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Combined therapeutic approach to ARDS

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Keywords

Acute lung injury, airway pressure therapy, direct/indirect lung injury, inhaled nitric oxide, positive end expiratory pressure, prediction of survival, prone position, treatment algorithm

Comments

These data suggest that a structured approach to the treatment of ARDS using a combination of available therapies maybe the most successful method. There was undoubtedly a selection bias resulting from the referral of ARDS patients from other centres. The conclusion that improved outcome results from combining treatments seems to be valid. Most importantly this may be due to decreasing damage caused by medical therapy, such as high airway pressures and high FiO_2.

Introduction

Acute respiratory distress syndrome (ARDS) is a condition with a high mortality ranging from 45-66%. Various conventional and innovative treatments have been used in clinical trials, but because of the heterogeneous nature of the condition, results have been disappointing. Current management is largely supportive and aimed at limiting the harmful effects of therapy, for example, barotrauma or high FiO_2.

Aims

To evaluate the effect of a combined therapeutic approach on survival of patients with ARDS when treated according to a strict algorithm.

Methods

Patients were recruited to the study with ARDS as defined by the American-European Consensus Conference on ARDS and a lung injury score of greater than 2.5. Patients were treated according to a treatment algorithm consisting initially of an evaluation period of "conventional therapy". This period lasted up to 96 h and consisted of a ventilation protocol (airway pressures less than 35 cm H_2O with 12-15 cm H_2O of PEEP), prone positioning, inhaled nitric oxide therapy (5-20 ppm) and dehydration. Response to this treatment was defined as a rise in PaO_2 of greater than 20% allowing a reduction in $FiO_2$and peak inspiratory pressures. Nonresponders then received extracorporeal membrane oxygenation (ECMO) therapy. Standard ICU management was continued throughout the study period. Antibiotics were used as guided by microbiological results, or started empirically (cefpirom and vancomycin) if patients were clinically septic.

Results

In total, 84 patients were studied (age range 12-73 years) including 58 referrals for ECMO. Forty-five patients had a direct cause for ARDS, eg aspiration or lung contusion, and 39 had an indirect cause, eg sepsis. Seventy-one patients responded to conventional therapy (CT) with an ultimate survival rate of 83%. Thirteen patients were nonresponders to CT and underwent ECMO. This group had a survival rate of 62% (8 patients). Overall 80% (67) patients survived to ICU discharge (two died later in hospital). Two patients died of unresponsive hypoxaemia and 15 of multiple organ system failure. There were no features on admission which significantly predicted the nonresponders to CT.Predictors of survival were number of days of mechanical ventilation prior to admission and total days requiring ventilation.

Discussion

This series presents better outcome data than other series and better than predicted by the APACHE II scores of the patients. Outcome could not be predicted from ventilator settings or oxygenation on admission, but was related to length of time of mechanical ventilation. The majority of patients (69%) were referrals from other centres and consequently selection bias cannot be ruled out. The strategy used in this study differed from others in that ventilation, prone position, dehydration and nitric oxide were used in all patients and the results suggest that there may be additive effects between therapies. The data suggest that a standardised treatment protocol can reduce the mortality from ARDS and result in survival rates of 80%.

References

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