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Prophylactic and Informational Abdominal Drainage Is Not Necessary After Colectomy and Suprapromontory Anastomosis

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Several randomized prospective studies in western countries regarding the usefulness of prophylactic drainage have concluded that prophylactic abdominal drainage tubes are unnecessary. In Japan, however, longitudinal and vascular margins are rather different from in western countries. Furthermore, body mass index and volume of mesentery differed. Thus, although it is a retrospective study, it is worth investigating the usefulness of prophylactic drainage in the Japanese context. Two hundred sixty patients underwent colectomy and suprapromontory anastomosis. Prophylactic drainage tubes were inserted in 124 cases (47%) and not inserted in 136 cases (53%). In terms of postoperative complications, no statistically significant difference was found between the with-drainage and the without-drainage groups. The incidence of the abscess formation was not statistically different in the with-drainage group (4.0%) or the without-drainage group (0.7%). We concluded that the prophylactic and informational drainage tubes are not necessary even in Japanese cases of suprapromontory anastomosis, which typically have a wide resection and regional lymphadenectomy containing the roots of regional vessels.

Key words: Colorectal cancer – Prophylactic drainage – Informational drainage – Suprapromontory anastomosis

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The use of drainage tubes after colonic resection is purported to have several roles. One is prophylactic drainage. It is believed that prophylactic evacuation of serosal fluid and blood prevents infection that could lead to abscess formation. Likewise, anastomotic leakage due to the abscess opening into the intestinal cavity is believed to be prevented. The other role is informational drainage; that is, the detection of signs of complications such as anastomotic leakage, surgical-site infection, and intra-abdominal bleeding by the nature of the drainage fluid. Then, once anastomotic leakage or intra-abdominal abscess occurs, the role of the drainage tubes becomes therapeutic.

Several randomized prospective studies in western countries regarding the usefulness of prophylactic drainage have concluded that prophylactic abdominal drainage tubes are unnecessary.[1–3] For elective colonic resections in Denmark, a randomized controlled trial to study the influence of a prophylactic drain on postoperative complications was designed, enrolling 60 patients. There were no differences in the incidence of anastomotic integrity, wound infection, or respiratory complications between the 2 groups. They concluded that there was no advantage in inserting prophylactic drains after colonic anastomoses, and their routine use needed to be reconsidered.[1] Another multicenter randomized controlled trial in France, which included 319 patients, also showed that drainage was not necessary. The incidence of postoperative complications possibly influenced by drainage did not differ between the 2 groups. All patients with anastomoses received a routine diatrizoate sodium enema to detect infraclinical leakage. Routine abdominal drainage after colonic resection and immediate anastomosis decreases neither the rate nor the severity of anastomotic leakage.[2] Petrowsky *et al*[3] performed a meta-analysis to characterize the drain effect. Lower gastrointestinal operations can be performed safely without prophylactic drainage. Drains should be omitted after hepatic, colonic, or rectal resection with primary anastomosis and appendectomy for any stage of appendicitis.[3] In Japan, however, longitudinal and vascular margins are rather different from in western countries; although Japanese D3 resection and complete mesocolic excision (CME) with central vascular ligation (CVL) are almost equivalent procedures with regards to lymphadenectomy.[4,5] Furthermore, patients' body mass index and mesentery volume differed. Thus, although it is a retrospective study, it is worth investigating the usefulness of prophylactic drainage in the Japanese context.

