

Safety of Open Surgery and Total Endoscopic Anastomosis Assisted Radical Resection of Colorectal Cancer (CRC)

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Keywords: Open Surgery, Full Cavity Mirror, Rectal Cancer, Total Endoscopic Anastomosis

Abstract: To study the safety of open surgery and total endoscopic anastomosis assisted radical resection of colorectal cancer. 100 patients with rectal cancer admitted to our hospital from March 2020 to May 2022 were selected as the subjects of this study. According to the operation method, the patients were randomly assigned into two groups, namely the control group and the observation group, with 50 cases each. The control group was treated with open rectal resection. After understanding the surgical treatment plan, the patients could be anesthetized, and lithotomy position was taken. The operation started from the middle of the abdomen, the mesentery was opened in the abdomen, the corresponding intestinal segment was isolated from the colonic artery, and the blood vessels on it were ligation with the surrounding lymph nodes. The intestinal tube was cut off at the position 5 cm away from the tumor, and then the small intestine was anastomosed, and then the distilled liquid was used to clean the bleeding carefully. After the hemostasis was completed, the drainage tube was inserted, and the wound was sutured. Observation group was treated with open surgery and total endoscopic anastomosis assisted radical resection of colorectal cancer. By comparing the operation conditions of the two groups, the intraoperative blood loss in the observation group is significantly lower than that in the control group, and the operation time and postoperative hospital stay are significantly lower than that in the control group. By analyzing the serum levels of IL-6, CRP and TNF- α in the two groups, the levels of IL-6, CRP and TNF- α were higher in both groups after surgery than before surgery. The levels of IL-6, CRP and TNF- α in the observation group were significantly lower than those in the control group. Through the analysis of serum motilin and gastrin levels in the two groups, the levels of motilin and gastrin in the two groups 3 days after surgery were lower than before surgery, and the levels of motilin and gastrin in the observation group were higher than those in the control group. Through observation, the number of postoperative incision infection cases in the control group was 4 cases, anastomotic bleeding cases were 3 cases, and intestinal obstruction cases were 5 cases. The concurrent probability was 24.00% (12/50). In the observation group, there were 2 cases of postoperative incision infection, 1 case of anastomotic hemorrhage and 1 case of intestinal obstruction, and the complication probability was 8.00% (4/50). The probability

of complications in the observation group was significantly lower than that in the control group, and the analysis difference between the two groups was statistically significant ($P < 0.05$). The therapeutic effect of open surgery and total endoscopic anastomosis assisted radical resection of colorectal cancer is significantly better than that of traditional open surgery, which is worthy of promotion in clinical treatment.

With the development of social economy and the progress of medical technology, total endoscopy technology has been widely applied in clinical practice [1]. The assistance of new technology of total endoscopy anastomosis can improve the disadvantages of open surgery and accelerate the recovery of patients. Therefore, the safety of open surgery and total endoscopic anastomosis assisted radical resection of colorectal cancer in the treatment of colorectal cancer was analyzed and elaborated in the following aspects. Rectal cancer is a kind of malignant tumor of digestive system with high mortality rate, which poses great harm to human health. According to the epidemiological survey results show that with the development of human, people's life quality and living habits change, resulting in the prevalence of rectal cancer is gradually increasing[2].Although the application of traditional open surgical techniques in colorectal cancer has the characteristics of clear field of vision, openness, convenient operation, flexibility, resection and so on, However, it does great harm to the patient's body and will also cause serious damage to the immune function of the human body, leading to various stress reactions in the patient's body, thus affecting the postoperative recovery of the patient[3-4].The purpose of this paper is to explore the quality of open surgery and the safety and advantage of total endoscopic anastomosis technology assisted radical resection of colorectal cancer in the treatment of colorectal cancer, and to promote its clinical application.

1. Data and Methods

1.1. Data

100 patients with rectal cancer admitted to our hospital from March 2020 to May 2022 were selected as the subjects of this study. Eligibility Criteria: (1) Colorectal cancer was confirmed by colonoscopy and biopsy; (2) It conforms to the indications of surgical treatment. Exclusion Conditions: (1) Recurrent rectal cancer patients after surgery; (2) Patients with distant metastasis before surgery; (3) Patients with serious heart, brain, liver and lung diseases; (4) Patients with coagulation disorders. Patients were randomly assigned to the control group and the observation group according to the method of surgery. There were 50 patients in the control group, including 27 males and 23 females, with an average age of 61-78 (68.3 ± 5.3) years. The tumor was approximately 2.0 to 5.0 (3.31 ± 0.38) cm in diameter. In the observation group, there were 50 patients, including 26 males and 24 females, with an average age of 62-79 (66.2 ± 5.4) years. The tumor was approximately 2.0 to 4.5 (3.29 ± 0.47) cm in diameter. There were no significant differences in age, gender, tumor diameter and other general data between the two groups ($P > 0.05$). This study has been reviewed and approved by the Medical Board of our hospital. All patients have been informed about the study method and treatment process, and all have signed informed consent forms.

