Patency and clinical outcomes of transjugular intrahepatic portosystemic shunt with polytetrafluoroethylene-covered stents versus bare stents: a meta-analysis


CRD summary
The authors concluded that polytetrafluoroethylene-covered stent-grafts improved shunt patency without increasing the risk of hepatic encephalopathy and with a trend towards better survival. The findings reflected the results of the review, but should be treated with caution given the uncertain study quality and potentially inappropriate pooling of studies.

Authors' objectives
To explore the patency and clinical outcomes of transjugular intrahepatic portosystemic shunt (TIPS) with polytetrafluoroethylene-covered (PTFE-covered) stent grafts versus bare stents.

Searching
PubMed was searched for English-language studies from 1950 to January 2010; search terms were reported. Reference lists were searched manually.

Study selection
Observational studies, including randomised controlled trials (RCTs), that compared TIPS with PTFE-covered stent-grafts against with a control group with bare stents were eligible. Outcomes comprised shunt dysfunction (>50% reduction of the lumen of the shunt at portography, a portosystemic pressure gradient >12mmHg or a combination of both), primary patency (absence of shunt insufficiency without intervention during TIPS surveillance), hepatic encephalopathy (Parsons-Smith criteria) and survival.

The mean age of patients in the included studies ranged from 53 to 59 years of age. Most patients by far in all studies were male. In all studies except one the patient population had cirrhosis; in the other study they had Budd-Chiari syndrome. TIPS patency surveillance involved ultrasonography in all studies, together with angiography or portography.

The authors did not report how many reviewers performed the study selection.

Assessment of study quality
Two reviewers independently assessed study quality based on predetermined criteria of research and control group patients from the same period and similar baseline variables between groups. Where both criteria were met then study quality was considered to be high.

Discrepancies were resolved by consensus.

Data extraction
Time-to-event data analysis was used to calculate overall hazard ratios (HR) and variance for each outcome. Data were estimated directly from the published Kaplan-Meier curves when these summary statistics were not reported; primary patency, free of encephalopathy and survival probabilities for each treatment group were transcribed from the Kaplan-Meier curves using the tools of line drawing and distance measure. Authors were contacted for missing data.

Two independent reviewers performed data extraction. Disagreements were resolved by discussion or using a third reviewer.

Methods of synthesis
Pooled hazard ratios (HRs) and corresponding 95% confidence intervals (CIs) were calculated using a fixed-effects model; a random-effects model was used when significant statistical heterogeneity was present. Statistical heterogeneity
was assessed using $X^2$ and $I^2$. Begg and Egger tests were used to test for the presence of publication bias.

**Results of the review**
Six studies were included (n=1,275 participants): five retrospective studies and one RCT. Three hundred and forty six patients were treated with TIPS with PTFE-covered stent-grafts and 929 TIPS with bare stents. Mean follow-up ranged from 12.4 to 37.5 months.

Patients treated with PTFE-covered stent-grafts had significantly improved primary patency (HR 0.28, 95% CI 0.20 to 0.35; four studies), reduced risk of hepatic encephalopathy (HR 0.65, 95% CI 0.45 to 0.86; three studies) and decreased mortality (HR 0.76, 95% CI 0.58 to 0.94; four studies). No statistical heterogeneity was observed for these comparisons.

There was no evidence of publication bias.

**Authors’ conclusions**
This meta-analysis showed that use of PTFE-covered stent-grafts clearly improved shunt patency without increasing the risk of hepatic encephalopathy and with a trend towards better survival.

**CRD commentary**
This review addressed a clear question supported by appropriate inclusion criteria. The search was limited to one relevant data source, which may have resulted in data being missed. There was potential for language bias, as only English-language studies were included. The authors made no attempts to identify unpublished data and publication bias may have been present. Publication bias was considered in the review, but too few studies were included for the findings to be meaningful. Suitable methods to minimise risk of reviewer error and bias were reported for data extraction and validity assessment; it was unclear whether this extended to study selection. The authors stated that they used criteria to assess study validity, but these criteria did not appear to be appropriate and the quality of the included studies was uncertain. The results were pooled using meta-analysis. Heterogeneity was assessed and found to be absent. Pooling of studies of different study designs may not have been appropriate.

The findings reflected the results of the review, but should be treated with caution given the uncertain study quality and inappropriate pooling of studies.

**Implications of the review for practice and research**
**Practice:** The authors did not make any recommendations for practice.

**Research:** The authors stated that their findings should be confirmed through large prospective studies with adequate sample sizes and longer follow-up periods.

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