PO Box 2345, Beijing 100023, China
Fax: +86-10-85381893
E-mail: wjg@wjgnet.com www.wjgnet.com

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• BRIEF REPORTS •

Gastrointestinal decompression after excision and anastomosis of lower digestive tract

Wen-Zhang Lei, Gao-Ping Zhao, Zhong Cheng, Ka Li, Zong-Guang Zhou

Wen-Zhang Lei, Gao-Ping Zhao, Zhong Cheng, Ka Li, Zong-Guang Zhou, Department of Gastrointestinal Surgery, West China Hospital, Sichuan University, Chengdu 610041, Sichuan Province, China
Correspondence to: Dr. Gao-Ping Zhao, Department of Gastrointestinal Surgery, West China Hospital, Sichuan University, Chengdu 610041, Sichuan Province, China. zhgaoping@yahoo.com.cn
Telephone: +86-28-68126226 **Fax:** +86-28-68123364
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Abstract

AIM: To discuss the clinical significance of postoperative gastrointestinal decompression in operation on lower digestive tract.

METHODS: Three hundred and sixty-eight patients with excision and anastomosis of lower digestive tract were divided into two groups, i.e. the group with postoperative gastrointestinal decompression and the group without postoperative gastrointestinal decompression. Clinical therapeutic outcome and incidence of complication were compared between two groups. Furthermore, an investigation on application of gastrointestinal decompression was carried out among 200 general surgeons.

RESULTS: The volume of gastric juice in decompression group was about 200 mL every day after operation. Both groups had a lower girth before operation than every day after operation. No difference in length of the first passage of gas by anus and defecation after operation was found between two groups. The overall incidence of complications was obviously higher in decompression group than in non-decompression group (28% *vs* 8.2%, $P<0.001$). The incidence of pharyngolaryngitis was up to 23.1%. There was also no difference between two groups regarding the length of hospitalization after operation. The majority (97.5%) of general surgeons held that gastrointestinal decompression should be placed till passage of gas by anus, and only 2.5% of surgeons thought that gastrointestinal decompression should be placed for 2-3 d before passage of gas by anus. Nobody (0%) deemed it unnecessary for placing gastrointestinal compression after operation.

CONCLUSION: Application of gastrointestinal decompression after excision and anastomosis of lower digestive tract cannot effectively reduce gastrointestinal tract pressure and has no obvious effect on preventing postoperative complications. On the contrary, it may increase the incidence of pharyngolaryngitis and other complications. Therefore, it is more beneficial to the recovery of patients without undergoing gastrointestinal decompression.

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INTRODUCTION

At present, gastrointestinal decompression after excision and anastomosis of lower digestive tract is still widely used in clinic. Although some researches regarding the application of gastrointestinal decompression after digestive tract operation were made, few researches related to the value of decompression after lower digestive tract have been carried out. Therefore, we performed a prospective randomized controlled study on 368 patients undergoing excision and anastomosis of lower digestive tract in West China Hospital, Sichuan University between July 2002 and October 2003. We also made an investigation in the application of gastrointestinal decompression among 200 general surgeons in China.

MATERIALS AND METHODS

Cases selection

Three hundred and sixty-eight cases underwent excision and anastomosis of lower digestive tract were divided into two groups. One group underwent gastrointestinal decompression after operation and the other group did not.

Clinical data

Of one hundred and eighty-six cases underwent postoperative gastrointestinal decompression, 109 were males and 77 were females, aged between 21-82 years with an average age of 56.8 years. Of the 182 cases in the group who did not undergo postoperative gastrointestinal decompression, 112 were males and 70 were females, aged between 23-84 years with a mean age of 57.2 years. In decompression group, there were 4 cases of small intestinal tumor, 6 cases of benign colon disease, 31 cases of carcinoma of colon and 145 cases of rectal cancer. In non-decompression group, there were 5 cases of small intestinal tumor, 8 cases of benign colon disease, 28 cases of carcinoma of colon and 141 cases of rectal cancer. Partial excision of small intestine was performed for small intestinal tumors. Patients with benign colon disease and colon carcinoma underwent partial or subtotal excision of colon, and those with rectal cancer received anterior resection.

