CANCER OF THE SIGMOID COLON
The Influence of the No-touch Isolation Technic on Survival

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In 1913, Tyzzer[1] investigating sarcoma of the breast in mice, suggested that surgeons should consider cancers of the breast explosive and handle them accordingly. Tyzzer worked with a spontaneously arising sarcoma in Japanese waltzing mice transplanting these skin tumors to the breast area of the mice. In an excellent controlled study, he manipulated these sarcomas (that metastasized only through the veins) and came to the conclusion that manipulation of the tumor hastened the production of distant metastases.

In 1952, Peyton Barnes[2] described a special technic for resection of the right side of the colon for cancer wherein the lymphovascular pedicles supplying the right side of the colon were ligated and divided before the cancer-bearing segment was removed. He called this technic, physiologic resection of the right colon. Barnes was of the opinion that cancers of the colon were unnecessarily manipulated while they were being removed and he suggested that this hastened the patient's death by the production of liver metastases.

In 1955, Fisher and I published the results of special studies on the demonstration and significance of tumor cells in the mesenteric venous blood in patients with colorectal carcinoma.[3] In this preliminary report, we found cancer cells in the portal venous blood in 8 of 25 resected segments. In later unpublished work, we found that the chance of finding malignant cells in the portal venous blood during the resection of colonic carcinoma was reduced from 33 to 10 percent by ligating the lymphovascular bundles and by dividing th emesentery and the intestine before manipulating the primary cancer.[4]

In have noted during the last 20 years that patients operated upon for cancer of the colon who had liver metastases at the time of surgery had metastases of different sizes in one or both lobes indicating that these tumors, which had a common growth rate, gained access to the liver at different periods in the life of the cancer. This is in contrast to patients who had a manipulative resection for cancer of the colon in whom no liver metastases were discovered at the time of surgery, but two or three years later had an enlarging liver that, when viewed at laparotomy, contained metastases of the miliary variety suggesting that these deposits were initiated at the time of the original resection.

In 1954, Cole, Packard, and Southwick,[5] reported finding cancer cells in the blood of a perfused resected cancer-bearing segment of human colon. This observation gave rise to Cole's further work in this field and his suggestion that the mesenteric vein should be ligated before significant operative manipulation was undertaken. Where Doctor Cole was concerned with preliminary venous ligation, we began to realize at this time that to ligate the trunk veins leading away from a cancer would allow the arteries to perfuse and fill the cancer-bearing segment which might allow the escape of cancer cells

more readily to the liver. I decide initially that the entire lymphovascular pedicle (artery, vein, and lymphatics) should be ligated and, indeed, the colon should be divided at the elected sites of resection and the mesentery divided before turning our attention to the cancer-bearing segment. I believe that total isolation of the cancer-bearing segment should be performed. In addition, in the mid 1950's, I began to inject a substance into the lumen of the bowel (40 percent ethyl alcohol) that would be harmless and yet destroy any free cancer cells, so that implantation at the anastomosis would not occur.

Because of our studies,[8] I devised a technic of colon cancer resection in late 1953 wherein the cancer-bearing segment was not manipulated or handled until the lymphovascular pedicles were divided and ligated, and the colon was divided at the elected sites of resection. To emphasize this technic, Doctor Frank L. Weakley of our Staff in Colon and Rectal Surgery, gave the name "no-touch isolation" to the method. This technic of resection has been applied to every cancer of the colon operated upon by our Staff in Colon and Rectal Surgery from late 1953 to the present time.

I have previously reported my experience with the no-touch isolation technic utilizing lifetables that were not corrected for age[6] and then again correcting for age,[7] and pointing out that the survival rates in patients having the isolation technic had doubled the reported survival rates for Class C cancers. I believe that the increased survival rates in Class C cancers is due to the avoidance of the manipulation of cancers that have already spread to the local lymphatics.[6,11] In contradistinction to this, the A cancers (confined to the bowel wall) do not spread by manipulation. In unpublished data, we found that the survival rates of patients with A cancers was about the same as in those patients having a conventional resection of the colon.

In September 1967, I reported[6] 460 patients with cancer of the colon having operation for cure, that is, Class A, B, and C cancers. I excluded Class D cancers that were incurable. The five-year survival was 81.8 percent. I excluded cancers of the rectum in this report, because it was necessary to manipulate them when they were removed.

PATHOLOGY

Adenocarcinoma of the sigmoid colon was divided into four clinicopathologic stages:[6]

Stage A—tumor confined to the colon and its coats.

Stage B—tumor extension into pericolic fat.

Stage C—tumor metastasis to one or more mesenteric lymph nodes, but no evidence of distant spread.

Stage D—tumor metastasis to liver, lung, bone, peritoneal seeding of tumor, irremovable, because of parietal invasion; adjacent organ invasion.

Histologic grading was not included in our original report[6] and will not be included in this one because most of the cancers were Grade III of the poorly differentiated type.

CALCULATION OF SURVIVAL RATES

Survival rates are calculated by the actuarial method and lifetables are prepared to show survival rates with and without correction for age. The standard deviation is recorded. The computer results for this study and for our original studies were completed by Doctor Frank R. Watson,

Chief Research Statistician, Ellis-Fischel State Cancer Hospital and Cancer Research Center; University of Missouri, Columbia, Missouri, and Doctor John Spratt, Chief Surgeon, Ellis-Fischel State Cancer Hospital, Columbia, Missouri. This report is based on our former analysis[6] of the results of surgical treatment of 896 patients with cancer of the colon treated at the Cleveland Clinic Hospital between 1950 and 1964.

