

Stent Placement for the Benign and Malignant Colorectal Obstruction

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【 Abstract 】

Objective	Discuss the clinical values of the stent placement for the benign and malignant colorectal obstruction.
Methods	Under the guidance of X-ray fluoroscopy and/or endoscopy, stent placement was performed in 30 patients with colonic or rectal obstruction, in which 20 had the obstruction at rectum, 2 at recto-sigmoid juncture, 3 at sigmoid colon, 3 at descending colon and 2 at transverse colon.
Results	31 colorectal stents were placed in all 30 patients with 100% success rate in just one placement. The patients with success in stent placement were immediately relieved from symptoms of intestinal obstruction without the occurrence of complications related to stent placement. The survival time of patients reached 271 days on average.
Conclusion	To treat colorectal obstruction by stent placement through anus is minimally invasive, safe, quick in effect and highly repetitive method. It can effectively relieve the patients from the obstructive symptoms with limited complications after operation and thus remarkably improve the quality of life.

【 Key words 】

Metal stent; Colorectal obstruction

With the continuous advancement and improvement of non-vascular stent placement technology, the clinical applications of stent in treating gastrointestinal obstructive lesions became more and more widely [1]. Wherein, the transanal metal stent placement with minimally invasive technique to treat colorectal obstruction has been applied clinically. Compared with traditional surgery, this method had no constraints of surgical indications; it featured minimally invasive, safe, effective and reproducible. In particular the constipation, acute and chronic intestinal obstruction, colonic or rectal fistula due to colonic or rectal lumen stenosis, which was caused by direct invasion of malignant tumors, or external pressure, or anastomotic stricture after colorectal surgery, could be treated with the palliative stent placement [2]. Colorectal obstruction and stenosis is unfurled through stent dilating

to relieve the obstruction, and then the Phase I resection is taken after the full preoperative bowel preparation; the stent provides a new approach for Phase I to treat colorectal malignant obstruction. In this study, 30 cases of stent placement to treat benign and malignant colorectal obstructions during July 2002 ~ December 2007 are reported as follows.

1 Material and Method

1.1 Clinical data

From July 2002 to December 2007, stent placement was performed in 30 patients with colonic or rectal obstruction, in which 20 occurred the obstruction at rectum, 2 at recto-sigmoid juncture, 3 at sigmoid colon, 3 at descending colon and 2 at transverse colon; 19 were male and 11 female, with age ranging from 29 to 70, averaging 53,

and duration of disease from six months to three years, averaging 1.9 years. All of them had the symptoms and physical signs of colorectal obstruction, including acute obstruction in 9 patients and chronic obstruction in 21 patients, were definitely diagnosed through biopsy of rectum sigmoidoscopy, colonoscopy or other related examinations. Among them, 25 with advanced colorectal cancer lost the chance for surgical operation, 5 had post-surgical recurrence, 11 were found to have hepatic metastases through ultrasonic, CT and X-ray examination, 6 had enlarged retroperitoneal lymph nodes, 3 had pulmonary metastases, 2 could not tolerate operation due to serious pulmonary heart disease and 2 due to cerebral infarction and 3 had surgical removal after the relief of acute symptoms of obstruction.

1.2 Method

1.2.1 Preparation Abdominal ultra-sonography barium enema, colonoscopy, CT were performed before the stent placement in order to determine the location, length and characteristics of obstruction and attention was paid to the existence of multi-segment obstruction. Causes of stenosis: 19 cases had stenosis in intestinal tract caused by the directly invasion of malignant tumor, 8 by outer cavity constriction of tumor of pelvis or metastatic lymphatic mass and 3 had scar contracture of stoma, with the stenosed segments varying from 3cm to 7cm. After the diagnosis of colorectal obstruction was confirmed, the stomach and intestine was treated with gastrointestinal decompression, infusion and related treatments. In order to improve the general conditions of patients, stent could be placed under radiography and/or endoscopy. The stent placement of colorectal obstruction could be divided into transitional treatment and palliative treatment according to its situation. Transitional treatment was to place stent as the preparatory part and relieves obstruction before the operation. It created favorable conditions for the first phase of radical operation. Palliative treatment referred to the treatment in which stent was placed as a non-operative method to relieve obstruction for those patients who lost the chances of radical operation, refuse or give up operation treatment and were not allowed to take operation because of the severity. For patients in palliative treatment, radiotherapy or chemotherapy could be taken according to conditions after placing the stent.