1.2. Methods

1.2.1. Control Group

The control group was treated with open rectal resection. After understanding the surgical treatment plan, the patients could be anesthetized, and lithotomy position was taken. The operation started from the middle of the abdomen, the mesentery was opened in the abdomen, the corresponding intestinal segment was isolated from the colonic artery, and the blood vessels on it were ligation with the surrounding lymph nodes. The intestinal tube was cut off at the position 5 cm away from the tumor, and then the small intestine was anastomosed, and then the distilled liquid was used to clean the bleeding carefully. After the hemostasis was completed, the drainage tube was inserted, and the wound was sutured. As shown in Figure 1.



Figure 1: showing (A) total endoscopic anastomosis with new technology assisted radical resection of CRC and (B) the corresponding intestinal segment was isolated from the colonic artery

1.2.2. Observation Group



Figure 2: Shows four-hole trocars that was inserted patient's abdomen, A puncture point and the operation port was set at the umbilical cord and Mackerel point.

Observation group was treated with open surgery and total endoscopic anastomosis with new technology assisted radical resection of colorectal cancer. Total endoscopic surgery was performed. General anesthesia was first performed, and lithotomy position was taken. A four-hole operation was adopted, as shown in Figure 2. A puncture point was set 1 cm above the umbilical cord, and an operation port was set at the umbilical cord and Mackerel point. The air pressure of the pneumoperitoneum was maintained at 11~14 mm Hg (1 mm Hg= 0.133kPa), and the operating instruments were placed in appropriate positions to observe the conditions in the cavity. The location of the tumor was determined. According to the principle of no tumor, the tumor was isolated with ultrasonic knife first, then ligation was performed, peripheral lymph nodes were cleaned, and then the Toldt space was directly isolated from the mesentery. An incision was made at 5 cm to separate the mesentery from the mesentery, and then a vertical incision was made on the

thoracic cavity, and then the intestines and mesentery were incised. After intestinal anastomosis, it was placed into the abdominal cavity and steam cleaned to observe the hemostasis. Finally, a drainage catheter was placed, and the incision was sutured.

1.3. Evaluation Index

(1) The amount of blood loss, operation time and hospital stay of the two groups were observed and recorded;(2) Plasma inflammatory response index: 3 mL peripheral blood (3500 r. min⁻¹) was taken one day before and after surgery, centrifuged for 10 min, and the upper serum was collected. Enzyme-linked immunosorbent assay (ELISA) was performed for the contents of C-reactive protein (CRP), TNF- α (TNF- α), tumor necrosis factor and IL-6 (IL-6). (3) Gastrointestinal hormones: 1 mL of peripheral blood, 3000 r. min⁻¹, was centrifuged for 5~10 min before surgery and 3 days after surgery. The upper serum was taken, and the contents of motilin and gastrin were measured by RT method, strictly following the use method of the test list. (4) Postoperative complications: The postoperative complications of the two groups were observed.

1.4. Statistical Methods

SPSS 19.0 was used to analyze the statistical data. The measured data were expressed as mean deviation \pm standard deviation ($\bar{x} \pm s$), and T-test was used in the two groups. The statistical data were expressed by percentage and number of cases, and were compared by χ^2 test. $P < 0.05$ was considered as a significant difference.

2. Results

2.1. Comparison of Surgical Conditions between the Two Groups

The comparison of surgical conditions between the two groups showed that the intraoperative blood loss in the observation group was significantly lower than that in the control group, and the operative time and postoperative hospital stay were significantly less than that in the control group, and the analysis difference between the two groups was statistically significant ($P < 0.05$). For details, see Table 1.

