

図12 B法(反転法)手順

- a : 口側で腸管を切離後、反転法を利用し病変を含む腸管を肛門から引き出す。  
 b : 反転した腸管断端を開放し、中枢側の郭清した腸間膜を体外に引き出す。  
 c : 肛門側腸管切離予定部から2～5cm 離し切開してアンビルの挿入。その後、TA で腸管を切離する。

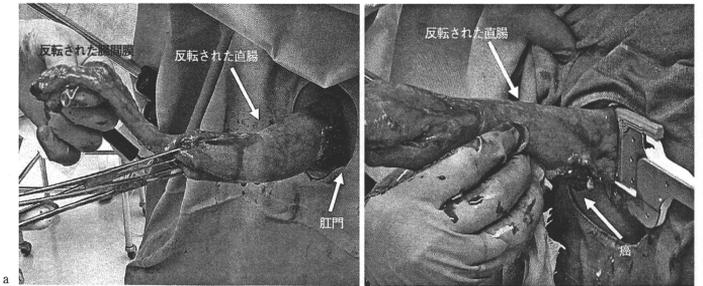


図13 反転法

- a : 近位側腸管断端をエンドクリンチで把持し、これを反転し、一括して肛門から体外へ引き出す。  
 b : 体外で直視下に直腸を洗浄し、肛門側直腸切離部位を正確に決定し、TA で切離する。

を最小化する。A 法の場合は切除標本を回収バッグに入れるとむしろ口径の広い状態で引き出され、出しにくい場合もある。回収バッグに入れずに直接出しやすい部位を鉗口鉗子で把持すると出

やすくなる場合がある。より肛門から容易に取り出す工夫として Alexis Wound Retractor を腹腔内に挿入し、肛門側直腸断端に固定し、これを肛門から出して巻き上げることで直腸の拡張する方

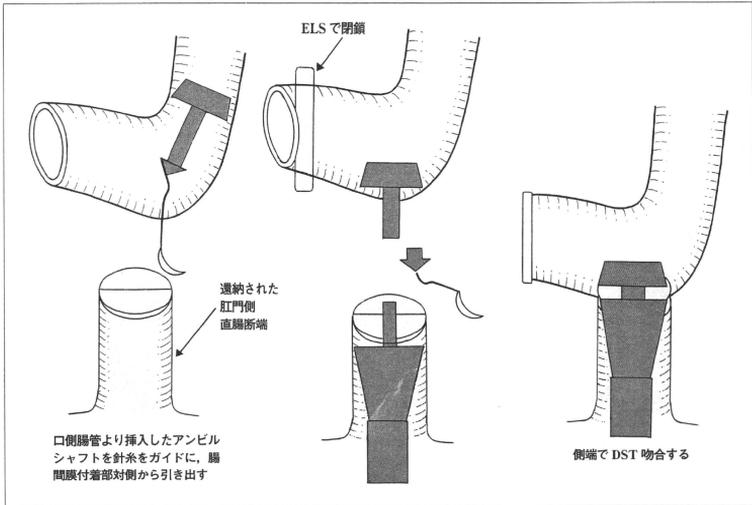


図14 腹腔内側端 DST 吻合の手順

法<sup>7)</sup>、TEM 用の器械を介して回収を容易にする方法<sup>8)</sup>などが報告されている。

B 法で反転法を利用する場合には直腸の剝離範囲を十分尾側まで行うこと、直腸内にキシロカインゼリーなどの潤滑剤を十分に注入すること、腸管を反転する時に無理に引き出さずに、埋没縫合を行う要領でまず、肛門側断端より約 5 cm 位肛門側の腸管を把持、この部位を固定し、まず反転の起点をつくり、無理に引き出さず、ゆっくりと順次反転を進める。反転が困難な場合には無理せず通常腹腔内での行う DST に変更する。

### 9. 口側腸管へのアンビルの装着

再気腹後、吻合は原則的に側端の DST で行う(図14)。口側腸管の口側約15 cm 付近に着脱式針子を装着し、腸内容の逸脱を防止する。次に口側断端のステイブルを除去し、腸管の内腔を開放する。アンビルヘッドから先に口側に向けて槍が

5 cm 位奥まで入るように口側腸管に挿入する。あらかじめ用意した彎曲を延ばした 2-0 鈍針を持針器で把持し、これを腸管内に愛護的に挿入し、断端より約 5 cm 近位側の腸間膜附着部対側で腸管内腔より腸管外に導針して糸を腸管外に誘導し、ここからアンビルシャフトを引き出す(図15)。次に ELS でアンビル刺入部より肛門側に約 5 ~ 6 cm 離して切離し、口側断端を閉鎖する。余剰腸管は右下ポートより回収する。

### 他のアンビル装着法

ここに示す側端吻合の他、体内縫合でアンビルシャフトに巾着縫合を行い装着する方法、口側腸管を完全切離せず、小切開からアンビルを挿入し、この近傍を ECS で切離することで装着を終了し、吻合は Triple Stapling Technique で行う方法などが報告されている<sup>9)10)</sup>。われわれは主に器械縫合を利用することで難度の高い体内縫合せずにアンビルが比較的容易に装着でき、しかも直腸低位