Methods

A nasogastric tube was placed in all patients during operation. The tube was removed in the group with gastrointestinal decompression after passage of gas by intestines with continuous vacuum aspiration. The nasogastric tubes in the group without gastrointestinal decompression were immediately removed after operation. Then, the following procedures were carried out. The gastric juice of patients was collected and measured after operation, the postoperative girth was measured by circling umbilical region in the morning as a comparison value with preoperative one, the time for passage of gas by intestines and defecation, the length of hospitalization after operation and the incidence of complications and prognosis were observed and recorded. Those suffering from anastomotic leaks were subjected to treatments such as anti-infective treatment, nutrition support or colostomy. Correspondingly, acute dilatation of stomach was subjected

to gastrointestinal decompression and vacuum aspiration, pulmonary infection to anti-infective therapy, wound infection to local drainage, and cough and throat pain to oral nursing and fog inhalation therapy.

Clinical investigation

An investigation was carried out among 200 general surgeons from 18 hospitals by way of communication. The contents of investigation included the length of placing gastrointestinal decompression after excision and anastomosis of lower digestive tract by these surgeons and their cognition of the significance of placing gastrointestinal decompression.

Statistical analysis

SPSS 10.0 software was used to conduct statistical analysis.

RESULTS

General data

There were no significant differences between two groups in terms of sex ($P>0.05$), age ($P>0.05$). No statistical difference was found between two groups in case distributions ($P=0.892$).

Table 1 Girth of 368 cases before and after operation on lower digestive tract (mean±SD)

Girth	Decompression group (n=186)	Non-decompression group (n=182)	P value
Before operation (cm)	76.3±17.6[b]	75.1±16.2[d]	0.051
After operation (cm)			
Day 1	82.4±21.5	81.5±20.7	0.562
Day 2	82.8±19.8	83.6±21.8	0.367
Day 3	82.2±21.5	84.7±21.2	0.551

[b]$P<0.001$, [d]$P<0.001$ *vs* the three initial days after operation.

Clinical observation

None of the 368 cases died due to operation. The volume of gastric juice in the group with gastrointestinal decompression was 10-520 mL every day after operation (146.5±87.4 mL on the 1st day, 204.9±92.5 mL on the 2nd day, and 205.3±107.1 mL on the 3rd day, respectively). The volume of gastric juice on the 1st day was lower than that on the 2nd and 3rd days ($P<0.001$). However, there was no statistical difference between the volumes on the 2nd and 3rd days ($P>0.05$). There was no significant difference between two groups in terms of girth before and after operation ($P>0.05$). However, the preoperative girth of two groups was less in comparison with the postoperative one ($P<0.001$) (Table 1). The time for passage of gas by anus was 3.2±1.1 d in the group with gastrointestinal decompression and 3.2±1.3 d in the group without gastrointestinal decompression ($P<0.05$). The time for the first defecation of the group with gastrointestinal decompression and the group without gastrointestinal decompression was 4.5±1.4 and 4.6±1.6 d, respectively ($P>0.05$). The time of hospitalization after operation was 9.0±4.5 d for the group with gastrointestinal decompression and 8.6±4.0 d for the group without gastrointestinal decompression ($P>0.05$). All patients were completely recovered from such illnesses and discharged from hospital.