Patients and Methods

Between January 2003 and November 2010, 260 patients (151 men and 109 women), whose mean age was 68.2 years, underwent colectomy and supra-promontory anastomosis in Gunma University Hospital, Japan. Of these, 254 were cases of colon cancers while 6 had other types of neoplasm. The data were collected retrospectively. Preoperative and intra-operative characteristics were recorded for all patients and are summarized in Table 1. All patients underwent colonic mechanical preparation by polyethylene glycol. Antibiotic preparation was not used. As the surgical procedure, colonic resection was performed with lymphadenectomy of the roots of the regional lymph nodes (Japanese D3 resection). In the majority of these patients (92%), hand-sewn anastomosis was made by Gambee's method with absorbable monofilament sutures. In some patients (8%), stapling anastomosis was made by a functional end-to-end anastomosis using linear staplers. Decisions about drainage tube insertion were made by chief surgeons, considering the risk factors of the patients. The drainage tubes were 19-French flex brake drains with continuous vacuum devices. The drainage tubes were put nearby the anastomosis, and then removed when the amount of exudate became less than 100 mL/d.

Results

Prophylactic drainage tubes were inserted in 124 cases (47%) and not inserted in 136 cases (53%). From 2003 to 2004, the prophylactic drainage tubes were inserted in 95% of surgical cases. After 2005, the rate of drainage-tube insertion was reduced to 30%. The patient's age tended to be higher in the drainage-tube group. However, no significant differences were observed in the age, sex, location, type of anastomosis, and operative procedures in the groups with (D+) and without drainage tubes (D–).

In terms of postoperative complications, no statistically significant difference was found between the D+ and D– groups (Table 2). Intra-abdominal abscess was observed in 6 of the patients (2.3%). The incidence of the abscess formation was not statistically different in D+ (4.0%) and D– (0.7%) groups. In other words, reduction of abscess formation was not observed in the D+ group; rather,

Table 1 Patient characteristics in D+ and D− groups[a]

	D+ (n = 124)	D− (n = 136)	*P* value
Age	69.4 ± 10.6	66.9 ± 12.3	0.09
Sex (M : F)	78 : 46	73 : 63	0.17
Tumor location			
Proximal	91	91	0.28
Distal	33	45	
Type of anastomosis			
Ileum-colon	69	64	0.17
Colon-colon	55	72	
Method of anastomosis			
Hand-sewn anastomosis	117	122	0.18
Stapled anastomosis	7	14	
Method of surgery			
Laparoscopic surgery	39	39	0.69
Open surgery	85	97	

[a]*P* values were calculated by Fisher exact test.

abscess formation and reoperation rates seemed higher in the D+ group, although the difference was not significant. Intra-abdominal bleeding was not observed in any of the cases. The incidence of intraluminal bleeding, wound infection, wound herniation, and bowel obstruction were low and did not differ between groups.

In terms of surgical site infection, 5 cases of the D+ group developed intra-abdominal abscess. These cases had anastomotic high-risk features, such as bulky tumor, re-colonic resection, and complicating emphysema. From our observation, drainage tubes seemed not to work well as prophylactic tubes. The duration to development of the intra-abdominal abscess varied from 3 days to 52 days from the operation. In 2 cases, drainage tubes had already been removed by the day of the diagnosis of the intra-abdominal abscess. In 3 cases, drainage tubes were inserted on the day of diagnosis of the intra-abdominal abscess. In none of the cases with abscess did the nature of the drainage fluids change. A computed tomography (CT) scan prompted by abdominal pain and fever revealed the intra-abdominal abscess (Fig. 1A). In this sense, our tubes were not working as informational tubes, either. CT-guided abdominal drainage evacuated these abscesses (Fig. 1B).

Discussion

In this study, the usefulness of drainage tubes was not apparent. It is necessary for the tube to be in an optimal position for it to work well as either an informational drainage tube or a therapeutic drainage tube. However, sometimes the abscessed lumen was separated from the drainage tube, and sometimes leakage occurred on the opposite side of the drainage tubes. The same phenomena of unsatisfactory drainage were observed in previous studies. Urbach *et al*[6] reported that in only 5% of all patients with anastomotic leakage did pus or enteric content actually appear in the effluent of the existing drain. The brake drain was a flexed type; thus it easily migrated away from the anastomosis. However, considering the frequency of the leakage and the intra-abdominal abscess, we decided to put in non-flexed drains. In our institution, CT-guided drainage puncture has been a useful method to rescue intra-abdominal abscesses.