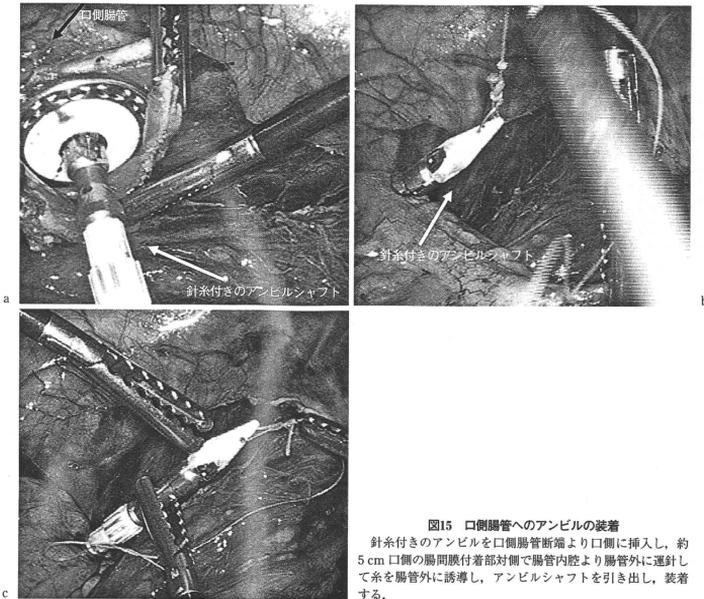


図15 口側腸管へのアンプルの装着  
針糸付きのアンプルを口側腸管断端より口側に挿入し、約5 cm口側の腸間膜附着部対側で腸管内腔より腸管外に導針して糸を腸管外に誘導し、アンプルシャフトを引き出し、装着する。

においても安全性がより高いと考えられる端側でのDSTを選択できるため本術式を採用している。

#### 10. 腹腔内吻合

吻合前に捻れがないこと、テンションがないこと、小腸が間膜背側に入り込んでいないことを確認する。吻合操作は通常のDSTと同様にゆっくりと正確に行い、終了後はリングの連続性を確認し、リークテストを施行する。操作に問題ない場合はドレーンは挿入しない。

#### IV. 術後成績

現在までに本術式を17例に施行した。A法9

例、B法8例に施行した。術中偶発症、術後合併症は経験していない。

#### 終わりに

大腸癌に対するILACは適切な症例選択をすれば、手技的にはほとんどが器械吻合を利用するため、比較的容易である。これにより従来のLAPに比較して術後疼痛の軽減、整容性の向上、小切開を追加することによる創感染、創ヘルニアなどの合併症の低減、単孔式腹腔鏡下手術などのReduced Port Surgeryへの応用やNOTESへのよりスムーズな導入に役立つことが期待される。

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## pM 大腸癌手術症例の検討

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**Summary**

Stage 0 colorectal cancer was found only in the innermost lining of the colon and rectum. Treatments for an early stage colorectal cancer were available including endoscopic polypectomy, endoscopic mucosal resection (EMR) and trans-anal or -sacral local excision, laparoscopy-assisted colectomy and open colectomy. Our study indicated that endoscopic therapy for the early stage colorectal cancer was more advantageous than the conventional operative treatment. Although EMR should be applied for intramucosal carcinomas, 11 intramucosal carcinomas were treated by a surgical resection due to several limitations at our institution. **Key words:** Early colon cancer, Intramucosal carcinoma, Endoscopic mucosal resection

**要旨** pM 大腸癌手術症例に対する治療内容を解析した。2004年1月～2008年12月までの原発性大腸癌手術1,037例中pM癌は43例であり、結腸癌29例、直腸癌14例であった。結腸癌の術式は、腹腔鏡下大腸切除15例と開腹大腸切除14例であった。結腸癌の腫瘍径は平均28mm、そのうち腫瘍最大径20mm未満は11例(38%)であった。直腸癌は、経肛門の直腸局所切除9例が最も多く、開腹手術4例、腹腔鏡手術1例であった。経肛門の直腸局所切除の腫瘍径は平均42mm、開腹および腹腔鏡下直腸切除の腫瘍径は平均34mmであった。そのうち最大径20mm未満の直腸癌は1例のみであった。最大径20mm未満のpM結腸癌11例(25%)は、理論上は開腹手術ではなく内視鏡治療で対応可能であったが、深達度診断の深読み、内視鏡治療の手法上の困難性、合併する腹部の他疾患の治療など様々な要因により外科的切除が施行された。

## はじめに

大腸癌治療ガイドラインによると、大腸癌のうち内視鏡治療の対象となるのはリンパ節転移の可能性がほとんどなく、腫瘍が一括切除できる最大径20mm未満のcM癌またはcSM軽度浸潤癌である<sup>1,2)</sup>。外科手術を施行されたpM大腸癌を臨床病理学的に解析し、内視鏡治療を主体とした局所切除の可能性をretrospectiveに検討した。

