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ORIGINAL ARTICLE

Comparison of efficacies of the self-expandable metallic stent versus transanal drainage tube and emergency surgery for malignant left-sided colon obstruction

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Emergency stoma surgery;
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Summary *Background/objective:* Patients with left-sided malignant colorectal obstruction require emergency treatment. Emergency stoma surgery has traditionally been recommended, however many stomas became permanent, decreasing patient quality of life. Recently, self-expandable metallic stents (SEMS) and transanal decompression tubes (TDT) have become widely used decompression methods to avoid stoma surgery. In this study, we evaluated: 1) the efficacy of SEMS compared with TDT and emergency surgery (ES) to avoid permanent stomas; and 2) the safety and success rate of each treatment.
Methods: We retrospectively reviewed data from 56 patients who underwent SEMS, TDT, or emergency surgery for malignant left-sided colon obstruction. We compared the permanent stoma rate of each group, and assessed whether or not each treatment was an independent risk factor for permanent stomas. We compared morbidity and mortality for each treatment group (SEMS, TDT, ES), and the success rate of the decompression procedures (SEMS and TDT).
Results: The permanent stoma rates in the SEMS, TDT, and ES groups were 5.3%, 50.0%, and 56.0%, respectively. Emergency surgery (vs. SEMS) and TDT (vs. SEMS) were independent risk factors for permanent stomas, as was age $\geq$ 75 years. Operative morbidity, mortality, and hospital stay were not different between groups. The success rate of SEMS was significantly higher

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than TDT; however, two deaths, including one perforation, occurred in the former group.
Conclusion: SEMS seems to be effective in avoiding permanent stomas, but caution should be taken to avoid complications.

1. Introduction

Colorectal cancer is complicated by large bowel obstruction in 7–29% of patients.[1–3] Patients with colorectal obstruction require emergency treatment and their prognosis is poor, because obstruction is most often a feature of advanced stage of disease. Patients with left-sided colorectal obstruction who undergo colonic anastomosis have a high risk for leakage due to the poor condition of the colon, which is often characterized by dilatation, lack of microperfusion, and edema. Staged surgery is traditionally recommended in these patients, including (1) emergency resection of the primary tumor and stoma creation in the proximal colon, followed by stoma closure as the second stage; or (2) creating a decompression stoma, followed by resection of the primary tumor and stoma closure. In some patients, stoma closure is performed as a third operation. Nevertheless, morbidity and mortality associated with emergency stoma surgery is high.[1] In addition, many patients are left with permanent stomas because they choose not to undergo stoma closure in order to avoid a secondary surgery.[4,5] Permanent stomas have been shown to decrease quality of life.[6,7] Parastomal hernias occur in 57% of patients[8]; additional complications include foul smell and stool leakage,[8] as well as emotional and sexual function impairments.[9]

The use of decompression procedures, including transanal decompression tubes (TDT) and self-expandable metallic stents (SEMS) have recently increased in popularity to avoid stoma surgery. In addition to decompression, SEMS allows for the evaluation of the patient's proximal colon; patients are also permitted food intake. However, due to its uncertain oncologic outcome, SEMS is not recommended by the European Society of Gastrointestinal Endoscopy (ESGE) guidelines.[10]

In Japan, with the increase in the aging population, there is a concern that the number of elderly patients with malignant colorectral obstruction will increase, along with an increase in the permanent stoma rate and decrease in QOL, because elderly people tend to avoid secondary surgery for stoma closure. In this study, the primary endpoint was the efficacy of SEMS in avoiding permanent stomas. We compared the permanent stoma rate of patients treated with SEMS, TDT, and ES, and evaluated whether each treatment was an independent risk factor for permanent stomas. We also evaluated the operative mortality and morbidity of each group and the success rate of SEMS and TDT as secondary endpoints.

2. Methods

The ethics committee of Shonan Kamakura General Hospital approved this study and waived the requirement for informed consent; instead, patients were allowed to opt out of the study.

In this retrospective observational study, we reviewed the records of all patients who visited our institution for colonic obstruction due to left-sided colorectal cancer between April 2006 and May 2016. In all cases, intestinal obstruction was diagnosed based on clinical and radiological findings. The left side of the colon was defined as distal to the splenic flexure. All patients underwent a decompression procedure (SEMS or TDT) or emergency surgery within 24 h after their visit.

Patients with benign disease, right-sided colonic obstruction, rectal cancer, invasion from a non-colorectal malignancy, and partial obstruction that could be managed conservatively (nil per os and intravenous [IV] therapy) were excluded from the analysis. Cases undergoing palliative SEMS and those who underwent emergency surgery for decompression stoma with no intention for curative resection were also excluded. Until 2010, we have used TDT as far as possible. We performed emergency surgery if the endoscopist was not available. From 2010 onwards, we used SEMS for all cases, except for cases with surrounding abscess formation.

We collected and analyzed data pertaining to patients' demographics, tumor site, longest and shortest diameters, preoperative carcinoembryonic antigen and carbohydrate antigen 19-9 levels, tumor/node/metastasis (TNM) stage, decompression procedure, presence of a permanent stoma, post-operative mortality and morbidity, and length of hospital stay. Patients were divided into three groups: SEMS, TDT, and emergency surgery. The frequency of permanent stomas, post-operative morbidity and mortality, and length of hospital stay were evaluated for each group. The success rate of the decompression procedures was also compared. Technical success was defined as safe placement. Clinical success was defined as successful decompression, and changing the reason for surgical intervention from emergency to elective. Multiple hospitalizations in the same patient were counted as one episode. Mortality was defined as death within 30 days after the procedure or surgery.

2.1. Endoscopic procedure

All stents (Niti-S Colorectal Stent, Taewoong Medical Inc., Gimpo-si, Korea) and tubes (CLINY colonoscopic retrograde

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