

Surgery for Perforation Complicating Colon Cancers

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ABSTRACT : Eleven patients with perforation complicating colon cancers were clinically analyzed with respect to perforation sites and surgical outcome.

In general, perforations complicating colon cancers are divided into two categories, free perforation and penetration with abscess or fistula formation.

It is emphasized that surgical outcome for free perforation is unsatisfactory. Therefore, two-stage operation is recommended and the aim of the treatment should be first concentrated on peritonitis. In conclusion, complete resection of carcinoma is necessary in obtaining a satisfactory result.

INTRODUCTION

By prolonged life and improvement of diet, the incidence of colon cancer has increased. Fortunately, the prognosis of colon cancer is not so unsatisfactory as compared with those cancers in other organ. Perforation is as one of the common complications of colon cancers. However, the prognosis of colon cancers relates to their complications such as perforation and ileus, older age over 75 years, advanced disease stage (stage V) as reported by DUTTON *et al*¹⁾.

In this series clinical experience with perforation of colon cancers is evaluated with respect to its prognosis.

MATERIAL AND METHOD

Seven-hundred forty-five colon cancers were operated upon in the First Department of Surgery, Nagasaki University School of Medicine. Perforations existed in 11 cases (1.5%).

The sites where perforation took place were

central portions in six and the proximal sites to cancer lesions in five cases. The cancer bearing colon was shown in Table 1. The most often sites of perforations complicating colon cancers were the sigmoid colon in seven, followed by the rectum in three and the transverse colon in one case. From the standpoint of the depth of cancer invasion, S1 was seen in two, S2 or A2 in seven and S3 in two respectively. According to the classification of disease stages, stage II contained four cases, stage IV three and stage V four respectively. In most cases of stage V, determination of stage V was mainly based on cancer extension of peritoneal dissemination (P2, P3).

According to age distribution, perforations associated with colon cancers occurred most often in older patients over 80 years old. Next was in the sixth and seventh decades. However, a few were younger patients aged 30 and 40 years as shown in Table 2. In this series, we encountered five hospital deaths who died within 48 days after surgery.

The influencing factors in hospital deaths

Table 1. Perforation sites

location of cancer lesion	proximal oral side			total
	cancer lesion 0	5	10cm	
ascending colon				0
transverse colon			ascend. colon ●	1
descending colon				0
sigmoid colon	● ● ● ●	●	●	7
rectum	●		sigmoid colon ●	3
total	6	5		11

Table 2. age and sex distribution

	30yrs~	40yrs~	50yrs	60yrs	70yrs	80yrs	total
male	0	0	0	2	1	3	6
female	1	1	0	0	1	2	5
total	1	1	0	2	2	5	11

were evaluated. The time intervals from onset to operation ranged from within 12 hours (min. three hrs) to over 24 hours (max. 70 hrs) as shown in Fig. 1. The hospital deaths did

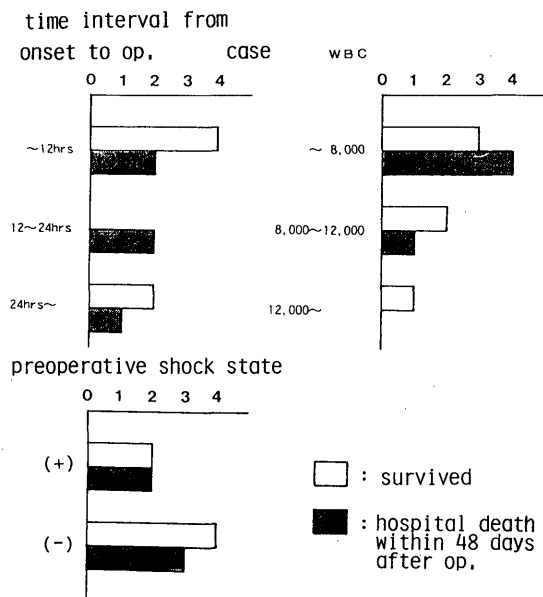


Fig. 1. Influencing factors on the hospital deaths

not relate to time intervals from onset to operation. Preoperative leucocyte counts were not indicative of a risk of hospital death. And also a presence of preoperative shock state did not necessarily correlate with hospital deaths.

Surgery in 11 cases included one-stage operation in 10 and second-stage operation in one. However, cancer lesions were not resected in four cases. The reasons for non-resectable surgery in four were peritonitis carcinomatosa with peritoneal dissemination in two, cancer invasion to neighboring organs in two and diffuse liver metastasis in two and severe shock state by barium peritonitis in one respectively. These factors were in combination with each other. Therefore, their prognoses were poor and all died within three months after surgery. Their survival times ranged from seven hours to 73 days.

Operation methods comprised of direct closure, resection either with anastomosis or without (Hartmann + colostomy or colostomy alone). Two-stage operation was applied to only one, who had resection by Hartmann' methods later as shown in Table 3.

