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Outcome and complications of stenting for malignant obstruction

Emo E. van Halsema, MD, Jeanin E. van Hooft, MD, PhD*

Department of Gastroenterology & Hepatology, Academic Medical Center, C2-116, Meibergdreef 9, 1105 AZ, Amsterdam, The Netherlands

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ABSTRACT

Malignant colorectal obstruction is not an uncommon clinical condition as it is frequently cited that obstruction occurs in 7%-29% of patients with colorectal cancer. The severity of this condition is illustrated by its high postoperative mortality (up to 24%) and morbidity (up to 78%) rates after these patients have undergone conventional emergency resection of the obstructing tumor. In the past decade, the application of self-expandable metal stents (SEMSs) as treatment of malignant large bowel obstruction has expanded rapidly to reduce these alarming numbers by 'bridge to surgery' treatment from an emergency to an elective operation. However, the randomized controlled trials published on this topic show conflicting results regarding the outcome of SEMS placement as a bridge to surgery. Recently, a number of meta-analyses have been published on the outcomes of SEMS placement as bridge to surgery compared with emergency surgery, and data are also developing on the long-term oncological consequences of preoperative SEMS placement in the curative setting of malignant large bowel obstruction. Therefore, this review provides an overview of the current evidence on the use of SEMSs in the treatment of malignant large bowel obstruction.

1. Introduction

Cancer of the colorectum is one of the most common cancers in the economically developed world [1]. It was estimated that 142,820 new cases of colorectal cancer would be diagnosed in 2013 in the United States, causing 50,830 deaths [2]. In the literature, it is frequently cited that bowel obstruction occurs in 7%-29% of patients with colorectal cancer, though this is based on old and heterogeneous patient populations [3,4]. More recent data suggest that the occurrence of obstruction is lower than previously thought. A French prospective multicenter study of patients undergoing colorectal surgery described colorectal cancer obstruction in 7.7% (77/997), while this was 16.9% (45/266) in a Spanish prospective evaluation of patients undergoing curative surgery for colonic cancer [5,6]. Population- and hospital-based data from the United States and Europe report colorectal cancer obstruction in 8.0%-12.9% of patients [3,7,8].

Despite these new data, malignant obstruction remains a significant problem (Figure 1). At presentation, these patients are in poor condition with abdominal distension, impaired ventilatory function, and fluid and electrolyte disturbances [9]. Traditionally, patients with obstruction are subjected to emergency surgery, which is associated with postoperative mortality rates of 11.9%-23.9% and morbidity rates of 40.7%-77.6% [7,10-14].

In the search for a less invasive approach to reduce these adverse outcomes of emergency surgery, self-expandable metal stents (SEMSs) had been introduced in the early 1990s [15]. Ever since, their application has grown and the stent models are evolving to improve the outcome of colorectal stenting. Since 2008, 9 randomized controlled trials (RCTs) have been published that compared emergency surgery with stenting [16-24], and the same number of meta-analyses appeared over the past few years [25-33]. Because of discrepancy between the outcomes of colorectal stenting, the debate on the use of SEMSs for malignant colonic obstruction is still going on. In this review, we consider the current evidence on the role of SEMSs in the treatment of malignant colonic obstruction.

2. The stent placement procedure

There are different approaches for colonic stent placement. A SEMS can be inserted endoscopically with or without the use of fluoroscopic guidance or solely with fluoroscopy. The technique of stent placement can be either through the scope, which has been well illustrated by Baron et al [15], or over the wire. With the latter technique, the stent deployment system is advanced across the stenosis using a stiff guidewire. This can be performed using

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* Corresponding author.
E-mail address: j.e.vanhooft@amc.uva.nl (J.E. van Hooft).

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Fig. 1. Obstructing tumor of the descending colon. (Color version of figure is available online.)

endoscopic monitoring or under fluoroscopic guidance. In the literature, most SEMSs are inserted endoscopically by the through the scope technique with the use of fluoroscopic guidance, which allows the most optimal visualization of the obstructed lumen and thereby facilitates guidewire maneuvers and advancement of the stent deployment system.