The 317 patients with cancer of the sigmoid colon reported herein, were operated upon utilizing the no-touch isolation technic. There was a 100 percent resection rate for Stage A, B, and C cancers, while the 99 patients with Stage D cancers had palliative procedure in one half of the cases or nothing at all was done since these tumors were considered hopeless at the start. The computer statistics in this series were corrected for age against the lifetables for Ohio white males.[8]

MECHANICAL AND ANTIBIOTIC PREPARATION OF THE COLON

If the patient with sigmoid cancer is obstructed to any degree at all so that there is fecal retention or gas in the colon, a proximal skin-level transverse loop colostomy[9] is performed as a first-stage procedure. The patient is allowed to decompress over a period of two weeks and then the operative procedures as designated here are performed.

A modified Condon-Nichols preparation[10] with antibiotics is used in every case. For two days prior to surgery, the patient eats a liquid, high-caloric, nonresidue diet. A dose of 30 cc of Neoloid (a) is given every morning at 7 a.m., preoperatively. Enemas of 1,000 cc are given three times a day prior to operation. At 1 p.m., 2 p.m., and at 11 p.m., the day prior to surgery, the patient is given 1 gram each of neomycin sulfate (b) and erythromycin base (c). Intravenous fluids are started at bedtime and continued until surgery.

The morning of surgery, under anesthesia, a catheter is introduced into the bladder. Forty milligrams of furosemide (d) are given intravenously. A No. 35 Pezzar catheter is inserted into the rectum and normal saline is infused into the left colon and recovered alternately until the left colon is clear or nearly clear of residual feces. The skin is prepared with povidone-iodine (e) utilizing a flagellating motion of the hand rather than deep palpation of any kind. It is our wish not to disturb the cancer.

THE NO-TOUCH ISOLATION TECHNIC OF RESECTION OF THE SIGMOID COLON

With the surgeon standing on the left side of the patient, the abdomen is opened through a long, midline incision extending from the pubis through the umbilicus to the midepigastrium or higher depending on the obesity of the patient. A long incision is necessary to remove the cancer-bearing segment without manipulation. The liver is explored for secondary deposits and the aorta is similarly explored beginning at the ligament of Treitz and extending down to the bifurcation looking for enlarged lymph nodes. Finally, the pelvis and sigmoid portion of the colon are examined by visualizing the cancer, but not by palpation. No member of the operating team palpates the lesion. Tubes and

(a) Lederle Laboratories.
(b) Eli Lilly and Company.
(c) E-Mycin; The Upjohn Company.
(d) Lasix; Hoechst-Roussel Pharmaceuticals, Inc.
(e) Betadine; The Purdue Frederick Company.

ovaries are examined to be sure that they are not involved directly. In the male, the bladder is inspected to be sure that it is not involved. If these organs are attached to the cancer, they will be taken in part or totally with the cancer-bearing segment of the colon after isolation technic has been performed both distal to the tumor and proximal to it.

A retroperitoneal approach to the inferior mesenteric and the left colic vessels is performed first (Fig. A). The upper sigmoid colon is freed from the left gutter and then with further retroperitoneal dissection, the sigmoid mesentery is separated from the fascia overlying the left kidney over to the infraduodenal space pushing posteriorly in turn the spermatic or ovarian vessels and the ureter which is left in its bed. The sympathetic nerves running on either side of the aorta and over the front of the aorta are left posteriorly to the plane of dissection. This retroperitoneal approach will locate the inferior mesenteric artery and left colic artery (Fig. 1) immediately below the third portion of the duodenum. The peritoneum is opened just to the right of the midline in this position and the surgeon's

Fig. A. Represents the blood supply of the entire sigmoid colon and the ligation and division points of the inferior mesenteric artery, the left colic artery, and the marginal artery. This is the pattern of the vessels and the sites of ligation for every resection for cancer of the sigmoid colon.

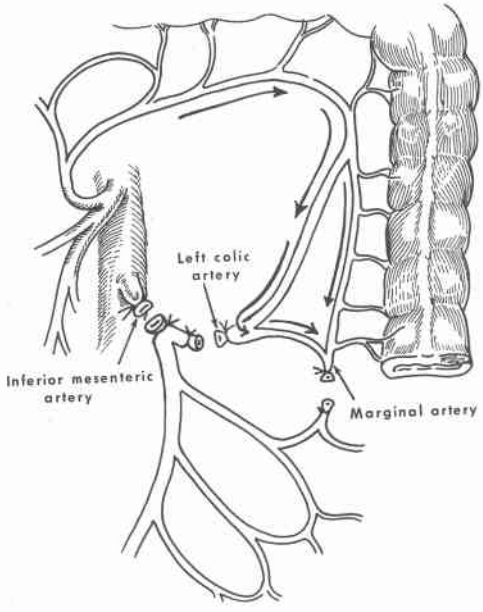
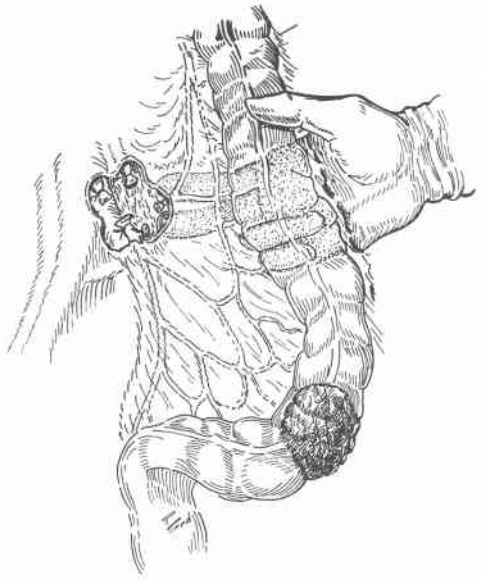


