Safety and cost-effectiveness of solvent-detergent-treated plasma: in search of a zero-risk blood supply

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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.

Health technology
Solvent detergent treatment of frozen plasma (SD FP).

Type of intervention
Primary prevention.

Economic study type
Cost-utility analysis.

Study population
Hypothetical cohort of plasma recipients, 69 years old.

Setting
Hospital. The economic study was carried out in USA.

Dates to which data relate

Source of effectiveness data
Data from the literature, a single study and opinions were used.

Link between effectiveness and cost data
Costing was not undertaken on the patient sample used in the effectiveness analysis.

Study sample
Sixty-three patients receiving frozen plasma. For two of these patients complete records were not available. No power calculations were reported.

Study design
Retrospective case series, single centre study. Duration of follow-up was three months.

Analysis of effectiveness
Analysis looked at 'treatment completers' only. Clinical outcome was the short term in-hospital mortality due to the patients' underlying clinical conditions.

**Effectiveness results**
39% of 61 patients died.

**Modelling**
A decision analysis model was used to estimate benefits and costs.

**Outcomes assessed in the review**
Rates of HCV, HBV and HIV infections due to blood transfusions.

**Study designs and other criteria for inclusion in the review**
Not stated.

**Sources searched to identify primary studies**
Not stated.

**Criteria used to ensure the validity of primary studies**
Not stated.

**Methods used to judge relevance and validity, and for extracting data**
Not stated.

**Number of primary studies included**
Nine studies were used overall.

**Methods of combining primary studies**
Not specified.

**Investigation of differences between primary studies**
Not stated.

**Results of the review**
The incidence rate of infections per FP unit were 0.03%, 0.002% and 0.001% for HCV, HBV and HIV respectively.

**Methods used to derive estimates of effectiveness**
Authors' assumptions were used to estimate the efficacy of SD FP in preventing the transmission of lipid-enveloped viruses.

**Estimates of effectiveness and key assumptions**
The authors assumed a 100% of efficacy.
Measure of benefits used in the economic analysis
Quality-adjusted-life-years gained. Markov models of prognosis were used to estimate long-term survival. No other details were given.

Direct costs
The hospital perspective was used. Costs of the SD treatment process and those of treating patients with transfusion-related infections were considered. Cost estimates of managing long-term infections were derived from two previously published studies. Final costs were derived using a decision analysis model. 1992 prices were used. Costs were discounted at 5%.

Currency
US dollars ($).

Sensitivity analysis
A sensitivity analysis was carried out on the incremental cost per unit of the SD process, on mortality rates and on a different case-mix of FP recipients.

Estimated benefits used in the economic analysis
The patient’s incremental quality-adjusted life expectancy was 35 minutes per SD FP unit transfused. Benefits were discounted at 5%.

Cost results
The incremental cost of the intervention versus the comparator was $19.30 per unit. Costs were discounted at 5%. Duration of costs related to acquired infections was lifetime.

Synthesis of costs and benefits
Projecting the analysis to the 2.2 million units of plasma transfused in the US each year, the use of SD FP yielded an incremental cost-effectiveness ratio of $289,300 per QALY saved. In sensitivity analysis, the incremental cost-effectiveness ratio dropped to $50,000 when the treatment process costs are reduced to $4.04 per unit. Similarly, when younger and healthier patients are considered, the ratio dropped dramatically.

Authors’ conclusions
The authors concluded that SD FP provides relatively small health benefits at high societal cost.

CRD Commentary
An interesting application of decision analytic techniques, which have been reported quite clearly. The conclusions appear robust to an extensive sensitivity analysis. The most relevant limitations of the study have been addressed by the authors. We would like only to add that more details would have been useful about the derivations of the quality of life utility values as well as the features of the studies from which the data were extracted.

A letter by Jackson et al (JAMA 1999;281(4):329) indicates that, since the publication of the paper on which this abstract is based, other studies have refined the assumptions and estimates used to determine the cost-effectiveness of solvent-detergent-treated frozen plasma (SDFP). New findings suggest a cost per QALY of $9,743,000, with all subgroup analyses producing figures above $2.8 million. These results further demonstrate that this method is not cost-effective and other methods of improving plasma safety should be pursued (for example methylene blue treatment and “fresh frozen plasma donor retested”).
Bibliographic details

PubMedID
7933351

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Blood Component Transfusion /economics /methods; Blood Specimen Collection /economics /methods; Cost-Benefit Analysis; Decision Support Techniques; Detergents /pharmacology; HIV /drug effects; HIV Infections /prevention & control /transmission; Hepacivirus /drug effects; Hepatitis B /prevention & control /transmission; Hepatitis B virus /drug effects; Hepatitis C /prevention & control /transmission; Humans; Plasma /virology; Safety; Solvents /pharmacology; Sterilization /economics /methods; Viral Envelope Proteins /drug effects

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