## I. 対象・方法

2004年1月～2008年12月までの原発性大腸癌初回手術1,037例におけるpM癌43例(4%)を対象にした(図

1)。男性26例と女性17例、平均年齢57歳(40～83歳)であった。占居部位は右側結腸16例(37%)、左側結腸13例(30%)、直腸14例(33%)であった。同時性大腸癌はpM癌のみは含めたが、家族性大腸腺腫症は除外した。

## II. 結果

開腹大腸切除18例(43%)、腹腔鏡下大腸切除16例(37%)、経肛門の直腸局所切除9例(20%)であった(図2)。結腸癌29例の術式は、腹腔鏡下大腸切除15例(52%)と開腹大腸切除14例(48%)が半数ずつであった。結腸癌の腫瘍径は平均28mm(15～70mm)、そのうち最大径20mm未満の腫瘍は11例(38%)であった

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(表1)。直腸癌は、経肛門の直腸局所切除9例(65%)が最も多く、開腹手術4例、腹腔鏡手術1例であった。経肛門の直腸局所切除の腫瘍径は平均42mm(20~85mm)、腸切除の腫瘍径は平均34mm(25~40mm)であった。20mm未満の直腸癌が1例あったが、SM高度浸潤癌と術前診断され手術を施行された(図3)。20mm未満の結腸癌11例は、すべて隆起型の病変であり、右側結腸癌が多数を占めていた(表2)。開腹手術の既往や大腸癌の治療と同時に、腹部他臓器の疾患に対する外科治療を必要とする症例も多くみられた。

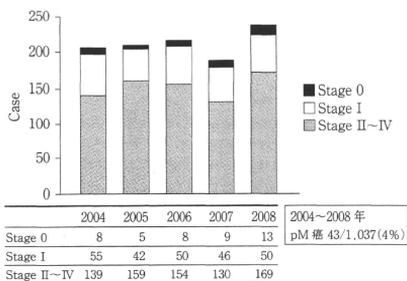


図1 原発性大腸癌初回手術におけるpM癌の割合

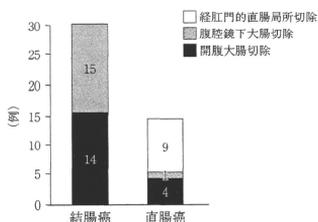


図2 pM癌の占居部位と術式

### III. 考察

現在の癌治療においては低侵襲で根治効果を得ることが要求されており、早期大腸癌に対する内視鏡治療と腹腔鏡手術は低侵襲治療として、様々な施設で施行されるようになった<sup>3,4)</sup>。pM大腸癌は内視鏡治療のよい対象であるが、われわれの施設で43例のpM癌が外科的切除を受けた。その要因としては、深達度診断の過大評価、内視鏡治療の技術的な制約、合併する腹部疾患に対する手術などであった。拡大内視鏡などの発達により、深達度診断能は約90%まで向上しているが、まだ完全とはいえない<sup>5)</sup>。特に凹凸のない隆起型の早期癌では深達度診断が難しい場合がある。また、右側結腸癌や腹部手術後の

表1 腫瘍最大径	
腫瘍径	平均 (mm)
結腸切除 (開腹および腹腔鏡)	28 (10~70)
直腸切除 (開腹および腹腔鏡)	34 (25~40)
直腸局所切除 (経肛門の局所切除)	42 (17~85)

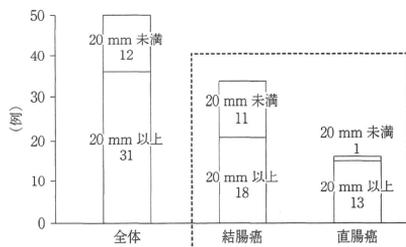


図3 腫瘍最大径と占居部位

表2 腫瘍最大径20mm未満の結腸切除症例

年齢(歳)	性別	腫瘍径(mm)	肉眼型	術前深達度	占居部位	開腹既往	同時手術	術式
62	男性	10	IIa+IIc	SM	Right	なし	胃部分切除	開腹術
62	男性	10	Is+IIa	SM	Right	あり	なし	腹腔鏡
80	男性	10	Isp	SM	Right	あり	なし	腹腔鏡
60	女性	12	IIa	SM	Right	あり	なし	腹腔鏡
61	男性	15	IIa	M	Right	なし	直腸切除	開腹術
65	男性	16	IIa	M	Right	あり	肝切除	開腹術
79	女性	17	IIa	SM	Right	あり	胆摘	腹腔鏡
60	女性	18	IIa	SM	Right	なし	なし	腹腔鏡
55	男性	14	Isp	SM	Left	なし	空腸部分切除	開腹術
71	男性	15	IIa	SM	Left	なし	腎生検	開腹術
48	男性	18	Isp	SM	Left	なし	なし	腹腔鏡

癒着がある場合には内視鏡操作が困難なことがあり、内視鏡治療が不可能になることもある。一方、腹部他臓器の開腹手術をする際に、大腸癌を同時に切除する症例も多かった。ほとんどの部位で癌罹患数が増加し、多重癌を治療する機会が多くなったことも一因である。上記の要因に加えて、内視鏡的切除と開腹手術との選択には、個々の患者の考え方などの社会的背景も影響している。特に下部直腸では不十分な治療が局所再発に結び付く可能性があるにもかかわらず、人工肛門を受け入れ難い患者においては、たとえSM高度浸潤癌とわかっていても、開腹手術ではなく経肛門の局所切除を選択することもある。

