Evidence-based choice of esophageal stent for the palliative management of malignant dysphagia

CRD summary
This generally well-conducted review concluded that metal stents were superior to plastic stents in terms of stent insertion-related mortality, morbidity and quality of palliation. Uncovered metal stents were associated with an increased rate of tumour in-growth compared with covered metal stents. This conclusion is likely to be reliable.

Authors’ objectives
To compare metal stents with plastic stents, and uncovered metal stents with covered metal stents, for the palliative management of malignant dysphagia.

Searching
The following databases were searched up to 2007 without language restriction: MEDLINE, EMBASE and the Cochrane Library. Search terms were reported. Google Scholar was also searched. Only published studies were eligible.

Study selection
Studies that compared metal stents with plastic stents in patients undergoing oesophageal stent as a primary intervention for malignant dysphagia, regardless of primary tumour, were eligible for inclusion. Studies which reported at least one outcome of interest and contained a previously unreported patient group were eligible for inclusion. The primary outcome was stent insertion-related mortality, defined as mortality during or with 24 hours of stent insertion. Secondary outcomes were stent-related morbidity (incidence of oesophageal perforation, haemorrhage and post-stenting pain) and complications related to quality of palliation (stent migration, tumour in-growth, tumour out-growth, need for repeated intervention, food bolus impaction, and improvement of dysphagia using Atkinson and Ferguson’s score).

Studies comparing covered with uncovered metal stents were also included in the review. All included studies were published between 1990 and 2007. The included studies were randomised controlled trials (RCTs), prospective non-randomised controlled trials, or retrospective studies. The mean dysphagia score of patients ranged from 2.9 to 3.67 in the plastic stent group and 2.7 to 3.6 in the metal stent group. More than 90% of patients were followed-up until death in almost all studies. The mean age of patients ranged from 65 to 78 years in the plastic stent group and 64 to 76.8 years in the metal stent group.

The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors assessed the study quality using the following criteria: randomisation, representability of patients undergoing plastic stent insertion, representability of patients undergoing metal stent insertion, comparability between groups, outcome assessment, and completeness of follow-up. Studies scoring at least seven were classified as high quality.

The authors did not state how many reviewers performed the validity assessment.

Data extraction
Data on the outcomes of interest were extracted.

Two reviewers independently extracted the data from studies and both reviewers had 100% agreement on data.
Methods of synthesis
The studies were combined in meta-analyses using both random-effects and fixed-effect models. The pooled odds ratios (ORs), with 95% confidence intervals (CIs), were estimated. Risk differences and number needed-to-treat (NNT) were also calculated. Statistical heterogeneity was assessed using both random-effects and fixed-effect models. Publication bias was visualised using funnel plots. Sensitivity analyses were conducted to examine the influence of study type, study quality and sample size.

Results of the review
Twelve studies (six RCTs, two prospective non-randomised controlled trials and four retrospective studies) comparing plastic and metal stents were included in meta-analyses (n=911 patients). Eight studies (one RCT, three prospective non-randomised controlled trials and four retrospective studies) comparing covered and uncovered metal stents were also included in meta-analyses (n=564 patients). The quality score of studies ranged from 3 to 13. Eight studies were judged as high quality.

Plastic versus metal stents: Compared with plastic stents, metal stents were significantly associated with a reduction in stent insertion-related mortality when all studies were combined (OR 0.23, 95% CI 0.09 to 0.6; eight studies) and when only RCTs were combined (OR 0.2, 95% CI 0.06 to 0.74; NNT=14; four RCTs). Metal stents were also significantly associated with a reduction in oesophageal perforation (OR 0.27, 95% CI 0.08 to 0.89; NNT=14; six RCTs), a reduction in stent migration (OR 0.24, 95% CI 0.08 to 0.73; NNT 11; six RCTs) and an increase in tumour ingrowth (OR 4.84, 95% CI 0.99 to 23.76; NNT=9; three RCTs). There were no significant differences in other stent-related morbidity outcomes and 30-day mortality between the metallic and plastic stent groups.

Covered versus uncovered metal stents: Compared with uncovered metal stents, covered metal stents were significantly associated with an increase in the rate of stent migration (OR 7.02, 95% CI 1.17 to 41.98; three studies) and a reduction in tumour ingrowth (OR 0.1, 95% CI 0.01 to 0.91; three studies). There were no significant differences in the incidence of perforation, haemorrhage or pain after stenting between the covered and uncovered metal stent groups.

There was no statistically significant heterogeneity between trials in any of the main outcomes. Statistically significant heterogeneity was only observed in the outcome of tumour ingrowth for the comparison between covered and uncovered metal stents (p=0.06, P² =63.7%). Sensitivity analyses of including only RCTs did not materially affect the results of stent insertion-related mortality and oesophageal perforation, but affected the results of some outcomes in complications related to quality of palliation. No evidence of publication bias was found according to the visual scanning of funnel plots.

Authors’ conclusions
Metal stents were superior to plastic stents in terms of stent insertion-related mortality, morbidity and quality of palliation. Uncovered metal stents were associated with an increased rate of tumour ingrowth compared with covered metal stents.

CRD commentary
The inclusion criteria of the review were clear. Several relevant databases were searched. Efforts were made to find published studies but not unpublished studies, introducing the potential for publication bias. Publication bias was further evaluated, but little of evidence was found. No language restrictions were applied, reducing the possibility of language bias. Steps were taken to minimise bias by having more than one reviewer independently undertake the data extraction, but it was unclear whether the processes of study selection and validity assessment were also performed in duplicate. Relevant criteria were used to assess the study quality. The method of pooling studies of different types may have not been appropriate, but the review also pooled RCTs separately and the result was not significantly different. Statistical heterogeneity was assessed and, although significant heterogeneity was found in the outcome of tumour ingrowth for the comparison between covered and uncovered metal stents, the studies generally showed the same direction of effects. This review was generally well conducted and the authors' conclusions are likely to be reliable.
Implications of the review for practice and research

**Practice:** The authors stated that choosing uncovered or covered metal stents for patients with malignant dysphagia should be tailored to the pathological characteristics of tumours.

**Research:** The authors stated that further high quality RCTs are required to examine the efficiency of different subtypes of stents, and evaluate outcomes and cost-effectiveness of covered versus uncovered metal stents.

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