Incidence of complications

Table 2 shows the incidence of complications after operation. Symptoms as fever and leakage of intestinal contents were diagnosed as anastomotic leakage. There were 5 cases suffering from the lesion in the two groups. All the leakages occurred during excision and anastomosis of lower or ultra-lower rectal tumor and healed after clinical therapy. Those who suffered from abdominal distension, emesis and succussion splash of stomach were diagnosed with acute dilatation of stomach and then subjected to gastrointestinal decompression. Four cases of pulmonary infection were found in two groups by chest X-ray and cured through anti-inflammatory therapy. Any symptom with throat upset or pain was diagnosed as pharyngolaryngitis, 23.1% of patients suffered from pharyngolaryngitis in decompression group and only 4.4% in non-decompression group. Through statistical analysis, the incidence rate of pharyngolaryngitis in decompression group was obviously higher than that in non-decompression group ($P<0.001$). No statistical difference was found in terms of other complications ($P>0.05$). Compared with non-decompression group, the total incidence of complications in decompression group was evidently higher ($P<0.001$).

Investigation results

We conducted an investigation among 200 general surgeons in China, 97.5%(195/200) of surgeons routinely placed nasogastric tube for the passage of gas by anus after excision and anastomosis of lower digestive tract, while 2.5%(5/200) of surgeons discarded gastrointestinal decompression 2-3 d after operation before the passage of gas by anus. All patients of these surgeons underwent gastrointestinal decompression after operation and this kind of management was assumed as a matter of course by the surgeons investigated. Ninety-five percent of the surgeons (190/200) held that gastrointestinal decompression should be maintained till the passage of gas by anus, 4.5%(9/200) of surgeons thought it unnecessary for placing gastrointestinal decompression till passage of gas by anus.

DISCUSSION

Present status of application of gastrointestinal decompression after excision and anastomosis of lower digestive tract

At present, it is still generally believed that gastrointestinal decompression should be performed after operation on abdominal region. The monographs on operation pointed out that gastrointestinal decompression should be conducted for the passage of gas by anus[1]. A randomized study on general surgeons showed that 72% of them performed routine gastrointestinal decompression after excision of small intestine and 49% of them performed routine gastrointestinal decompression after excision and anastomosis of large intestine[2]. The present study revealed that 97.5% of surgeons thought gastrointestinal decompression should be performed for the passage of gas by anus after excision and anastomosis of lower digestive tract, suggesting that it has become a routine

Table 2 Complications of 368 cases after operation on lower digestive tract

Patient froup	Anastomotic leakage (n, %)	Acute dilation of stomach (n, %)	Pulmonary infection (n, %)	Pharyngolaryngitis (n, %)	Wound infection (n, %)
Decompression group (n=186)	3(1.6)	1(0.5)	3(1.6)	43(23.1)[b]	2(1.1)
Non-decompression group (n=182)	2(1.1)	2(1.1)	1(0.5)	8(4.4)	1(0.5)

[b]$P<0.001$ *vs* non-decompression group.

procedure after excision and anastomosis of lower digestive tract.

Effects of gastrointestinal decompression

Paralysis of intestine is a natural and transient physiological process after operation on abdominal region. Some researches[3,4] regarding the relationship between such a phenomenon and gastrointestinal decompression have been made. However, there were few reports focusing on the theoretical basis of this field. It is well-known that the volume of secreted digestive juices was about 5 300-9 500 mL, and the gas secreted by deglutition and intestines was about 30-300 mL[5]. Nevertheless, the volume extracted by gastrointestinal decompression every day was less than 10% of digestive juices. This study showed the volume extracted by gastrointestinal decompression every day was 200 mL. It is thus evident that gastrointestinal decompression could not effectively extract digestive juices. After operations on abdominal region, gastrointestinal motor function was reduced and the function of intestinal absorption was not greatly influenced. This research showed that the postoperative girth was increased as compared with preoperative girth, demonstrating that there exists paralysis of intestines after operation and paralysis of intestines is a normal and brief process. Clevers *et al*.[3] reported that paralysis of intestine could not be alleviated by gastrointestinal decompression. The present study demonstrated that there were no significant differences between two groups in terms of passage of gas by anus and the length of defecation. The findings made it clear that gastrointestinal decompression could not get rid of paralysis of intestine or shorten the length of paralysis of intestine. There was no statistical difference between two groups in the increase of girth after operation, demonstrating that with the aid of gastrointestinal decompression, the liquid and gas were difficult to be extracted from intestines and there was no obvious effect upon postoperative abdominal distension. The above research results showed that gastrointestinal tract pressure could not be effectively reduced by means of gastrointestinal decompression.