近年普及しつつある内視鏡的粘膜下層剝離術 (endoscopic submucosal dissection: ESD) を用いると、cM癌とcSM軽度浸潤癌は、大きさに関係なく完全一括摘除が可能とされており、外科手術を回避できる機会がさらに減少することが期待されている。しかし、完全切除の不確実性や病変の遺残、再発の懸念が残ることもあり、深達度予測がさらに向上することが重要である。

## 結 語

すでに早期癌に対する腹腔鏡下大腸切除は急速な広がりを見せ、手技は安定した時期に入っている。ESDも先進医療として承認された。低侵襲手術をさらに進めるためには、壁深達度診断とリンパ節転移診断能がさらに向上することが重要である。

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## Surgical Management for a Malignant Bowel Obstruction With Recurrent Gastrointestinal Carcinoma

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**Background:** A malignant bowel obstruction (MBO) is a common clinical complication in patients with recurrent gastrointestinal carcinoma, which has a poor prognosis and a limited life expectancy. This study considered the effectiveness of surgical management for MBO.

**Methods:** This study reviewed the clinical course of 70 patients who underwent surgery for MBO and compared the outcomes in three groups: patients with (A) peritonitis carcinomatosis without manifest ascites, (B) peritonitis carcinomatosis with ascites, (C) local recurrence without peritonitis carcinomatosis.

**Results:** The 1-year survival rate and median survival time (MST) in the patients in group A were 33.3% and 228 days, which was statistically longer than those (6.7% and 46 days) in the patients in group B ( $P = 0.026$ ). The rate of the patients with possible oral intake of solid meals for 6 months and median oral intake periods were 45.4% and 161 days in patients in group A and 28.0% and 93 days in patients in group C. In contrast, 66.7% in group B could not take solid meals for more than 1 month, and five patients could not take solid meals at all.

**Conclusion:** Palliative operations for the patients with manifest ascites of MBO are risky and rarely effectively improve oral intake, but this is not considered to be a contraindication for surgical management. Informed consent is therefore important in the surgical management of MBO.

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**KEY WORDS:** surgical management; malignant bowel obstruction; peritonitis carcinomatosis; recurrent gastrointestinal carcinoma

### INTRODUCTION

A malignant bowel obstruction (MBO) is a common clinical complication in patients with recurrent gastrointestinal carcinoma, such as colorectal, stomach, bile duct, and pancreatic carcinomas. Patients who present with an intestinal obstruction with recurrent carcinoma, such as peritonitis carcinomatosis or local recurrence, of gastrointestinal carcinoma postoperative have a poor prognosis with only a limited life expectancy. Conservative treatments including decompression with a short gastric or long intestinal tube show some success but are rarely effective in most of these patients with MBO [1].

Surgical management is necessary to improve the quality of life in these patients. Many of the patients have poor performance status and their general condition might deteriorate with an operation. It is often difficult to consider surgical management, because it might lead to significant morbidity and mortality.

The current study reviewed the clinical course of 70 patients who underwent surgery for a MBO with a recurrence of gastrointestinal carcinoma postoperative and considered the effectiveness of surgical management for a MBO.

### PATIENTS AND METHODS

From January 1990 to December 2007, 177 postoperative gastrointestinal carcinoma patients were treated surgically for an intestinal obstruction, at the Department of Gastroenterological Surgery, Saitama Cancer Center. The surgical findings showed intestinal obstruction caused by recurrent carcinoma (MBO) in 70 patients with peritonitis carcinomatosis or local recurrence. On the other hand, no recurrence was visible in 107 patients. The primary sites of the malignancy in the patients with an intestinal obstruction were the stomach in 105 patients, colon in 28, rectum in 29, and others in 15 (Table I). The patients who underwent an operation due to an early complication after the initial

operation were excluded. In addition, the patients with an intestinal obstruction due to recurrent gynecological carcinoma such as ovarian carcinoma were excluded in this study, because the clinical courses of the patients were variable and depended on their sensitivity to chemotherapeutic agents, even if the patients had malignant ascites [2,3].

The 70 patients with MBO were classified into three groups as follows: (A) patients who did not have manifest ascites with peritonitis carcinomatosis, (B) patients who had ascites with peritonitis carcinomatosis, (C) patients who had local recurrence without peritonitis carcinomatosis. The intestinal obstructions with recurrent stomach carcinoma were caused by peritonitis carcinomatosis in 31 of 35 patients (88.6%), on the other hand, 15 of 26 (57.7%) in recurrent colorectal carcinoma (Table II).

The surgical procedures included 15 resections, 26 bypass operations, 27 enterostomies (10 gastrostomies or jejunostomies, 17 colostomies), and 2 exploratory laparotomies (Table III). A resection, a bypass operation, and a colostomy were performed to improve the intestinal obstruction and possibly enable oral intake of solid meals. On the other hand, gastrostomy and jejunostomy were often done only for decompression. After the operation, these patients could remove the short gastric tube and take liquid diet. However, the patients often required the support of somatostatin analog (Octreotide) and parenteral nutrition for oral intake without symptoms caused by the intestinal obstruction, such as colicky pain, and nausea [4].

