Cost-effectiveness analysis of early veno-venous hemofiltration for severe acute pancreatitis in China

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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 aim of the study was to identify the most cost-effective haemofiltration modality for early management of severe acute pancreatitis in China from among continuous or long-term veno-venous haemofiltration, short-term veno-venous haemofiltration (SVVH), SVVH plus peritoneal dialysis, and no haemofiltration. The study suggested that SVVH was the most cost-effective strategy. Given the limitations of the underlying studies used to derive clinical the estimates, the authors acknowledged the uncertainty of their conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective of the study was to identify the most cost-effective haemofiltration modality for early management of severe acute pancreatitis (SAP) in China. The analysis focused on the time interval and duration of haemofiltration.

Interventions
The four strategies considered were continuous or long-term veno-venous haemofiltration (CVVH/LVVH), short-term veno-venous haemofiltration (SVVH), SVVH plus peritoneal dialysis (PD), and no haemofiltration. All the haemofiltration modalities were started in the early stage of SAP, generally 3 to 5 days after onset of the disease.

Location/setting
China/hospital.

Methods
Analytical approach:
This economic analysis was based on the development of a decision model intended to simulate a simplified clinical course of SAP. The time horizon of the analysis and the perspective of the analysis were not explicitly stated.

Effectiveness data:
The clinical estimates were derived from a systematic review of the literature, which the authors of this economic evaluation carried out. PubMed and Chinese Biomedical Disk databases were searched from 1990 to 2006. Only studies carried out in the Chinese population were considered. Other inclusion criteria were reported. The clinical inputs were retrieved from 10 randomised clinical trials (RCTs) and 6 controlled trials, comprising 891 Chinese patients in total. Data from the individual sources were combined in a meta-analysis. Survival rate, complications and surgery rate with the different modalities were the key clinical measures of the analysis.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The three summary benefit measures considered were overall survival, the overall complication prevention rate and the overall surgery prevention rate. These were all derived from the meta-analysis.

Cost data:
The analysis included the total cost of hospitalisation, which was derived from 5 controlled studies from 4 Chinese medical institutions. The results of each of these studies were given. The economic data were combined using average estimates weighted by the number of patients enrolled in each study. The price year was 2005. The currency was Chinese renminbi (RMB); the results were also presented in US dollars ($).

Analysis of uncertainty:
A deterministic two-way sensitivity analysis was carried out on the total cost of hospitalisation and overall survival rate.

**Results**
The overall survival rate was highest with SVVH (0.942), followed by SVVH plus PD (0.853), CVVH/LVVH (0.851) and no intervention (0.821).

The overall complication rate was highest with SVVH plus PD (0.843), followed by SVVH (0.792), CVVH/LVVH (0.733) and no intervention (0.588).

The overall surgery prevention rate was highest with SVVH (0.984), followed by SVVH plus PD (0.925), CVVH/LVVH (0.918) and no intervention (0.706).

The mean costs were $11,317 with no intervention, $7,868 with SVVH plus PD, $5,809 with SVVH and $18,826 with CVVH/LVVH.

Average and incremental cost-effectiveness ratios were presented. SVVH only was always associated with the lowest average cost-effectiveness ratio, irrespective of the benefit measure used.

The incremental analysis showed that SVVH only was a dominant strategy (more effective and less expensive) when the benefit measures were overall survival and overall surgery prevention, while CVVH/LVVH and no intervention were inferior to SVVH and SVVH plus PD for overall complication prevention. The incremental cost per overall complication prevention ratio of SVVH plus PD was $40,385.

The sensitivity analysis showed that there was often an overlap in clinical results between SVVH and SVVH plus PD.

**Authors’ conclusions**
The authors concluded that SVVH was the most cost-effective approach for the treatment of SAP in the Chinese setting. SVVH plus PD might achieve similar findings and further investigation of this approach is warranted. Overall, the authors pointed out that the optimal approach is still unclear, owing to the poor methodological quality of the published studies.

**CRD commentary**
**Interventions:**
The rationale for the choice of the comparators was clear in that different methods of veno-venous haemofiltration on the basis of the most appropriate time interval were considered and compared against a baseline strategy of no intervention. They are likely to be generalisable to other settings. However, the authors stated that, in China, both CVVH and LVVH are too costly, thus the cheaper strategy of SVVH was considered a relevant comparator.

**Effectiveness/benefits:**
The authors stated that most studies carried out in China were of a poor methodological quality, thus the effectiveness estimates were based on a meta-analysis, the design of which should ensure the validity of the clinical estimates. The use of a systematic review of the literature and then meta-analysis of these results represents a strength of this study.

**Costs:**
The analysis of the costs was restricted to hospital services, which are likely to be relevant from the perspective of the institution, although the cost/resource boundary of the analysis was not explicitly stated. However, a breakdown of the cost items was not provided. The sources of the costs were reported and reflected Chinese studies, the estimates of which were aggregated on the basis of sample size. The impact of variations in model inputs on the total costs was
considered in the sensitivity analysis.

Analysis and results:
The synthesis of the costs and benefits was appropriate, and the results of both the base-case and the sensitivity analysis were presented clearly. The issue of uncertainty was discussed and well reported. The external validity of the study was not considered. The study used Chinese sources for both the clinical and the economic inputs of the model, thus caution should be exercised if extrapolating the study findings to other settings.

Concluding remarks:
The quality of the study methodology was good, but limited by the drawbacks of the primary sources used in the model, especially on the clinical side of the analysis. Thus, the authors stated that their findings should be interpreted with caution.

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Bibliographic details

Other publications of related interest


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