Fig. 1. The retroperitoneal aproach to the inferior mesenteric artery and the left colic artery. The upper sigmoid is freed from the parietes, the spermatic vessels and the ureter.



left hand is removed from the retroperitoneal retrocolic infraduodenal position and is then inserted anteriorly to grasp the inferior mesenteric artery and the left colic artery en masse. The inferior mesenteric artery is isolated, clamped, divided, and ligated at its origin under the third portion of the duodenum. The left colic artery is located immediately to the left of this vessel along with the inferior mesenteric vein. They are ligated and divided. The mesentery and its communicating vessels are

Fig. 2. This diagram shows the elected sites of resection for cancer of the midsigmoid colon. After vascular isolation, the cancer-bearing sigmoid colon is injected with about 800 cc of 40 percent ethyl alcohol. The alcohol passes over the cancer into the rectum where it is collected through a Pezzar catheter. Alcohol will fix malignant cells that have accumulated in the upper rectum during the operative procedure.

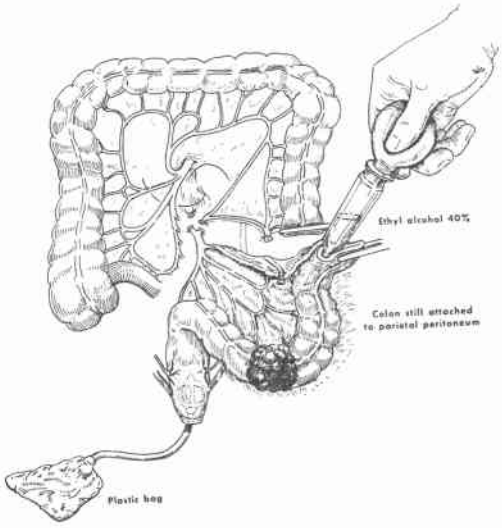
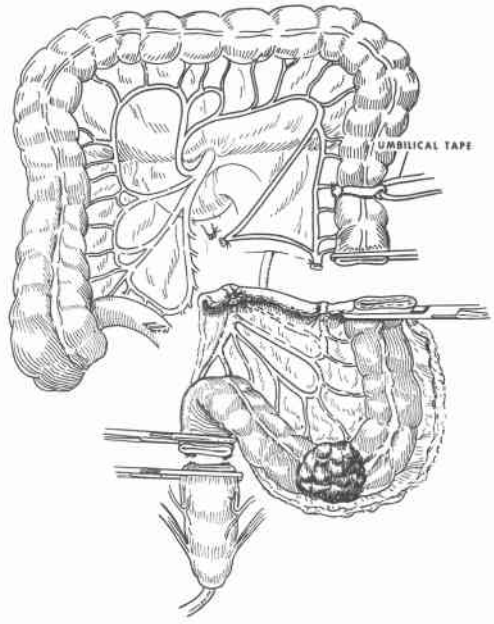


Fig. 3. The isolation technic is complete. The superior rectal arteries have been divided and ligated behind the rectal segment. The ureter is separated from the sigmoid mesentery and from the tumor area by finger dissection, and the tumor-bearing segment in its entirety is removed in a prograde direction taking along any structures that are adherent to the cancer-bearing segment plus a 3 or 4 cm segment of peritoneum in the region of the cancer.



divided in turn out to the junction of the descending and sigmoid colon where the colon is divided between Bainbridge clamps.

On the right side of the midline, the mesentery of the sigmoid colon is divided with scissors down to the rectosigmoid junction (just in front of the promontory of the sacrum). The superior rectal vessels are divided on the back of the rectum as high or as low as is deemed necessary to be sure that the rectum will be cut across at least two inches or more below the lower border of the cancer.

At this point, the clamp is released on the proximal sigmoid colon (opening the bowel) and the bowel is injected with about 800 cc of 40 percent ethyl alcohol (Fig. 2), the alcohol being collected through the rectum by the Pezzar irrigating catheter that had been left in place during the initial "on the table" left colon lavage. The clamp is reapplied to the proximal end of the sigmoid colon after air has been injected into the lumen of the bowel to clear the rectal segment of alcohol. A Bainbridge clamp is now placed across the rectosigmoid or lower as the case may be, and the distal rectum is cut across (Fig. 3).

At this point, I would like to go into the details of transection of the rectal mesentery. Before

placing the clamp distally, the Rectum is circumcised of its mesentery, cutting the mesentery freely without regard to bleeding; then, the primary vessels are picked up and tied or suture-ligated, rendering the distal rectal segment free of any bleeding from its mesentery. After the alcohol injection previously described the Bainbridge clamp is placed directly across the rectum within 1/2 cm of the ligated vessels. Up until this point there has been no regard for the left ureter except at the upper end of the mobilization. A finger is inserted over the left ureter and it is pushed into its retroperitoneal bed down to the bladder area behind the mesentery of the sigmoid colon and alongside the upper rectal segment to make sure that it is not involved with the cancer. Should the ureter appear to be attached to the cancer, further dissection with the finger will show that it is almost never involved. It will usually separate easily from the sigmoid colon and its mesentery. Now that the sigmoid colon is completely isolated by division and from a vascular bundle standpoint, it is reflected in a prograde direction toward the left side of the patient. The ureter and spermatic vessels are further separated from the mesentery if necessary (or taking along the spermatic vessels if they are involved with the tumor) and finally, taking away with a very generous margin any portion of bladder, uterus, psoas muscle, and 3 or 4 cm of peritoneum lateral to the tumor, until the tumor segment has been removed (Fig. 3). One may have regard only for the ureter in this region which, if involved by direct contact with the cancer, may be ligated at the entrance to the pelvis with silk and resected with the cancer-bearing segment. As mentioned, however, the ureter is hardly ever truly involved and may be separated from the tumor without risk of implantation when done gently with a finger rather than by a gross dissection technic. The left iliac vein and artery are almost never involved with the cancer, unless the tumor is inoperable and incurable.