1.2.2 Stent placement Before operation, a small amount of sedatives could be applied to patients. 0.038-inch bibulous super-hard guide wire with a 70 cm~100 cm 7F

tube was inserted into the obstructed segment (Figure 1) under the X-ray and/or endoscope-guided, the guide wire was removed and contrast medium for imaging was injected to determine the proximal and distal sides of the obstruction in order to confirm whether the presence of intestinal perforation (Figure 2). After the determination of location, a 260 cm guide wire with 0.038 inch was inserted to pass beyond the splenic flexure, the wire was fixed as the catheter was taken away, the stent delivery system was inserted under the guidance of guide wire and the stent should be long enough to cover the whole obstructed segment with the 2 cm beyond both proximal and distal part. After the stent location was determined, the stent could be released by withdraw the outer cannula (Figure 3). According to the situations of stenosed segment, nickel-titanium alloy wire was used. The mesh-tube stent was weaving in a bell-shaped mouth in single wire, with the caliber of the stent from 20 mm to 32 mm and the length from 100 mm to 140 mm. Restricted by remote delivery, the diameter of stent used in transverse colon was small in size without membrane, while the diameter of stents used in descending colon, sigmoid colon and rectum were all those more than 27 mm with membrane. The stent with single side and/or double side bell-shaped openings, were available.

1.2.3 Treatment after stent placement After stent placement, abrosia was recommended and fluid infusion were maintained for one to two days and then residue-free or low-residue food was taken in place gradually. The patients should record the characteristics and number of defecation daily. Special attention should be paid on the characteristics of bowel movement and the existence of symptoms such as abdominalgia, hematochezia and so on. In the 1st day after the stent placement, X-ray fluoroscopy follow-up was recommended. If the stent placement was used as a transitional treatment, preoperative and gastrointestinal preparation was made after confirming the smoothness of defecation. The doctor should discuss with the patient on scheduling further operation. If the stent was used as a palliative treatment, they can be discharged from hospital as soon as the smoothness of defecation was restored and general conditions got improvement. And the follow-up visit was scheduled every two to four weeks in out-patient clinic. If necessary, chemotherapy could be conducted from the first week after the stent placement. In general, after the placement the stent should be unfolded completely

in 24~49 hours and the most of clinical symptoms were reduced in 24 hours after the operation. The relief of obstruction in 24 hours was the criteria concern for treatment success. And incomplete obstruction relief was usually related to incomplete stent expansion or stent migration. If so, the original stent could be taken out and a new one could be re-placed. The failure of obstruction relief again may be resulted from multiple primary carcinomas at the same time and dry and hard fecal impaction. For patients with multiple primary carcinomas, operation treatment or several stents placement was recommended.

2 Results

Among 30 patients with colorectal obstruction, 31 colorectal stents were placed totally, 2 stents were placed at transverse colon, 3 at descending colon, 4 at sigmoid colon and 22 at recto-sigmoid juncture and rectum. All the stents were only placed once and succeeded after the insertion of guide wire. All the 30 cases with successful stent placement were immediately relieved the symptoms of intestinal obstruction and returned to normal food taking. Observed for 26~76 days after the placement, except for one patient with recto-vaginal fistula whose stent was taken out through the anus because of its migration at the distal end after 28 days from the placement and one patient with hepatic flexure of transverse colon who had re-stenosis at the proximal end of the original stent and incomplete intestinal obstruction after 120 days from the placement, most of patients were found to have no symptoms related to stent placement. Patients with malignant stenosis could survive for 27 days at least and 760 days at most, 271 days on average.

3 Discussion

3.1 With the constant improvement and perfection of non-vascular stent placement technique, stent placement is more and more widely applied in the clinical practice of treating gastrointestinal stenosis and pathological changes. About 85% of patients had an acute intestinal obstruction. The standard treatment for acute intestinal obstruction was two-stage method, removal of the pathological changes by mean of performing colostomy to relieve intestinal obstruction firstly and then stoma reversion of colon was followed after six months. This operation is an emergency operation for those patients have intestine stenosis, excrement accumulation, poor

