Role of corticosteroids in the management of acute respiratory distress syndrome

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CRD summary
This review found evidence to support the use of lower doses of corticosteroids for treating early and late phase acute respiratory distress syndrome, but not the use of short-course, high-dose corticosteroids. Given the lack of some methodological information, and the limitations of the evidence, the reliability of the authors’ conclusions is unknown.

Authors’ objectives
To evaluate the effects of corticosteroids in preventing and treating acute respiratory distress syndrome.

Searching
MEDLINE and EMBASE were searched for English-language publications up to January 2008. Search terms were reported.

Study selection
Randomised controlled trials (RCTs) that evaluated corticosteroids for preventing and treating acute respiratory distress syndrome were eligible for inclusion.

The included trials evaluated adults with early-phase or late-phase acute respiratory distress syndrome, respiratory failure, sepsis/septic shock, or community-acquired pneumonia. Corticosteroids evaluated were methylprednisolone (2mg/kg or 30mg/kg), dexamethasone (6mg/kg), and hydrocortisone (50mg) plus fludrocortisone (50μg/d). The included trials compared treatment with an inactive control or no intervention. The outcomes evaluated included mortality, shock reversal, progression of acute lung injury to acute respiratory distress syndrome, improvement in lung function, infection, hyperglycaemia, and duration of mechanical ventilation.

The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors commented on sample sizes, an a priori sample size calculation, baseline comparability between groups, and intention-to-treat (ITT) analysis.

It was not stated how many reviewers performed the validity assessment.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
The studies were grouped by corticosteroid regimen and combined in a narrative synthesis. Clinical heterogeneity between the studies was described.

Results of the review
Ten RCTs (n=1,088) were included in the review. The sample sizes ranged from 24 to 304 participants.

Early, short-course, high-dose corticosteroids: Three of four trials reported no significant difference in progression to acute respiratory distress syndrome; one reported a significant increase in progression to acute respiratory distress syndrome in the corticosteroid group. Three of the trials reported no significant difference in mortality when all patients were considered. One of these trials included some patients with acute respiratory distress syndrome at baseline. One trial treatment for acute respiratory distress syndrome reported no significant difference between corticosteroids and controls for 45-day mortality.
Low-dose, prolonged-duration corticosteroids: The results were inconsistent for the treatment of late-phase acute respiratory distress syndrome with corticosteroids. One trial reported 13% hospital mortality in the treatment group compared to 63% in the inactive treatment group (p=0.03), however another trial reported no significant difference between groups for 60-day mortality. One trial reported that patients who received early-phase acute respiratory distress syndrome treatment were more likely to have improved lung function (p=0.002), be free of mechanical ventilation (p=0.001), and have a lower mean lung injury score (p=0.004) at day seven; hospital survival rates were similar between the two groups.

Moderate-dose corticosteroid use in additional populations at risk for acute respiratory distress syndrome: Subgroup analysis from one trial demonstrated that 28-day mortality was significantly reduced in non responding acute respiratory distress syndrome patients receiving treatment compared to controls (p=0.02). Another trial demonstrated significant improvements for a number of outcomes in patients with severe community-acquired pneumonia.

Authors' conclusions
The evidence supported the use of lower doses of methylprednisolone for treating early and late phase acute respiratory distress syndrome before day 14. It did not support the use of short-course, high-dose corticosteroids for preventing acute respiratory distress syndrome or for the treatment of early acute respiratory distress syndrome. There was inconclusive evidence on the use of longer-course corticosteroids.

CRD commentary
The review addressed a clear question, and inclusion criteria were specified for intervention, study design, and participants, but not for outcomes. Only English language publications were sought, and no attempt was made to identify unpublished studies, so some relevant studies may have been missed. The authors did not state how many reviewers were involved in the study selection, data extraction and validity assessment processes, introducing the potential for error and bias. Some aspects of study quality were discussed, and the authors considered the limitations of the evidence in their results section. Comprehensive details of the included trials were provided, and the authors acknowledged the potential influence of clinical heterogeneity on the generalisability of the results. Given the lack of some methodological information, and the limitations of the evidence, the reliability of the authors' conclusions is unknown.

Implications of the review for practice and research
Practice: The authors stated that the use of methylprednisolone is recommended for treating early and late phase acute respiratory distress syndrome before day 14, and that this strategy should be used in conjunction with appropriate fluid management and mechanical ventilation.

Research: The authors stated that further research is necessary before recommendations can be made on the role of moderate doses of corticosteroids in patients with acute respiratory distress syndrome and either septic shock or severe community-acquired pneumonia; studies should be methodologically sound and assess clinically meaningful outcomes.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.