THE TECHNIC OF COLORECTAL ANASTOMOSIS

Following the resection, the descending colon will now be found to be too short to get down to the rectum for anastomosis. It is not ordinarily necessary to free up the splenic flexure. Instead, the left colon is freed from the left gutter and its mesentery is freed from the left kidney (renal fascia) over to the ligament of Treitz at which point there are no mesenteric attachments in the midline. To separate the mesentery of the descending colon from the left kidney will lengthen the left colon and now it will be found quite mobile and may be pulled down into the pelvis and an anastomosis can be made to the rectum without tension. A Cheatle's slit is performed on the antimesenteric end of the descending colon (Fig. 4) (antimesenteric slit) so that the lumen will match the circumference of the rectal segment. A single layer of interrupted mattress sutures of 4-0 chromic catgut approximates the posterior aspect of the anastomosis (the mesenteric side) to ensure that the mucosa is all within the lumen of the bowel posteriorly (Fig. 5 and 6). The suture line on the mesenteric side is now converted to simple interrupted seromuscular sutures as shown in Fig. 7. A second suture line of interrupted Ethiflex-Lembert (f) sutures will complete the anastomosis (Fig. 8). I would like to call attention to the fact that the mesenteric side of the bowel has interrupted mattress sutures through all layers for 50 percent of the anastomosis and that the anterior side of the bowel has interrupted seromuscular sutures. A second suture line is not necessary on the mesenteric side since through-and-through mattress sutures con-

(f) Ethicon.

Fig. 4

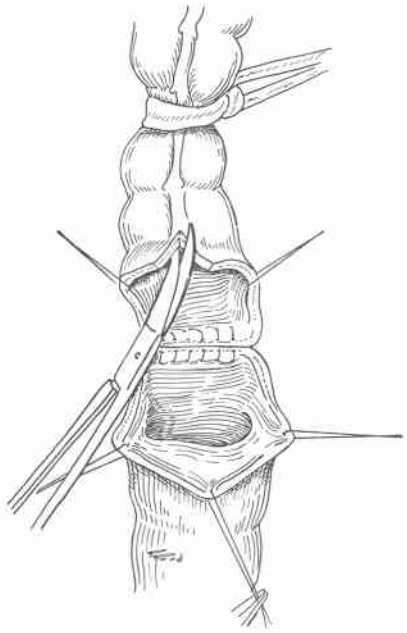


Fig. 5. Demonstrates further placement of mattress sutures on the mesenteric side of the bowel. At least 50 percent of the anastomosis is made with these interrupted mattress sutures before placing sutures on the outside of the antimesenteric side.

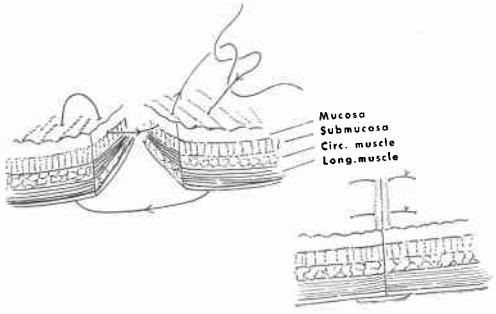


Fig. 6. Placement of the interrupted mattress sutures on the mesenteric side of the anastomosis.

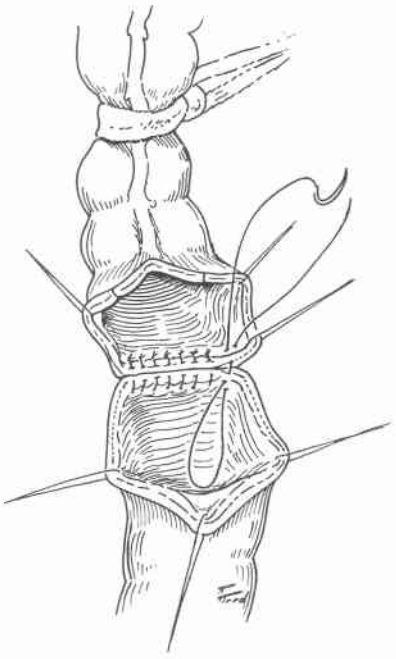


Fig. 7. Simple seromuscular sutures are placed on the anterior wall without picking up the mucosa.

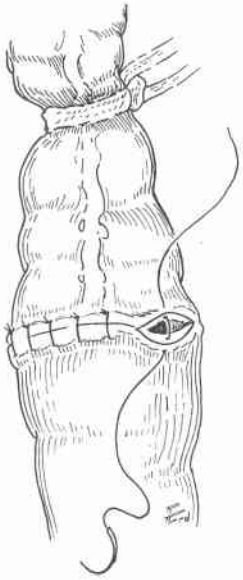


Fig. 8. Interrupted Lembert sutures of 0000 Ethiflex suture represent the second suture layer.