Table 3. Perforation sites and operation methods

op. methods		site	rectum		sigmoid colon		descending colon		∑†
			cancer	non-cancer	cancer	non-cancer	cancer	non-cancer	
one stage	direct closure + colostomy				3 4	1			4
	suture closure without anastomose after resection of carcinoma colostomy						0 1	1	1
	Hartmann				2 3	1			3
	resection + anastomosis		1 1	0	0 1	1			2
two stage	resection colostomy Hartmann				1 1	0			1

On the other hand, as shown in Table 4 in which resected cases were listed, the disease stages were far advance with respect to depth of cancer invasion which was shown as being a₂ and/or ss. The survival times ranged from seven hours to two years and six months. However, except three cases death of survived

cases are still doing well, expecting to be long survivors.

DISCUSSION

Colon cancer is now one of the increasing diseases in number. The most frequent

Table 4. Resected cases for perforative colon cancers

No	case age	sex	histology	stane	operation	prognosis
1	85	F	well diff ad. ca	s ₁ n ₀ P ₀ H ₀ Stage II	Hartman	13hrs death
2	71	M	well diff ad. ca	ss n ₀ P ₀ H ₀ Stage II	resection of transverse colon, colostomy	3hrs death
3	65	M	mod. diff ad. ca	a ₂ n ₀ P ₁ H ₀ Stage V	two stage colostomy Hartmann	1y5M death
4	71	F	well diff ad. ca	a ₂ n ₀ P ₂ H ₀ Stage V	low anterior resection combined with ovariem	1y7M alive
5	80	M	well diff ad. ca	ss n ₀ P ₀ H ₀ Stage II	sigmoid colon resection	2y6M alive
6	80	M	mod. diff ad. ca	a ₂ n ₂ P ₀ H ₀ Stage IV	Hartman	11M alive
7	85	F	mod. diff ad. ca	s ₁ n ₀ P ₀ H ₀ Stage II	Hartman	11M alive

complications of colon cancers were perforation and ileus.

The incidence of perforation complicating colon cancer is reported to be 2.7%²⁾ to 26%³⁾ with varying variety. Such a different frequency of perforation associated with colon cancers depends on the definition of perforation itself. In general, perforation means the conditions of free perforation and penetration including localized abscess formation and fistula formation to the contiguous organs or the skin. It is accepted that perforation includes the following two situations, free perforation without wrapping neighboring organ and penetration with wrapping contiguous organs, forming a localized abscess.

The incidences between perforating and penetrating colon cancers were almost similar in occurrence except for DEVITT's report²⁾ that the incidence of perforation is four times more dominant than that of penetration.

The sites in which perforation occurred are divided into two, one is cancer lesion, the other is proximal portion to cancer lesion. In general, cancer lesion is susceptible to perforation rather than proximal portion to cancer lesion. The rates of their frequencies were 74.1 : 25.9 as reported by KELLEY,⁴⁾ 82.6 : 7.4 by MICHOWITZ⁵⁾ and 29 : 1 by GLENN⁶⁾. In contrast, in this series the ratio was 6 : 5, showing no definitive differences in perforation sites. It takes it into consideration that perforations at the proximal colons to cancer lesions tend to increase in the colons downwards to the anal side and the type of its perforation is mainly free perforation.⁷⁾ HOLLENDER⁸⁾ indicated that a presence of free gas in the abdominal cavity on X-ray film is seldom evidenced when perforation complicating colon cancers occur. Surgeons should be careful in doing an examination by barium enema when perforation is suspected, because chemical peritonitis by barium is induced and intestinal content is expelled out of the lumen of the gut by pressure added. According to histological examination, when the depth of cancer infiltration reaches into the serosa or adventitia, cancer cells extend to the regional or distant lymph nodes via lymph channels in about half (41%) and constitutes liver metastases via blood vessels. In our series determina-

tion of advances in cancer stages was mostly to be a presence of peritoneal dissemination.

In view of the types of perforation, most were penetration with abscess formation (Si or Ai) and only 18% were free perforation.

Surgery for perforation complicating colon cancers has been focused on as to whether one stage operation should be recommended or not in each case. However, most investigators have defined that two staged operation should be recommended for the patients with free perforation and /or with a left side colon affected even though preoperatively satisfactory mechanical and chemotherapeutic colon cleaning were made. LIECHTY,⁹⁾ however, emphasized to recommend one stage operation for prevention of postoperative infection and late death by cancer extension.

As the prognosis of free perforation is very poor, the treatment of peritonitis should be attempted first. If a complete resection of colon cancer is performed, the prognosis would be satisfactory. In this series, long survivors were expected to keep living well LICHTY⁹⁾ reported the reason for obtaining a good result of perforative colon cancers. He explained that cancer cells are unable to implant and grow on the surface of inflammatory peritoneum. In contrast, Kelley reported that prognosis for perforative colon cancers were very poor on the basis of 7% of the 5-year survival rate and it was reasoned that when perforation occurred in colon cancers it would widely spread peritoneal dissemination. MICHOWITZ pointed out that the prognosis of perforative colon cancers did not relate to the type of perforation of colon cancers but depended upon a speed of cancer extension.

In conclusion, as far as the prognosis is concerned, perforative colon cancer should be resected, if feasible, to obtain a satisfactory prognosis.

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