The frequency of leakage, intra-abdominal hemorrhage, and intra-abdominal abscess was very low in this study. We did not experience cases in which drainage tubes revealed anastomotic leakage or intra-abdominal abscess and intra-abdominal hemorrhage. Our experience strongly suggests that the most important method of monitoring is physical examination to identify signs and symptoms such as rebound pain and muscular guarding; and when fever and abdominal pain are observed, emergent CT scanning is useful. We concluded that the prophylactic and informational drainage tubes are not necessary even in Japanese cases of supra-promontory anastomosis, which typically have wide

Table 2 Incidence of surgical complications in D+ and D− groups[a]

	D+ (n = 124)	D− (n = 136)	*P* value
Intra-abdominal abscess	5 (4.0%)	1 (0.7%)	0.11
Intra-abdominal hemorrhage	0 (0%)	0 (0%)	1.00
Intraluminal hemorrhage	1 (0.8%)	1 (0.7%)	1.00
Wound infection	9 (7.3%)	9 (6.6%)	1.00
Wound herniation	2 (1.6%)	0 (0%)	0.23
Ileus	4 (3.2%)	5 (3.7%)	1.00
Re-operation	4 (3.2%)	0 (0%)	0.05

[a]*P* values were calculated by Fisher exact test.

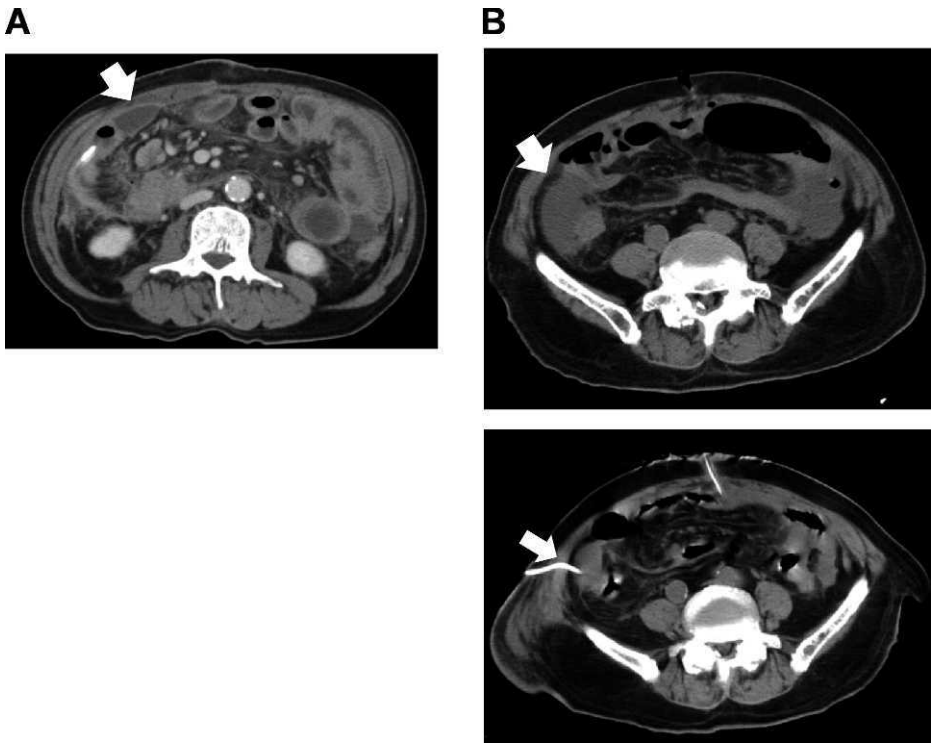

Fig. 1 (A) An abscess formation occurred on the opposite side of the drainage tube. (B) CT-guided drainage rescued abscess formation.

resection and regional lymphadenectomy containing the roots of regional vessels.

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