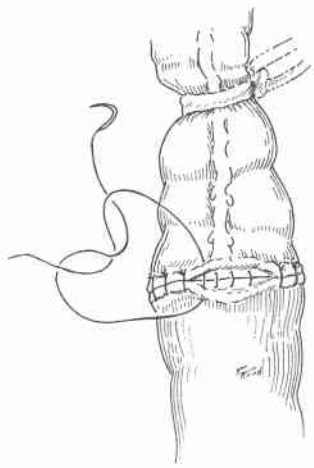
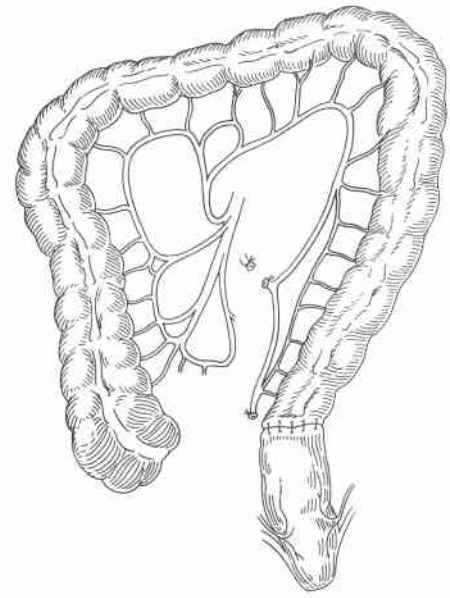


Fig. 9. The vascular arrangement following completion of the anastomosis. Freeing the upper left colon and its mesentery from the left kidney has allowed the colon to be pulled down into the pelvis where the anastomosis is easily made without tension. The blood supply of the proximal side of this anastomosis is directly from the splenic flexure division of the midcolic artery through the left colic artery.



stitute an effective two-layer anastomosis. On the antimesenteric side, however, two layers need to be placed as indicated in Fig. 8.

Fig. 5 and 6 show the details of the mesenteric mattress sutures. These 4-0 interrupted sutures in the posterior wall are placed about 1/2 cm apart.

Further details of the posterior half of the anastomosis are shown in Fig. 6. After the mesenteric side of the anastomosis is complete, seromuscular sutures are placed on the outside of the bowel as shown in Fig. 7 utilizing the same suture material (chromic catgut) and placing the sutures the same distance apart, tying square knots securely and cutting the sutures short.

A second seromuscular layer of interrupted Ethiflex sutures is placed Fig. 8. These sutures invert the entire circumference of the bowel on the antimesenteric border. Posteriorly, only the fat is approximated and if this is difficult, no sutures are placed at all.

In principle, the anastomosis is made between two ends of the intestine that are equal in size; this equality being gained by opening the proximal side of the anastomosis (antimesenteric Cheatle's slit) as shown in Fig. 4. If the rectum is narrow as well, which would be unusual, it also may be slit down the antimesenteric border to open it. By slitting the bowel as indicated, the greatly enlarged lumen can be closed in two layers without compromising the total diameter of the lumen.

The mesentery of the descending colon is attached to the right-sided peritoneum over the aorta

from the ligament of Treitz to the pelvis by sutures so that the small bowel cannot herniate under it. No reconstruction is done on the left side.

VARIATIONS IN TECHNIC

If the cancer of the sigmoid colon is located midsigmoid or higher, it will only be necessary to dissect the rectosigmoid free of the Waldeyer's presacral fascia and transect it at the promontory of the sacrum. There will be no pelvic bleeding if this dissection plane is used. If, however, the cancer is located low in the sigmoid colon and it is necessary to take along the upper half of the rectum, the rectum will be dissected free of Waldeyer's presacral fascia, pulling it forward so that the pelvis posteriorly is open. We have already mentioned that if the dissection is made anteriorly to Waldeyer's fascia, there will be no pelvic bleeding, since this is an avascular space.

CLOSURE OF THE ABDOMINAL WALL

The peritoneum is closed with continuous 00 chromic catgut from the pubis to the arcuate line and then the entire wound is closed with through-and-through 3-0 interrupted vertically placed stainless steel wire sutures. The umbilical skin is reconstructed with mattress sutures of polyethylene tying these sutures to reconstruct the umbilicus. Otherwise, the skin and subcutaneous tissues of the entire wound are left open for ten days and at that time mattress sutures that had been placed in the skin are tied effecting a delayed primary skin closure. We have found that wound abscess can be completely eliminated in colon cancer patients by leaving the skin open for ten days, placing long strips of Furacin (g) soaked gauze in the wound and removing it on the ninth day before closure.

AN ALTERNATE OPERATIVE PROCEDURE WHEN THE CANCER IS LOCATED HIGH IN THE SIGMOID COLON

I would like to describe an alternate operative procedure for cancers located at the junction of the sigmoid and descending colon. While this cancer is technically a sigmoid cancer, all of the sigmoid colon, and the descending colon including the splenic flexure must be removed (Fig. 10). The details of this operative procedure are shown in the accompanying diagram. The reconstruction following left colectomy is shown in Fig. 11. With removal of the left colon and dividing the mesentery through the splenic flexure and taking down the colon from the greater curvature of the stomach, the transverse colon is pulled through a rent in the mesentery as shown located between superior mesenteric artery and the ileocolic artery (Fig. 11) over the underlying duodenum and down into the pelvis to complete the anastomosis with the rectum. This is a superior method of reconstructing the bowel after left colectomy. There is no need to divide the midcolic artery. There is no way for the small intestine to get obstructed by this maneuver and the mesenteric hiatus between the transverse colon and the ascending colon no longer exists.

STATISTICAL ANALYSIS OF 317 PATIENTS WITH CANCER OF THE SIGMOID COLON OPERATED BY THE NO-TOUCH ISOLATION TECHNIC

Three hundred seventeen patients with sigmoid colon cancers were operated on consecutively

(g) Nitrofurazone, 5-nitro-2-furaldehyde semicarbazone, Eaton Laboratories.