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**TABLE I. Primary Site of the Gastrointestinal Malignancy in the Patients Treated Surgically for an Intestinal Obstruction (January 1990 to December 2007, Saitama Cancer Center)**

Primary site	Recurrence (-)	Recurrence (+)	Total
Stomach	70	35	105
Colon	12	16	28
Rectum	19	10	29
Others	6 <sup>a</sup>	9 <sup>b</sup>	15
Total	107	70	177

<sup>a</sup>Esophagus 3, bile duct 1, liver 1, and small intestine 1.

<sup>b</sup>Pancreas 4, bile duct 3, and esophagus 2.

The clinical courses of 70 patients with a MBO were retrospectively reviewed to evaluate the efficacy of the surgical management for a MBO with recurrent gastrointestinal carcinoma.

The survival rate and oral intake period were evaluated using the Kaplan-Meier method and the statistical testing was based on the log-rank test. The statistical test for the average of diagnostic time was based on Student's *t*-test. The significance of differences was assumed at *P*-values of 0.05 or less.

## RESULTS

The intestinal obstruction occurred within 3 years in 141 of 177 patients (79.7%) after the initial operation for primary carcinoma (Table IV). Twelve patients underwent surgery for intestinal obstruction more than 5 years after the initial operation. Recurrence was recognized in 4 out of the 12 patients (33.3%). The primary carcinomas were curatively removed at the initial operation in these four patients. The intestinal obstruction occurred during chemotherapy for local recurrence of rectal carcinoma in three of four patients. The other patient received a diagnosis of recurrence with peritonitis carcinomatosa of stomach carcinoma based on the surgical findings.

A recurrence could not be diagnosed preoperatively in 14 of 70 patients (20.0%) who underwent operations for a MBO (Table V). Preoperative diagnosis of the recurrence influenced the timing of the operation. The operations were performed at  $5.8 \pm 0.5$  days (mean  $\pm$  SE) after the onset of the obstruction in the patients without a recurrence, which excluded the patients who underwent emergency surgery for strangulation or incarceration. If there was no preoperative diagnosis of recurrence, the operations were performed in  $6.1 \pm 0.8$  days after the onset of the obstruction even in the patients with recurrence. When a diagnosis of a recurrence was done preoperatively including the patients with visible peritoneal dissemination or positive cytology of carcinoma at the initial operation, the

**TABLE II. Classification of the Patients Who Underwent the Operations for an Intestinal Obstruction With Recurrent Gastrointestinal Carcinoma**

	Group A		Group B		Group C		Total
	Peritonitis carcinomatosa						
	Ascites (-)	Ascites (+)	Local recurrence				
Stomach	22	9	4			35	
Colon	8	3	5			16	
Rectum	3	1	6			10	
Pancreas	2	1	1			4	
Bile duct	1	1	2			4	
Esophagus	0	0	1			1	
Total	36	15	19			70	

**TABLE III. Surgical Procedures for Malignant Intestinal Obstruction With Recurrent Gastrointestinal Carcinoma**

Operative procedures	Group A	Group B	Group C	Total
Resection				15
Massive resection	4	0	0	
Partial resection	6	1	4	
Bypass operation				26
Jejunum-jejunum, colon-colon	10	6	10	
Enterostomy				27
Gastrostomy, jejunostomy	4	4	2	
Colostomy	11	3	3	
Exploratory laparotomy	1	1	0	2
Total	36	15	19	70

decision for surgical management was difficult and required  $15.7 \pm 1.6$  days after the onset of the obstruction, which was statistically longer than the duration until surgery in the patients without a preoperative diagnosis of recurrence ( $P = 0.0044$ ). More than 1 month was needed in 7 of 56 patients (12.5%) with preoperative diagnosis of recurrences.

The 1 year survival rate and median survival time (MST) in the patients in group A, evaluated by Kaplan-Meier, were 33.3% and 228 days, which was statistically longer than those (6.7% and 46 days) in the patients in group B ( $P = 0.026$ ; Fig. 1). Thirty-two of 36 patients (88.9%) in group A could leave the hospital and thereafter receive home care. In contrast, 11 of 15 patients (73.3%) in group B could not go home after the operation.

Complications included five intestinal fistulas and one postoperative bleeding in group A, two intestinal fistulas and one pneumonia in group B, three intestinal fistulas and two wound infections in group C. Surgical deaths and deaths in 2 months were 1 (2.7%) and 4 (11.1%) in group A, 4 (26.7%) and 8 (53.3%) in group B, 0 and 3 (15.8%) in group C, respectively.

Chemotherapy was administered to 31 of 70 patients (44.3%) after the operation, including 20 of 36 patients (55.5%) in group A, 3 (20.0%) in group B, and 8 (42.1%) in group C. Five patients received radiotherapy in group C. Methotrexate combined with 5-fluorouracil was administered to 12 patients, S-1 to 4 patients, 5-fluorouracil alone to 2 patients, 5-fluorouracil plus levofolinate calcium to 3 patients, 5-fluorouracil plus cisplatin to 3 patients, paclitaxel plus cisplatin to 2 patients, irinotecan alone to 2 patients, and others to 3 patients (FOLFOX, doxorubicin, unknown by each).

