effective therapies yet, resulting in a still-high mortality rate.

The possible targets of basic research in ARDS, which will be discussed at this symposium are: mediator induction by stimuli, receptor modulation by mediators, the intracellular response transduction pathway, gene induction pathways in the nucleus, gene proteins, and, finally, activated biological responses induced by newly discovered substances. The convergence of basic science with clinical research promises to influence the care of most of our ARDS patients. I hope that today's discussions will be a step towards developing strategies for the prevention and treatment of acute respiratory failure.

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