Influence of gastrointestinal decompression upon postoperative complication

It is undoubtedly that the risk of incidence of anastomotic leakage would increase with the increased tract pressure after anastomosis. One of the purposes of gastrointestinal decompression was to reduce the inner pressure of gastrointestinal tract and the incidence rate of anastomotic leakage. This study revealed that there was no significant difference between two groups in the development of anastomotic leakage, which might be correlated with the fact that gastrointestinal decompression could not effectively reduce stoma pressure of gastrointestinal tract, and especially that gastrointestinal decompression played a small role in reducing the pressure of stoma of lower digestive tract. In the two groups, 3 cases suffered from acute dilation of stomach and no statistical difference was found between two groups. Of the 3 cases of acute dilation of stomach, 1 was from the non-decompression group and cured by the gastrointestinal decompression for 28 d. Although there was an increased probability of acute dilation of stomach without gastrointestinal decompression, its incident rate was lower and easily treated when it happened. In the two groups, there were 4 cases of pulmonary infection. Although gastrointestinal decompression was not the immediate cause for pulmonary infection, it could lead to cough and expectoration, and indirectly induce pulmonary infection. Owing to a low incidence rate of pulmonary infection, further researches for more cases need to be conducted. According to the report by Huerta *et al*.[6], the incidence rate of pulmonary infection in those with gastrointestinal decompression after operation on abdominal region was 10 times higher than that in those without gastrointestinal decompression. In addition, this report deemed that it was improper to perform gastrointestinal decompression as a routine procedure and that gastrointestinal decompression could be only used for the treatment of paralysis and dilation of stomach. Pharyngolaryngitis could be immediately induced by long-term irritation and compression of throat by gastrointestinal decompression tubes. Nathan *et al*.[2] reported that the incidence rate of throat pain was greatly increased in gastrointestinal decompression group. This study revealed that the incidence rate of pharyngolaryngitis in decompression group was up to 23.1%, 5 times as high as in non-decompression group, showing that pharyngolaryngitis was related to nasogastric tubes. This kind of pharyngolaryngitis could be easily dealt with through treatments as fog inhalation therapy and oral nursing after removal of the tube. Michowitz *et al*.[7] revealed that the incidence rate of complications was obviously increased in the group with gastrointestinal decompression after operations on abdominal region, and that postoperative hyperpyrexia and atelectasis were markedly enhanced. Another randomized research report showed that 70% of severe upsets were caused by gastrointestinal decompression[8]. This study demonstrated that gastrointestinal decompression could not effectively prevent severe postoperative complications such as anastomotic leakage and instead, resulted in an increased incidence rate of pharyngolaryngitis.

Influence of gastrointestinal decompression upon prognosis

According to some research reports[9,10], there were no increase in incidence rate of complications and no obvious influence upon prognosis by fluid feeding from the 1st day after operation on gastrointestinal tract without gastrointestinal decompression. Researches showed that it was unnecessary for gastrointestinal decompression after operation on abdominal region, which could reduce the incidence rate of pneumonia and recover the tract functions as early as possible[11-16]. The present study showed that there was no obvious difference between two groups in terms of passage of gas by anus and length of defecation time, implying that there was no adverse influence upon recovery of intestinal functions without gastrointestinal decompression. Despite of no significant difference in the time of postoperative hospitalization, the total incidence rate of complications in decompression group was obviously higher than that in non-decompression group, demonstrating that it was more beneficial to the recovery of patients without gastrointestinal decompression.

In conclusion, gastrointestinal decompression following excision and anastomosis of lower digestive tract cannot reduce the pressure of gastrointestinal tract and has no obvious effects upon preventing of postoperative complications. Contrary to expectations, it may increase the incidence rate of pharyngolaryngitis and other complications. Therefore, it is more beneficial to the patients' recovery without gastrointestinal decompression.

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