The percentage patients with possible oral intake of solid meals for 6 months were 45.4% in patients in group A and 28.0% in patients in group C (Fig. 2). The median oral intake period was 161 days in group

**TABLE IV. The Time of Occurrence of the Intestinal Obstruction After the Initial Operation for Primary Carcinoma**

	<0.5 year	~1 year	~3 years	~5 years	>5 years	Total
Presence of recurrence at operation						
Recurrence (-)	28	25	35	11	8	107
Recurrence (+)	8	12	33	13	4	70
	53 (75.7%)					
Initial operation of recurrent carcinoma						
Curative resection	1	4	28	10	4	47
Non-curative resection	7	8	5	3		23
	20 (87.0%)					

TABLE V. Preoperative Diagnosis for Recurrent Gastrointestinal Carcinoma During Surgery for a Malignant Intestinal Obstruction

	Preoperative diagnosis		Dissemination (+) at the initial operation	Total
	Recurrence (-)	Recurrence (+)		
Peritonitis carcinomatosa				
Group A				
Ascites (-)	11	9	16	36
Group B				
Ascites (+)	0	8	7	15
Local recurrence				
Group C	3	16	0	19
Total	14 (20.0%)	33	23	70

A and 93 days in group C, which was 70.6% and 56.4% of the MST. Three patients could not re-start solid meals (8.3%) in group A and two (10.5%) in group C. Surgery could provide a satisfactory result in groups A and C. In contrast, 10 of 15 patients (66.7%) in group B could not take solid meals for more than 1 month, and 5 patients (33.3%) could not take solid meals at all, including 3 patients who underwent a bypass operation. The median oral intake period was 8 days which was only 17.4% of the MST (46 days) in group B.

Does this indicate that an operation was a contraindication for the patients in group B? Four patients in group B could take solid meals more than 1 month after the operation (Table VI). Oral intake could be resumed even in a patient in group B with a few burdens, such as a colostomy or bypass operation. The life expectancy in the patients in group B was about 1.5 months, and there were only six patients (40.0%) who could take a solid meal for more than 2 weeks.

Five patients in group A underwent a massive resection of the small intestine or colon (Table VII). The periods of possible oral intake and home care were very short after a massive resection of intestine in addition to carcinoma dissemination.

There were seven patients who underwent two operations for recurrent MBO (Table VIII). Six patients could take solid meals for 46.9%, 45.9%, 97.3%, 64.6%, 87.8%, and 57.1% of the duration of life, respectively. Patient 15 could not go home after the operation because he underwent surgery during the early 1990s and no instructions for at-home intravenous hyperalimentation were provided. He could not take solid meals at all. However, the short tube could be removed after the operation.

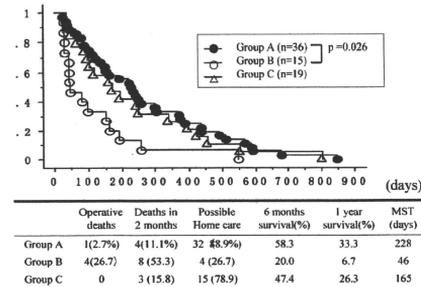


Fig. 1. The survival rate was evaluated by the Kaplan-Meier method, and the log-rank test was used for the statistical analysis.

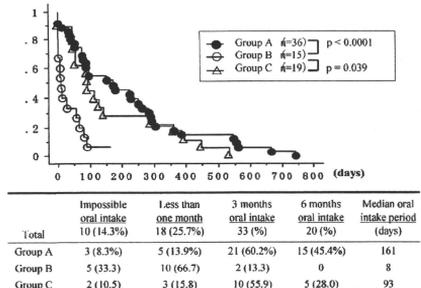


Fig. 2. The rate of the patients with possible oral intake of solid meals was evaluated by the Kaplan-Meier method.

## DISCUSSION

Recently, more palliative surgeries are performed for patients with recurrent gastrointestinal carcinoma including operations for MBO. The number of surgeries has increased even among patients demonstrating a MBO with a poor performance status if the patient hoped to receive oral intake again, because cancer notification increased in the past decade in Japan. However, it is often difficult to accurately diagnose MBO and decide whether or not surgery is appropriate.

The recurrence of carcinoma could not be diagnosed preoperatively in 14 out of 70 patients with a MBO. Thirteen of 14 patients developed intestinal obstruction within 3 years after the initial operation. One patient in group A had an MBO due to peritonitis carcinomatosa with a small amount of ascites 5 years and 6 months after a distal gastrectomy for stomach carcinoma with invasion to the greater omentum and lymph node metastases. His recurrent carcinoma was diagnosed during the laparotomy for an intestinal obstruction. About 80% of the patients developed an intestinal obstruction within 3 years after the initial operation for primary carcinoma, but recurrence must always be considered when treating a patient with an intestinal obstruction even after more than 5 years, especially in the patients who underwent curative operations.

