Comparison of efficacy between uncovered and covered self-expanding metallic stents in malignant large bowel obstruction: a systematic review and meta-analysis

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CRD summary
This review concluded that tumour ingrowth was more common with uncovered stents, but late migration was more common with covered stents, for patients with malignant bowel obstruction. Given the potential for publication bias and the very limited evidence, the authors' conclusions should be considered to be tentative.

Authors' objectives
To compare the efficacy and complication rates of uncovered versus covered self-expanding metal stents, for malignant large bowel obstruction.

Searching
MEDLINE, EMBASE and Cochrane Central Register of Controlled Trials were searched, without language restriction, up to September 2011; search terms were reported. The reference lists of retrieved studies were searched.

Study selection
Randomised controlled trials (RCTs) or comparative studies of uncovered versus covered self-expanding metal stents in patients with malignant bowel obstruction were eligible for inclusion. Studies were required to measure technical and clinical success, postprocedural complications (tumour ingrowth and overgrowth, early and late migration, and perforation), or unblocked stent duration. Where multiple publications on the same study were identified, the most recent publication was included.

In the included studies, the mean age of participants ranged from 58 to 71 years and approximately half were men, where reported. Most of the studies matched their participant groups for age, gender, diagnosis and site of obstruction. Stents were inserted either for palliation or as a bridge to surgery. Where reported, the stents were Choostent, Niti-S, WallFlex, Comvi, D-Weave, Wallstent, Bonastent, and Hanarostent. The stents were generally cylindrical form or dumbbell shape, and the covered stents were fully or partially covered.

The authors did not state how many reviewers selected studies for the review.

Assessment of study quality
The quality of the included studies was assessed on the modified Newcastle-Ottawa Scale. The criteria included patient selection, comparability of study groups, and assessment of outcome. Studies that scored five or more, out of a maximum of nine, were considered to be high quality.

Two reviewers independently assessed studies, with disagreement resolved by consensus.

Data extraction
Data were extracted on the outcomes to enable the calculation of relative risks for dichotomous data or mean differences for continuous data, with 95% confidence intervals. When the standard deviation was not available, it was inferred from the standard error of the mean, confidence interval, interquartile range, or range.

Two reviewers independently extracted the data into a pre-designed form.

Methods of synthesis
The pooled relative risks and weighted mean differences, with corresponding 95% confidence intervals, were calculated using a random-effects model. Heterogeneity was assessed using $X^2$ and $I^2$. Sensitivity analyses were undertaken by excluding low-quality studies, excluding studies with fewer than 80 participants, and excluding studies of fully covered stents.
Results of the review
Six studies, with 464 patients (range 25 to 151) were included in the review. Two studies were retrospective, three were prospective and not randomised, and one was a prospective randomised trial. Four studies scored five or more and were of high quality.

Compared with covered stents, uncovered stents had significantly higher rates of tumour ingrowth (RR 5.99, 95% CI 2.23 to 16.10; I²=0; six studies), but significantly longer unblocked stent duration (MD 15.34 days, 95% CI 4.31 to 26.37; I²=0; five studies), and significantly reduced late migration (RR 0.25, 95% CI 0.08 to 0.80; I²=39%; six studies).

Sensitivity analyses excluding low-quality studies and studies with small samples confirmed the benefits of covered stents for tumour ingrowth, but for the two other outcomes (stent duration and late migration) there was no longer a significant difference between groups. Studies of partially covered stents only were all high quality and those of fully covered stents were all low quality, replicating the analysis excluding low-quality studies.

There was no evidence of significant differences for the other outcomes: technical success (four studies), clinical success (four studies), tumour overgrowth (five studies), early migration (six studies), perforation (six studies), and overall complications (six studies). Sensitivity analyses did not change the results.

Authors' conclusions
Tumour ingrowth was more common with uncovered stents, but late migration was more common with covered stents.

CRD commentary
The review addressed a clear research question, supported by appropriate inclusion criteria. Relevant sources were searched, without language restriction, but no specific attempts to find unpublished studies were reported, so it is possible that some studies were missed. The authors did not state how many reviewers selected studies, so reviewer error and bias cannot be ruled out. Appropriate methods were used to extract the data and assess study quality. Few criteria were used for quality assessment so the impact of quality on the results is not clear.

The included studies had small samples and only one was randomised. The synthesis of study results and the assessment of heterogeneity were appropriate. There was no evidence of significant statistical heterogeneity, but the authors acknowledged that the included studies varied in their selection criteria, treatment protocols and type of stent. The sensitivity analyses to assess the stability of the findings were appropriate; the exclusion of low-quality studies and small studies changed some of the findings.

Given the potential for publication bias and the very limited evidence, the authors' conclusions should be considered to be tentative.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that further large scale randomised clinical trials were needed to compare covered and uncovered stents to assess the duration of their patency (remaining unblocked).

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.