Fig. 10. Extent of resection when the cancer is isolated in the upper sigmoid colon.

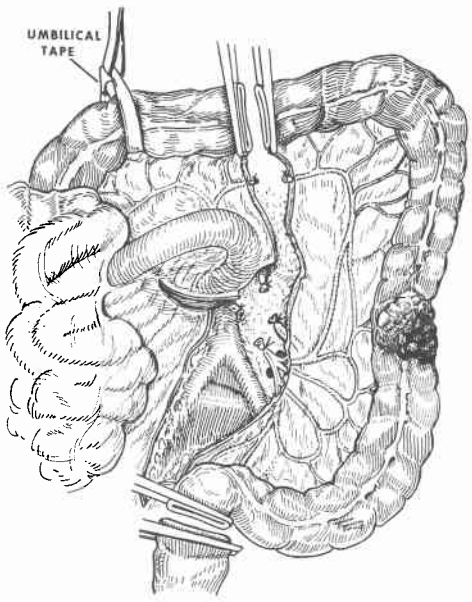
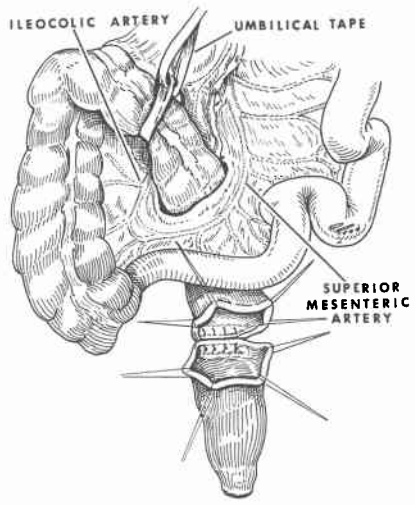


Fig. 11. The anatomic arrangement of the colorectal anastomosis pulling the proximal transverse colon through an aperture in the terminal ileal mesentery between the superior mesenteric artery on the left and ileocolic artery on the right.



during the years 1950—1964. During this same time, a total of 460 patients with Stage A, B, and C cancers were operated on for cancer of all parts of the colon (including sigmoid colon) utilizing the no-touch isolation technic. The age corrected five-year survival was 81.6 percent. During this period, 611 patients with cancer of the rectum were also operated upon, but since the no-touch isolation technic was not applicable, because of the location of the cancer, they will not be considered.

Of the 317 patients with cancer of the sigmoid colon, there were 59 patients who had Class A cancers. There were 63 who had B cancers extending out into the pericolic fat 1/2 cm, there were 30 that extended out into the pericolic fat over 1/2 cm, there were 66 patients who had Class C cancers with lymph nodes involved, and 99 patients were incurable and had class D cancers. A

Fig. 12. Cancer of the Sigmoid Colon No-Touch Isolation Technic of Resection

Stage of Cancer	Number of Cancers	Crude 5-Year Survival	Age Corrected 5-Year Survival	Per cent Stage of Cancer
A	59	79.49	95.66	18.61
B	63*	73.49	88.17	19.87
	30**	66.91	83.67	9.46
C	66	57.32	66.70	20.82
D	99	10.58	12.98	31.23
Total	317	50.53	60.91	

*Extension under 1/2 cm. into fat.
**Extension over 1/2 cm. into fat.

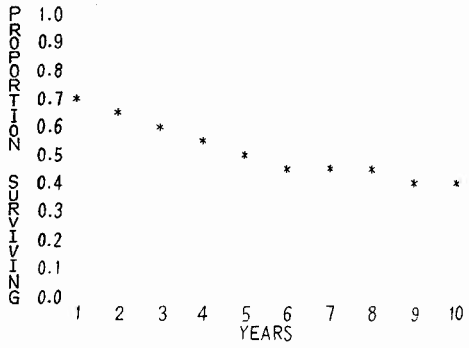
glance at Fig. 12 will show that 18.6 percent of the patients in this group had Class A cancers. Class B were represented by 29 percent of the total. Class C had 20 percent of the total. Class D were the most numerous with 31 percent of the total. It will be evident that the no-touch isolation technic was most worthwhile in 50 percent of the patients in this series having the operation, i.e., there was extension of the cancer outside the bowel wall or into the regional lymphatics. We know from previous experience that Class A tumors have similar survival rates whether they are manipulated or not. We then direct our maximum technical effort toward Class B and C cancers.

Fig. 12 expresses the number of cancers for each Stage of tumor, the five-year survival rate, the age corrected five-year survival rate and the percent Stage of cancer in each category.

Fig. 13 represents the computer print out on 317 cancers of the sigmoid colon operated upon by the no-touch isolation technic consecutively. The figures represent the percent total survival and corrected survival with the standard deviation survival for Stage A, B, C, and D. I point out that even though 1/3 of these patients had incurable Class D cancers, there was still a five-year survival of 50.53 percent, and an age corrected five-year survival of 60.91 percent.

Fig. 13.