The possibilities of making a preoperative diagnosis of a recurrence influence the timing and decision-making for surgical management [5]. A preoperative diagnosis of recurrence extended the time required to determine the need for an operation and required  $15.7 \pm 1.6$  days after onset, which was statistically longer than the duration until surgery in the patients without a preoperative diagnosis of recurrence ( $6.1 \pm 0.8$  days).

The management of patients with a MBO is one of the greatest challenges for physicians who treat cancer patients. Whereas surgery remains the treatment of choice for a MBO and should be considered in all cases, absolute contraindications for surgery were found in the patients with advanced stages of carcinoma, such as diffuse peritonitis carcinomatosa demonstrated in a previous operation, diffuse intraabdominal tumors or multiple palpable masses, poor nutritional status, poor general performance status, a large amount of ascites, and the refusal of the patients to surgery [6,7]. A palpable mass,  $>3$  L ascites, multiple sites of small bowel obstruction, preoperative weight loss  $>9$  kg, or non-colorectal carcinoma might be associated with inferior palliation outcome after surgery [3,8]. There was no difference in the efficacy of the operation for a MBO between colorectal and non-colorectal carcinoma in current series.

TABLE VI. Four Patients Who Could Take Solid Meals for More Than 1 Month in Group B

	Primary site	Ascites (ml)	Operation	Oral intake (days)	Home care (days)	Survival time
1	Rectum	1,700	Ileo-ileo bypass jejunostomy	57	0	82
2	Bile duct	>1,000	Ileocecal resection	66	0	260
3	Stomach	>1,000	Sigmoid colectomy	91	61	152
4	Stomach	1,000	Jejunio-jejunio bypass cecostomy	163	117	192

The patient in group B who had manifest ascites with peritonitis carcinomatosa had a very short life expectancy. The rate of surgical deaths, 6 months survival rate, and MST were 26.7%, 20.0%, and 46 days, respectively. Seven out of 15 patients (66.7%) in group B could take solid meals for less than 1 month even after surgery, including 5 patients who could not re-start solid meals at all. An operation with a few burdens should be selected for the patients with short life expectancy. More than 2 months of life expectancy is one of the criteria for a laparotomy for a MBO [1,9]. Palliative operations for the patients with manifest ascites of MBO are risky and rarely effective for possible oral intake, but this is not a contraindication because four patients could take solid meals more than 1 month (Table VI). Surgery is required if patients hope to take solid or liquid meals again even if the surgery is considered to pose a high risk. Informed consent is therefore important, especially in these patients.

The palliation of the symptoms and improvement in the quality of life are the foremost consideration in the management of a MBO. Although the improvement in the quality of life after surgery for a MBO is variable (42–85%), no consistent parameter has been used to determine this clinical outcome [1,2]. The evaluation of the efficacy of management of MBO includes the ability to tolerate solid food, the ability to tolerate oral feeding at discharge, a restoration of the bowel function, the ability to return home, the ability to live without a recurrent obstruction, and a survival for more than 60 days [2]. They also include survival time and procedure-related morbidity and mortality. The rate of the patients with a possible oral intake of solid meals for 6 months and median oral intake period were 45.4% and 161 days in group A and 28.0% and 93 days in group C. Thirty-two of 36 patients (88.9%) in group A and 15 of 19 (78.9%) in group C could leave the hospital and receive home care, which were satisfactory results.

Surgical mortality is frequent (5–32%) and often related to the progression of the neoplasm [2,10,11]. The median postoperative survival for surgically treated patients with a MBO is only 2–5 months [10,12]. The 30-day operative mortality rate is 16% and an in-hospital mortality is 22%. Surgical intervention must be carefully weighed for patients with known intraabdominal recurrence of disease, in light of the limited survival, prolonged hospitalization, high morbidity and mortality, and potential failure to resolve the obstruction.

Morbidity is also common (42%), and a re-obstruction after surgery may be quite high (10–50%). The survival time of the patients with re-obstruction is very short and the chance of successful surgical relief of the MBO is markedly diminished [5]. No decompression is possible in 21%, while 6% of the patients develop enterocutaneous fistula. There were 10 intestinal fistulas (14.3%) and 2 wound infections in current series. The number of surgical deaths and deaths in 2 months were

5 (7.1%) and 15 (21.4%), respectively. Closed-loop syndrome with diarrhea, steatorrhea, anuria, body weight loss, pain, vitamin, and mineral deficiency is also common complications after palliative surgery for MBO [13].

GI symptoms such as nausea and vomiting, colicky pain are often controlled by a short nasogastric tube or long intestinal tube. These tubes cause great distress to the patients because of discomfort and morbidity caused by nasal irritation, erosion, and pain. The percutaneous endoscopic gastrostomy catheter (PEG) cannot be inserted into patients with an intestinal obstruction for recurrent stomach carcinoma after a gastrectomy [2,14].