2.1. Technical and clinical success

Technical success of stent placement is usually defined as positioning the stent correctly across the entire length of the stenosis (Figure 2). Clinical success is defined as resolution of obstructive symptoms within the first days after the procedure. Success rates ranged widely in the RCTs that have been published,

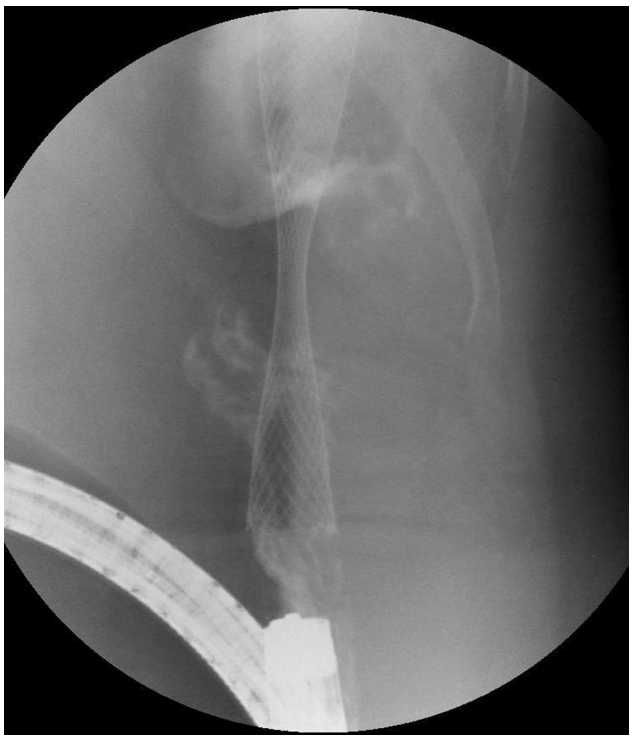

Fig. 2. Technically successful placement of an enteral WALLSTENT (Boston Scientific, Natick, MA) in the descending colon.

with a pooled technical success of approximately 75% (range: 47%-100%) and pooled clinical success of 72% (range: 40%-100%) [25,27]. The main reasons for technical failure of stenting are (1) inability to pass the stenosis with a guidewire or the deployment system because of the severity of the obstruction or its angularity, (2) procedural perforation, usually caused by guidewire manipulation, and (3) stent dysfunction, such as inadequate expansion, malpositioning, or immediate migration [34-36]. Clinical failure is mainly attributed to stent failure and adverse events, such as perforation and migration [35-37]. Several patient, operator, and stent characteristics have been identified, mainly in retrospective literature, to influence the short-term success of colonic stent placement.

2.1.1. Method of stent placement

Although high rates of technical success (83%-95%) with radiologic stent placement have been reported [38-40], 2 retrospective series found significantly higher technical success rates when stent placement was performed endoscopically with fluoroscopic guidance [34,41].

2.1.2. Stent covering

No difference in technical and clinical success was found between the use of uncovered and covered SEMSs for malignant colorectal obstruction in 2 meta-analyses that focused on this topic [42,43].

2.1.3. Operator experience

A retrospective multivariate analysis of 334 patients showed significantly higher technical and clinical success when stent placement was performed by an operator who had performed more than 10 procedures [34]. Another large series reported a significantly higher immediate perforation rate when stents were inserted by endoscopists without experience in pancreaticobiliary endoscopy [44]. Furthermore, a learning curve was observed in 2 noncomparative studies of a single endoscopist performing colonic stenting [45,46].

2.1.4. Proximal colonic lesions

Although several studies found no difference in technical and clinical success rates between stenting of proximal and distal obstructions [34,47,48], a retrospective multivariate analysis of 412 patients found a significantly increased technical failure rate for stent placement in the right colon (odds ratio [OR] = 2.2, P = 0.03) [36].

2.1.5. Extracolonic malignancies

Stent placement for obstruction caused by extracolonic malignancies has been shown to be feasible in the retrospective literature, with technical and clinical success rates ranging up to 96% and 96%, respectively [49-52]. However, several series found significantly lower technical and clinical success rates compared with those of primary colonic cancer [36,37,52,53].

2.1.6. Length of stenosis

There is limited evidence regarding the outcome of stent placement in long obstructed segments. A retrospective multicenter study including 201 patients found significantly higher technical (OR = 5.3) and clinical failure (OR = 2.4) rates when SEMSs were inserted in stenoses >4 cm [37].

2.1.7. Severity of stenosis

A prospective study compared the outcome of stent placement in complete and incomplete malignant obstruction [54]. Similar technical and clinical success rates were observed between both