Cost-effective analysis of transjugular intrahepatic portosystemic shunt versus surgical portacaval shunt for variceal bleeding in early cirrhosis

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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
This study investigated the cost-effectiveness of the transjugular intrahepatic portosystemic shunt (TIPS) and the portacaval surgical shunt to prevent variceal re-bleeding in patients with early cirrhosis. The authors concluded that the portacaval shunt was cost-effective, compared with the usual practice of the TIPS. There were a few limitations to the study, in terms of the reporting of the methods used to derive both the effectiveness and cost data; these make it difficult to assess the authors’ conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The aim was to examine the costs and health outcomes of two shunts for the prevention of re-bleeding in patients with a previous upper gastrointestinal variceal bleed and early cirrhosis.

Interventions
The transjugular intrahepatic portosystemic shunt (TIPS) was compared with the portacaval surgical shunt, to prevent variceal re-bleeding. The TIPS was the usual care.

Location/setting
USA/secondary care.

Methods
Analytical approach:
A decision analytic tree using Markov modelling was used to synthesise the evidence from a selection of relevant published studies. The study had a lifetime horizon and the authors did not report the perspective.

Effectiveness data:
A literature review was performed to provide the effectiveness estimates. These included the occurrences of variceal re-bleeds, hepatic encephalopathy, surgical and TIPS complications, and mortality. The sources included epidemiological studies and a randomised controlled trial for the portacaval shunt efficacy.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit was life-years saved (LYS).

Cost data:
The direct medical costs included the procedures (oesophagastroduodenoscopy and band ligation, TIPS, TIPS revision, and portacaval shunt) and complications (hepatic encephalopathy, upper gastrointestinal bleed, and uncomplicated wound infections). The unit costs were based on the Current Procedural Terminology codes and Diagnosis-Related Group data from the 2007 US Medicare reimbursement system. The costs were presented in 2007 US dollars ($).
Analysis of uncertainty:
The model parameters were examined with one-way and probabilistic sensitivity analyses. The results of the one-way sensitivity analyses were presented in tornado diagrams. Those of the probabilistic sensitivity analysis were illustrated on the cost-effectiveness plane.

Results
For patients receiving the TIPS, the re-bleeding rate ranged from 10.5% to 30%, compared with 1% to 11% for the portacaval shunt. Higher rates of re-intervention, hepatic encephalopathy, and deaths within 30 days were found with the TIPS than with the portacaval shunt. The mean life expectancy was 5.0 years for the TIPS and 7.0 years for the portacaval shunt.

For patients receiving the portacaval shunt, the incremental cost-effectiveness ratio was $3,299 per LYS, compared with the TIPS.

The results were sensitive to variations in the probability of re-bleeding after TIPS and the mortality with the portacaval shunt. The portacaval shunt was dominated by the TIPS, as it was more expensive and less effective, when the mortality exceeded 15.3%, with an incremental net monetary benefit of zero at a willingness-to-pay threshold of $50,000 per LYS.

Authors’ conclusions
The authors concluded that the portacaval surgical shunt to prevent variceal re-bleeding in patients with cirrhosis was cost-effective, compared with the usual practice of the TIPS.

CRD commentary
Interventions:
The two strategies were briefly described. They might be reasonable clinical substitutes for each other and approved for use in other settings.

Effectiveness/benefits:
The authors stated that an exhaustive literature review was undertaken, but few details were provided and it was unclear if all the best available evidence was used. The details of the clinical sources were not provided, which makes it difficult to assess the quality of the clinical estimates included. The measure of benefit was appropriate, given that it looked at patient mortality, which was indicated as being an important factor for this population. But it did not include quality of life, which was also indicated as being relevant to these patients. It was unclear if the benefits were discounted, which increases the uncertainty in the estimates.

Costs:
The perspective was not stated, so it is unclear if all the relevant costs were included. The unit costs were clearly presented, but the resource quantities and the total mean costs were not reported; this makes it unclear of the most accurate total costs were calculated for the interventions. The unit costs were from publicly available sources. The currency and price year were clearly stated, but discounting was not reported and this increases the uncertainty in the estimates.

Analysis and results:
The Markov model, used to synthesise the evidence, appears to have been appropriate. Its details were reported, with a diagram. The results were adequately reported and those of the sensitivity analyses were illustrated in diagrams, which should allow an assessment of the impact of variation of the inputs due to uncertainty. The authors compared their findings with a cost study, which also concluded that the TIPS was more expensive than the portacaval shunt. Some limitations were acknowledged, including the omission of a major adverse event and the omission of follow-up costs, which could be considerable.

Concluding remarks:
There were a few limitations to the study, in terms of the reporting of the methods used to derive both the effectiveness and cost data; these make it difficult to assess the authors’ conclusions.
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