Pharmacologic managements for gastrointestinal symptoms in the patients with inoperable or recurrent MBO have been studied and their efficacy has been confirmed. Octreotide, a synthetic analog of somatostatin, is administered to manage the symptoms of bowel obstruction and inhibits the release of several gastrointestinal hormones, thereby modulating gastrointestinal functions by reducing gastric and intestinal secretions, slowing down intestinal motility, decreasing bile flow, and increasing the absorption of water and electrolytes thereby reducing bowel distension and vomiting [4,15]. A randomized controlled study, comparing Octreotide with hycosamine, scopolamine butylbromide, and opioid demonstrated a statistically significant improvement in nausea, vomiting, and anorexia in the Octreotide group [16].

Chemotherapies have been developed for a recurrence of gastrointestinal carcinoma; however, the effect of chemotherapy for peritonitis carcinomatosa and local recurrence is still controversial. Intraperitoneal chemotherapy and aggressive surgery including an omentectomy and peritonectomy is used in an attempt to prolong the beneficial effects of treatment for patients with an obstructing cancer (MBO) [17]. Regardless of the aggressive surgery, which took more than 10 hr of surgery, with about 1,500 ml blood loss, and a high rate of postoperative morbidity (55%) and mortality (7%), the survival benefit was controversial for recurrent colorectal carcinoma. Improvement of the survival time and quality of life by intraperitoneal chemotherapy was recognized only in mucinous adenocarcinoma of either appendicular or ovarian carcinoma even after additional aggressive surgery [17].

Systemic chemotherapy has been widely adopted for the patients with peritonitis carcinomatosa. Based on a randomized phase III trial, S-1 plus cisplatin became the standard first-line chemotherapies for advanced or recurrent gastric cancer [18]. However, it is difficult to use S-1 for the patients with a MBO with gastrointestinal symptoms and poor performance status. Methotrexate plus 5-fluorouracil regimen is useful for the patients with MBO who cannot take solid food satisfactorily and have gastrointestinal symptoms [19]. However, there

TABLE VII. Effect of a Massive Resection of the Small Intestine or Colon for the Patients in Group A

	Primary site	Initial operation	Dissemination at initial operation	Resection	Oral intake	Home care	Survival time
5	Stomach	Distal gastrectomy	(–)	Small intestine	32	20	101
6	Stomach	Total gastrectomy	(+)	Colon	51	13	111
7	Sigmoid colon	Colectomy	(+)	Small intestine	(–)	(–)	38
8	Descending colon	Colectomy	(+)	Colon	554	537	589
9	Ascending colon	Colectomy	(+)	Rectum	(–)	(–)	43

TABLE VIII. Characteristics of the Patients Who Underwent Two Times Operations for Recurrent Malignant Intestinal Obstruction

	Primary site	Group	First operation	Second operation	Oral intake (days)	Home care (days)	Survival time (days)
10	Rectum	A	J-J, I-I, I-A/C bypass	Gastro-jejunostomy	75 <sup>b</sup> (46.9%)	57	160
11	Stomach	A	Massive resection of colon	Tube-jejunostomy	51 (45.9%)	13	111
12	Stomach	A	Partial resection of jejunum	Ileo-sigmoidostomy	250 (97.3%)	87	257
13	Stomach	A	Descending colostomy	Transverse colostomy	283 (64.6%)	247	438
14	Cecum	A	Transverse colostomy	I-I, I-T/C bypass*	743 (87.8%)	649	846
15	Stomach	B	Ileum bypass	Tube-jejunostomy	0	0 <sup>c</sup>	546
16	Pancreas	C	Jejunum bypass	Duodeno-jejunostomy	112 (57.1%)	96	196

\*Patient 14 underwent a resection of three parts of the small intestine as the third operation.

<sup>b</sup>The value in parenthesis indicate the ratio of the oral intake period to survival time.

<sup>c</sup>Patient 15 could not go home after the operation because he underwent surgery during the early 1990's, and no instructions for at-home intravenous hyperalimentation were provided. The short tube could be removed after the operation.

are possible side effects in patients with ascites, because a high concentration of methotrexate may remain in ascites and cause severe toxicity for the patients. The methotrexate plus 5-fluorouracil regimen was commonly used for the patients with MBO in this study, including six stomach, two colorectal, and one biliary cancer in group A, one stomach cancer in group B, and two stomach cancer in group C, without any severe side effect.

A weekly paclitaxel regimen is used for the patients with peritonitis carcinomatosa as the second-line chemotherapy, because paclitaxel appears to be non-cross resistant to other anti-cancer agents [20]. Paclitaxel can be highly detected in ascitic and pleural fluids after intravenous administration, and it has been shown to effectively decrease ascites or pleural effusion [21]. Gemcitabine is a standard anti-cancer agent for advanced or recurrent pancreatic and biliary carcinoma [22]. Oxaliplatin, plus 5-fluorouracil, and leucovorin (FOLFOX) is also a standard for advanced or recurrent colorectal carcinoma; however, patients with MBO and a poor performance status are not candidates for treatment by these agents [23].

Unfortunately, a complete MBO does not improve after palliative non-surgical treatment, and an operation seems to remain the only possible therapeutic option if the patients desire to take solid food again. In this context, postoperative palliation effects and morbidities become important parameters for therapeutic decision-making. Many of the patients with a MBO have a poor performance status and their general condition might deteriorate due to an operation. Informed consent and appropriate mental care are important in the surgical management of the patients with MBO.

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