Interval	Number	Withdrawn	Dead	QX	Sig (QX)	Percent Tot. Sur.	Std. Dev. Tot. Sur.	Corrected Survival	Std. Dev. Survival	Normal Survival
1	317	13	88	0.283	0.026	71.66	2.56	74.11	2.65	0.97
2	216	10	25	0.118	0.022	63.17	2.76	67.69	2.96	0.93
3	181	10	14	0.080	0.020	58.14	2.85	64.68	3.17	0.90
4	157	10	9	0.059	0.019	54.70	2.90	63.28	3.36	0.86
5	138	14	10	0.076	0.023	50.53	2.97	60.91	3.58	0.83
6	114	12	11	0.102	0.029	45.38	3.04	57.13	3.83	0.79
7	91	10	4	0.047	0.023	43.27	3.08	57.01	4.06	0.76
8	77	13	1	0.014	0.014	42.65	3.10	58.95	4.28	0.72
9	63	13	2	0.035	0.025	41.14	3.17	59.79	4.60	0.69
10	48	10	0	0.000	0.000	41.14	3.17	63.01	4.85	0.65



DR Turnbull (1 19)/1/
and
Location of Lesion-Sigmoid Colon (1 21)/7/
All Stages of Cancer A, B, C, D.
1950—1964

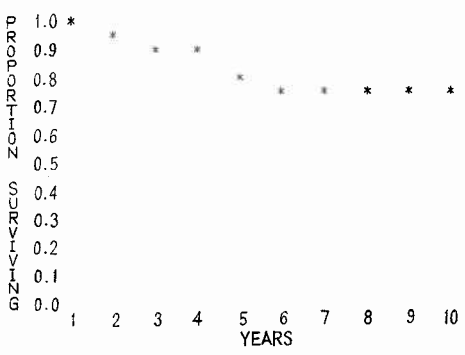
Fig. 14 reveals survival figures, both corrected and uncorrected for age. Stage A cancers are the most curable. Figure 15 represents Stage B cancers that extended less than 1/2 cm out into the pericolic fat and the corrected and uncorrected survival rates are readily seen.

Fig. 16-B represents those Stage B cancers that extended over 1/2 cm into perirectal fat.

The Stage C cancers are represented by Fig. 17. These are cancers that ordinarily have a low

Fig. 14.

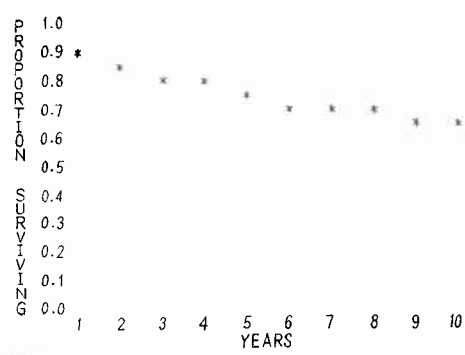
Interval	Number	Withdrawn	Dead	QX	Sig. (QX)	Percent Tot. Sur.	Std. Dev. Tot. Sur.	Corrected Survival	Std. Dev. Survival	Normal Survival
1	59	6	1	0.018	0.018	98.21	1.77	101.46	1.83	0.97
2	52	3	2	0.040	0.027	94.32	3.19	100.87	3.41	0.94
3	47	5	2	0.045	0.031	90.09	4.22	99.96	4.69	0.90
4	40	4	0	0.000	0.000	90.09	4.22	103.97	4.88	0.87
5	36	4	4	0.118	0.055	79.49	6.22	95.66	7.48	0.83
6	28	2	1	0.037	0.036	76.54	6.65	96.30	8.36	0.79
7	25	3	1	0.043	0.042	73.29	7.12	96.65	9.39	0.76
8	21	6	0	0.000	0.000	73.29	7.12	101.59	9.87	0.72
9	15	2	0	0.000	0.000	73.29	7.12	107.08	10.40	0.68
10	13	2	0	0.000	0.000	73.29	7.12	113.18	10.99	0.65



DR Turnbull (1 19)/1/
and
Type of Cancer–A (1 35)/0/
and
Location of Lesion-Sigmoid Colon (1 21)/7/
1950—1964

Fig. 15.

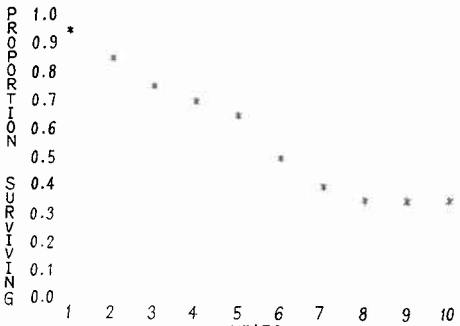
Interval	Number	Withdrawn	Dead	QX	Sig (QX)	Percent Tot. Sur.	Std. Dev. Tot. Sur.	Corrected Survival	Std. Dev. Survival	Normal Survival
1	63	3	5	0.081	0.035	91.87	3.48	94.92	3.60	0.97
2	55	3	3	0.056	0.031	86.72	4.38	92.74	4.68	0.94
3	49	2	3	0.063	0.035	81.30	5.10	90.16	5.66	0.90
4	44	2	2	0.047	0.032	77.52	5.52	89.32	6.36	0.87
5	40	3	2	0.052	0.036	73.49	5.92	88.17	7.11	0.83
6	35	2	1	0.029	0.029	71.33	6.13	89.30	7.68	0.80
7	32	3	1	0.033	0.032	68.99	6.36	90.33	8.33	0.76
8	28	3	0	0.000	0.000	68.99	6.36	94.68	8.73	0.73
9	25	4	2	0.087	0.059	62.99	7.08	90.82	10.21	0.69
10	19	4	0	0.000	0.000	62.99	7.08	95.65	10.75	0.66



DR Turnbull (1 19)/1/
and
Type of Cancer B-Nnder One Half cm.
Ext. Into Fat (1 35)/2/
and
Location of Lesion-Sigmoid Colon (1 21)/7/
1950—1964

Fig. 16-B.