Table 1: Analysis of intraoperative blood loss, operative time and postoperative hospital stay of the two groups

Group	Number of Cases(n)	Intraoperative blood loss	Time of operation	Postoperative hospital stay
Control group	50	162.03 \pm 34.64	138.45 \pm 17.42	16.16 \pm 2.44
Observation group	50	116.64 \pm 27.14	132.45 \pm 16.67	12.63 \pm 1.67
T		6.846	0.824	16.50
P		<0.05	> 0.05	<0.05

Note: Compared with the observation group, * $P < 0.05$.

2.2. Analysis of Serum IL-6, CRP and TNF- α Levels in Two Groups

Through the analysis of serum levels of IL-6, CRP and TNF- α in the two groups, the levels of IL-6, CRP and TNF- α in the two groups were higher after surgery than before surgery. The levels of IL-6, CRP and TNF- α in the observation group were significantly lower than those in the control

group. The analytical difference between the two groups was statistically significant ($P < 0.05$). For details, see Table 2.

Table 2: Analysis of serum levels of IL-6, CRP and TNF- α in the two groups

Group		IL-6 / (ng L - 1)	CRP/ (mg L - 1)	TNF- α / (ng·L -1)
Control group(n=50)	Before the surgery	10.03 \pm 1.64	2.31 \pm 1.16	2.04 \pm 1.31
	1 day after surgery	16.66 \pm 2.54	15.64 \pm 2.94	6.94 \pm 0.64
Observation group(n=50)	Before the surgery	10.31 \pm 2.01	2.39 \pm 1.04	2.16 \pm 0.24
	1 day after surgery	12.64 \pm 1.64	9.56 \pm 2.85	4.13 \pm 0.42

Note: Compared with the observation group, * $P < 0.05$.

2.3. Analysis of Serum Motilin and Gastrin Levels in the Two Groups

Through the analysis of serum motilin and gastrin levels in the two groups, it can be seen that the levels of motilin and gastrin in the two groups 3 days after surgery were lower than before surgery, and the levels of motilin and gastrin in the observation group were higher than those in the control group. The analytical difference between the two groups was statistically significant ($P < 0.05$). For details, see Table 3.

Table 3: Analysis of serum motilin and gastrin levels in the two groups

Group		Motilin/(ng L - 1)	Gastrin/(ng L - 1)
Control group(n=50)	Before the surgery	334.19 \pm 20.56	156.44 \pm 3.46
	3 days after the operation	271.46 \pm 25.13	124.46 \pm 9.14
Observation group(n=50)	Before the surgery	346.56 \pm 17.94	150.64 \pm 5.61
	After the surgery	321.45 \pm 19.46	139.46 \pm 6.46

Note: Compared with the observation group, * $P < 0.05$.

2.4. Analysis of Postoperative Complications in the Two Groups

Through observation, the number of postoperative incision infection cases in the control group was 4 cases, anastomotic bleeding cases were 3 cases, intestinal obstruction cases were 5 cases, and the complication probability was 24.00% (12/50). In the observation group, there were 2 cases of postoperative incision infection, 1 case of anastomotic hemorrhage and 1 case of intestinal obstruction, and the complication probability was 8.00% (4/50); The probability of complications in the observation group was significantly lower than that in the control group, and the analysis difference between the two groups was statistically significant ($P < 0.05$).

3. Discussion

In recent years, the incidence of rectal cancer is constantly increasing, among which the low rectal cancer is the majority. Early rectal cancer usually shows no special signs, and most patients are diagnosed during regular physical examinations. Due to the improvement of current medical technique, the new technique under total laparoscopy has been widely used in our country. Although the open surgery has a better field of vision and higher resolution, it can obviously distinguish between different anatomical structures, and reduce the damage to the organ and the surrounding texture during surgery [5]. However, the safety of open surgery and total endoscopic anastomosis assisted radical resection of colorectal cancer is higher. Through this study, it can be found that postoperative blood loss, length of stay and postoperative combination rate are significantly reduced after open surgery and total endoscopic anastomosis assisted radical resection

of colorectal cancer. The results showed that the smaller the area of surgical trauma, the shorter the postoperative hospital stay, the lower the probability of complications. Surgery is bound to cause damage to the body, leading to the secretion of inflammatory mediators, leading to increased levels of inflammation [6].

