### Title:
Stent-in-Stent Technique for Removal of Embedded Esophageal Self-Expanding Metal Stents

### Author(s):
Hirdes MMC, Siersema PD, Houben MHMG, Weusten BLAM, Vleggaar FP

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### Objective:
Partially covered self-expanding metal stents (SEMSs) are regularly used for malignant and occasionally for benign esophageal disorders. Safe removal of these stents can be challenging due to embedding of the uncovered stent ends. Our aim is to report the results of removal of embedded, partially covered SEMSs by induction of pressure necrosis using the stent-in-stent technique.

### Methods:
Consecutive patients referred to three endoscopy units in 2007–2009, treated by the stent-in-stent technique, were reviewed. The partially covered SEMSs were inserted for malignant (n=3) or benign (n=16) conditions and were left in situ for a median of 42 days (14–189). When SEMSs were found to be embedded, a fully covered self-expanding plastic stent (SEPS) or fully covered SEMS was placed inside the partially uncovered SEMS. Subsequent removal of both stents was planned after a period of 10–14 days.

### Results:
In total, 23 stent-in-stent procedures were performed in 19 patients (10 males). Placement of a fully covered stent (SEPS: n=9 and SEMS: n=14) was technically successful in all patients. In 21 of 23 (91%) procedures, both stents were successfully removed in one procedure after a median of 12 days (5–18). In two patients, a repeat stent-in-stent procedure was needed for persistent embedding of the partially uncovered SEMSs. One (5%) procedure was complicated by severe bleeding, which could be treated endoscopically. In seven (36%) patients, the initial disorder had resolved after stent removal and no further endoscopic interventions were needed. Two (10%) patients were treated with chemoradiation or surgery for esophageal cancer after stent removal. In 10 (53%) patients, a repeat endoscopic intervention was required during follow-up because of progressive dysphagia or a persisting leak or fistula.

### Conclusions:
The stent-in-stent technique is safe and effective for the removal of partially covered SEMSs that are embedded in the esophageal wall.

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