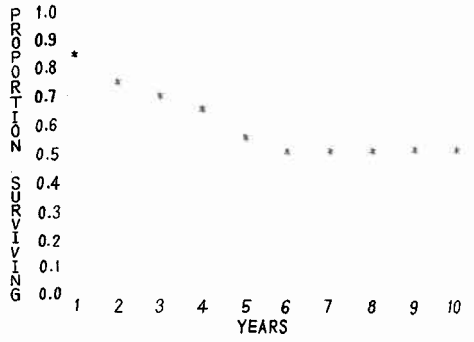
Interval	Number	Withdrawn	Dead	QX	Sig. (QX)	Percent Tot. Sur.	Std. Dev. Tot. Sur.	Corrected Survival	Std. Dev. Survival	Normal Survival
1	30	1	2	0.068	0.046	93.22	4.63	97.10	4.82	0.96
2	27	1	2	0.075	0.051	86.18	6.42	93.69	6.98	0.92
3	24	1	3	0.128	0.069	75.18	8.16	85.47	9.27	0.88
4	20	2	1	0.053	0.051	71.23	8.63	84.84	10.29	0.84
5	17	1	1	0.061	0.059	66.91	9.13	83.67	11.41	0.80
6	15	2	4	0.286	0.121	47.79	10.38	62.87	13.65	0.76
7	9	1	1	0.118	0.111	42.17	10.57	58.46	14.66	0.72
8	7	0	1	0.143	0.132	36.15	10.64	52.93	15.58	0.68
9	6	0	0	0.000	0.000	36.15	10.64	56.02	16.49	0.65
10	6	1	0	0.000	0.000	36.15	10.64	59.41	17.49	0.61



DR Turnbull (1 19)/1/
and
Type of Cancer B-Over One Half cm. Ext. Into Fat (1 35)/1/
and
Location of Lesion-Sigmoid Colon (1 21)/7/
1950—1964

Fig. 17.

Interval	Number	Withdrawn	Dead	QX	Sig (QX)	Percent Tot. Sur.	Std. Dev. Tot. Sur.	Corrected Survival	Std. Dev. Survival	Normal Survival
1	66	1	10	0.153	0.044	84.73	4.44	87.04	4.56	0.97
2	55	3	5	0.093	0.040	76.81	5.25	81.18	5.55	0.95
3	47	2	3	0.065	0.036	71.80	5.65	78.22	6.16	0.92
4	42	2	5	0.122	0.051	63.05	6.17	70.92	6.94	0.89
5	35	4	3	0.091	0.050	57.32	6.44	66.70	7.49	0.86
6	28	4	3	0.115	0.063	50.70	6.73	61.16	8.12	0.83
7	21	3	0	0.000	0.000	50.70	6.73	63.53	8.43	0.80
8	18	4	0	0.000	0.000	50.70	6.73	66.12	8.78	0.77
9	14	7	0	0.000	0.000	50.70	6.73	68.97	9.16	0.74
10	7	1	0	0.000	0.000	50.70	6.73	72.11	9.57	0.70



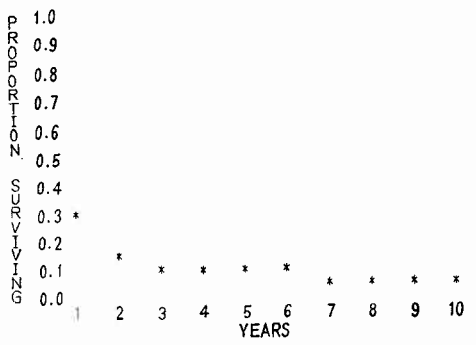
DR Turnbull (1 19)/1/
and
Type of Cancer C (1 35)/3/
and
Location of Lesion-Sigmoid Colon (1 21)/7/
1950—1964

survival rate of 30 to 35 percent. However, it is readily apparent that when the isolation technic was used, the crude survival of 57.3 percent and the corrected survival of 66.7 percent would indicate that the isolation technic was worthwhile.

Table 18 represents the Class D incurable cancers. The rapid death rate in the first three years in these patients indicates liver metastasis as the primary cause of death.

Fig. 18.

Interval	Number	Withdrawn	Dead	QX	Sig (QX)	Percent Tot. Sur.	Std. Dev. Tot. Sur.	Corrected Survival	Std. Dev. Survival	Normal Survival
1	99	2	70	0.714	0.046	28.57	4.56	29.66	4.74	0.96
2	27	0	13	0.481	0.096	14.81	3.63	15.99	3.91	0.93
3	14	0	3	0.214	0.110	11.64	3.28	13.09	3.69	0.89
4	11	0	1	0.091	0.087	10.58	3.15	12.42	3.69	0.85
5	10	2	0	0.000	0.000	10.58	3.15	12.98	3.86	0.82
6	8	2	2	0.286	0.171	7.56	2.88	9.71	3.71	0.78
7	4	0	1	0.250	0.217	5.67	2.71	7.64	3.66	0.74
8	3	0	0	0.000	0.000	5.67	2.71	8.04	3.85	0.71
9	3	0	0	0.000	0.000	5.67	2.71	8.48	4.06	0.67
10	3	2	0	0.000	0.000	5.67	2.71	8.96	4.29	0.63



DR Turnbull (1 19)/1/
and
Type of Cancer D (1 35)/4,8/
and
Location of Lesion-Sigmoid Colon (1 21)/7/
1950—1964

SUMMARY

I have presented 317 patients with cancer of the sigmoid colon giving the reasons experimentally and technically that the no-touch isolation technic gives the best results for five-year survivals and I have discussed the technic employed. I have presented the survival rates with computer analysis tables for close inspection. I believe that these improved results are due to the no-touch isolation method of resection and I feel that with the evidence at hand, the old conventional manipulative resection technic for cancer of the colon should be abandoned in favor of the isolation technic, as described.

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