CRP is a critical metabolic product in the human body. It is synthesized and secreted into the blood through the liver [7]. After the human body suffers from inflammation or tissue damage, CRP is produced through the action of cytokines such as IL-6. Tnf- α is a major inflammatory cytokine, which is produced after the activation of a large number of fat and other bacterial metabolites. It can promote the production of IL-1, IL-8, IL-6, TNF and other reaction factors, and promote the occurrence of inflammation. Inflammatory factors can be used to evaluate the operative effect of rectal cancer. On the 1st day after surgery, the plasma levels of IL-6, CRP and TNF- α were significantly reduced in the observation group, indicating that compared with traditional open rectal resection, open surgery and total endoscopic anastomosis assisted radical resection of colorectal cancer can reduce the surgical injury and reduce the inflammatory factors in tumor cells. Gastrointestinal hormone is a very effective physiological active ingredient, has the function of regulating human body, and gastrin and motilin are the main gastrointestinal hormones. Gastrin can stimulate the gastrointestinal activity of the body and increase the secretion of gastric acid. Motilin can regulate the metabolic cycle in the stomach, improve the movement of the gastrointestinal tract, and thus improve the gastric emptying rate. Surgical procedures can cause gastrointestinal dysfunction, reduce the intestinal function of patients, reduce the prognosis of patients, improve the postoperative mortality of patients. Previous experiments have shown that the effects of motilin and gastric secreted hormone can be significantly reduced by controlling the inflammatory response of gastric mucosa in patients with rectal cancer[8]. Traditional open surgery has larger incision, more postoperative bleeding, higher probability of postoperative complications, and postoperative stress reaction, which has a certain impact on the postoperative gastrointestinal function of patients, and even has an adverse effect on the curative effect of surgery. Due to the characteristics of open surgery itself, it can better excise cancer cell lesions, effectively control the amount of blood loss under the full endoscopy and reduce the damage to the surrounding organs and tissues [9-10]. This not only increases the surgical operation ability, but also promotes the recovery of the body. By comparing the operation conditions of the two groups, the intraoperative blood loss in the observation group is significantly lower than that in the control group, and the operation time and postoperative hospital stay are significantly lower than that in the control group. By analyzing the serum levels of IL-6, CRP and TNF- α in the two groups, the levels of IL-6, CRP and TNF- α were higher in both groups after surgery than before surgery. The levels of IL-6, CRP and TNF- α in the observation group were significantly lower than those in the control group. Through the analysis of serum motilin and gastrin levels in the two groups, the levels of motilin and gastrin in the two groups 3 days after surgery were lower than before surgery, and the levels of motilin and gastrin in the observation group were higher than those in the control group. Through observation, the number of postoperative incision infection cases in the control group was 4 cases, anastomotic bleeding cases were 3 cases, intestinal obstruction cases were 5 cases, and the complication probability was 24.00% (12/50). In the observation group, there were 2 cases of postoperative incision infection, 1 case of anastomotic hemorrhage and 1 case of intestinal obstruction, and the complication probability was 8.00% (4/50). The probability of complications in the observation group was significantly lower than that in the control group, and the analysis difference between the two groups was statistically significant ($P < 0.05$).

The clinical manifestations of open surgery and total endoscopic anastomosis assisted radical resection of colorectal cancer have certain curative effects, but for surgeons, the improvement of surgical technology can shorten the operation time as much as possible, so surgeons also need to

conduct more training. Studies have shown that total endoscopic surgery can reduce the physical injury of patients, reduce the complications associated with it, and reduce the stress response. Stress response is a kind of self-protection produced by human body to the environment, which is an unspecified systemic response [11-12]. At the same time, stress response, inflammatory and immune stress index have certain reference value for evaluating the recovery of patients. Rectal cancer is a clinically common gastrointestinal malignancy with a high mortality rate. At present, surgery is the main surgical treatment for rectal cancer. With the continuous development and progress of medical technology, total endoscopy has gradually replaced laparotomy and become the first choice for the treatment of rectal cancer. Compared with the traditional laparotomy, total endoscopic radical resection of rectal cancer is more comprehensive. First of all, it can make the operative field under full endoscopy more clear [13-15], so as to ensure the accuracy of the operation. Secondly, it has a good lighting effect, can clearly see the part of the artery, to prevent damage to the artery; The application of ultrasonic knife to hemostasis under total endoscope can effectively reduce postoperative blood loss.

4. Conclusion

Through this study, it can be found that the therapeutic effect of open surgery and total endoscopic anastomosis with the new technology assisted radical resection of colorectal cancer in the treatment of radical resection of colorectal cancer is significantly better than that of traditional open surgery, which can improve the quality of life of patients and provide postoperative recovery, worthy of promotion in clinical treatment.

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