The COAST study: cost-effectiveness of albumin in severe sepsis and septic shock
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The objective was to estimate the cost-effectiveness of albumin-based fluid support for patients with severe sepsis or septic shock, or both. The authors concluded that albumin infusion was cost-effective for treating severe sepsis in the intensive care unit. There were issues with the reporting of the study, the methods, and the lack of sensitivity analysis; the authors' conclusions should be treated with caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to estimate the cost-effectiveness of albumin-based fluid support for patients with severe sepsis or septic shock, or both.

Interventions
The intervention was the infusion of albumin, a natural colloid. Standard practice in French intensive care units (ICUs) did not include albumin; crystalloids were usually used.

Location/setting
France/hospital intensive care.

Methods
Analytical approach:
The cost-effectiveness analysis was based on a published clinical trial, and new epidemiological data to inform life expectancy. The authors stated that they took a French National Health System perspective, with a five-year time horizon.

Effectiveness data:
The key effectiveness outcome was the reduction in mortality with albumin. This was from a subset analysis of the published Saline vs Albumin Fluid Evaluation (SAFE) study, a large prospective, double-blind, multicentre, randomised study of albumin in ICUs. The patient life expectancy was estimated using the Declining Exponential Approximation of Life Expectancy (DEALE). This was adjusted for age, gender, Simplified Acute Physiology Score (SAPS II), and the McCabe score, which were from a database of ICUs in a network of hospitals in Paris and its suburbs (CUB-Rea). For this study, all patients treated for severe sepsis, in the 35 participating CUB-Rea ICUs, between January 1998 and December 2002, were selected if they met the stated inclusion criteria.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The benefit measures were the number of lives saved and the number of years of life gained.

Cost data:
The cost categories were albumin, cardiac failure and shock, septicaemia, and the ICU stay. These costs were from diagnosis-related group (DRG) data, and fixed daily prices for French ICUs. The cost of albumin was estimated for the quantities administered in the SAFE study. All costs were presented in 2005 Euros (EUR).
Analysis of uncertainty:
Several one-way sensitivity analyses were undertaken. The mortality with albumin was varied from -1% to +10%; the volume of infused albumin was varied from 1.5L to 6L; the McCabe score was varied from 35% to 65% of natural life expectancy; and mortality was varied based on the SAPS II.

Results
The hospital mortality for patients without albumin infusion was 53.7%, compared with 49.1% for patients with albumin infusion. The estimated number of lives saved, over the five years, with albumin was 513 among the 11,317 patients included from the CUB-Rea network. The expected life-years gained with albumin were 5,017.

With albumin infusion, the estimated cost per life saved was EUR 6,037 and per life-year gained it was EUR 617.

The cost per life saved and cost per year of life gained were sensitive to changes in mortality and in the quantity of albumin administered.

Authors’ conclusions
The authors concluded that albumin infusion was cost-effective for the treatment of severe sepsis in the ICU.

CRD commentary
Interventions:
The intervention was described, but the description of usual practice was brief. It was not clear what was involved in standard practice, apart from albumin not being used. It was also unclear if there were other treatment options that could have been compared.

Effectiveness/benefits:
The effectiveness data were described. The SAFE study appears to have been of good quality, but it was not clear how the subset of patients was selected. No attempt was reported to systematically search for the best available evidence. It was not clear if the SAFE study subset showed a greater treatment effect than the average study. It was also not clear how appropriate the estimate of life expectancy was for the model.

Costs:
The study perspective was clearly stated, and the cost categories were appropriate for this perspective. The cost data for hospital stay appear to have been appropriate, but it was not clear how the cost of albumin was derived. The quantity of albumin was based on the SAFE study, which may not reflect ICUs outside a clinical trial setting. The time horizon was five years, so the costs should have been discounted.

Analysis and results:
The analytic approach was described, but seems to have been overly simplistic. The results were sufficiently described. Some sensitivity analysis was undertaken, but it was unlikely to have fully assessed the uncertainty in the analysis. The authors highlighted some limitations with their study, which included issues around the mortality data and the methods for calculating life expectancy.

Concluding remarks:
There were issues with the reporting of the study, the methods, and the lack of sensitivity analysis. The authors’ conclusions should be treated with caution.

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Bibliographic details

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