blood supply in intestinal wall, pantatrophia, poor immunity and other unfavorable factors, a high mortality rate and occurrence of complications, 0.9%~6.0% and 15%~20% respectively, is found. A palliative enterostomy also brings patients great harms physically and mentally. Scholars review clinical results of intestinal decompression treatments for acute intestinal obstructive cancer. Treatments of intestinal stenosis are using by mean of dilation (including balloon dilation), freezing, electric coagulation, laser, photon knife, etc. Although these treatments offer a certain help in avoiding emergency operation, intestinal obstruction can easily occur again because of increasing the tumor's size. Thus, they can be hardly adopted in clinic. In the stent placement for intestinal obstruction caused by colorectal cancer, the operation time is mostly 30~40 minutes, usually less than one hour, and the success rate is 90%~96%. 75%~80% of the patients are relieved of symptoms of intestinal obstruction after 24 hours from the stent placement. Above 90% are completely relieved of intestinal obstruction in three days. To raise the success rate of stent placement, we used the shape-memory stent made of nickel-titanium alloy wire. Choosing a stent with appropriate radial and longitudinal flexibility facilitates the success delivery. It is especially important when the stent is applying in bending intestinal lumen. The delivery system is equipped a polyene plastic pusher with good plasticity, high toughness and low friction coefficient. A comprehensive measurement includes the help of colonoscope, guide wire and a super-hard wire in stretching convolutions corner. As a result, the delivery system can be placed successfully from distal-end of transverse colon to descending colon. As the transanal placement of colorectal stent can unblock intestinal obstruction on the premise of maintaining normal physiological excretory passages, it has a great clinical significance in improving the living quality and lengthening the survival time of patients with advanced tumor.

3.2 The application of mesh-tube stent in this paper overcomes several shortcomings in applying helical tube stent in initial stage. Neither stent migration nor heavy hemorrhage, which is due to uneven bearing pressure with tumor tissue, is reported. It becomes an ideal colorectal stent at present. Bell-shaped openings are found at the upper and lower end respectively, which makes the fixation sturdier and reduces the chance for stent from migration. While adopting nickel-titanium alloy stent is the way to treat obstructive intestinal cavity, the following

problems should be paid attention ^[5]. In order to locate accurately, the stent should be placed according to the distance between stenosis section and anus edge. In the placement, the upper end of the stent should be made to pass the upper edge of the cancer. The bell-shaped opening will expand exactly at the upper end of the tumor without migration. After the placement, radiography or colonoscopy is used to confirm whether the location is accurate. Regular radiography is performed to observe the restored stent shape and adjust the position under X-ray monitoring when necessary. If the location is inaccurate after the stent placement, it can be taken out and re-applied after recovery and disinfection. In case of incomplete dilation, for example the cancer is in distal bending lumen, the intestinal cavity in stenosis segment did not be fully dilated, the stenosis part could not be completely restored its shape. At this time, a balloon catheter filling with hot water could be inserted. The stent's shape restoration could be achieved by the expansion of balloon. Hemorrhage is a common topic. The dilation of tumor tissue, caused by the stent shape restoration, may induce a mild hemorrhage. Haemostatic can be achieved by oppressing dry gauze on the bleeding site. Stent migration may occur because of oppression of stent, avascular necrosis and partially reduces the volume of tumor tissue, resulting in the reduction of bearing pressure between stent and tumor tissue. Abdominal pressure and strenuous defecation can also cause the stent migration.

3.3 The metal stent placement for colorectal obstruction provides a palliative treatment to remove obstruction

for patients, who suffered from advanced colorectal cancer and lost the chance for surgical operation. Stent placement can avoid from enterostomy, keep anus defecation in normal physiological status and thus be easily accepted by patients. Compared with conventional surgery, the trans-anal stent placement for treating colorectal obstruction is not restricted by the indications of surgery. It is a minimally invasive, safe, quickly effective and highly repetitive characteristics. Even after the direct invasion, exterior oppression of malignant tumor or stoma stenosis after colorectal surgery, stenosis of colorectal cavity may re-occur and thus result in dysporia, acute or chronic intestinal obstruction and colonic or rectal fistula, palliative stent treatment can be adopted^[6]. Indications of colorectal stent placement include: ① Avoid enterostomy and its complications as a permanent palliative treatment for patients in advanced stage losing the chance for surgical operation. ② Apply to patients with risky group, such as cardiovascular and cerebrovascular diseases, diabetes, disturbances of blood coagulation and so on, as a permanent or temporary therapeutic measure. ③ Relieve acute obstruction, avoid operation at emergency and create the best opportunity of operation. ④ Treat various benign stenosis. ⑤ Applicable to patient who refuses from enterostomy and stent placement is an option instead. Contraindications: no absolute contraindications except that stent pusher cannot reach where there are extremely long stenosis segments, or many bends or pathological changes in the distal locations with acute intestinal obstruction caused by rectal cancer.



Figure 1: The guide wire and catheter pass through the obstruction under X-ray guidance.



Figure 2: Rectal lumen stenosis is shown with contrast agent injected through catheter, no intestinal perforation.



Figure 3: Release the stent when the position is determined. Bowel obstruction symptoms are relieved immediately.

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