Loop Transverse Colostomy
The Case Against*

MARTIN J. WINKLER, M.D., PETER A. VOLPE, M.D.

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All large-bowel stomas (198) performed between 1970 and 1980 in a community hospital were reviewed. Twenty-nine stomas were loop transverse colostomies. There were five deaths, a complication rate related to the stoma of 28 per cent, and only 18 patients ever achieved colostomy closure. Our conclusions are as follows: (1) transverse colostomy is a holdover from the past; (2) "temporary" loop colostomy is a misnomer; (3) all colostomies should be end-bearing and matured primarily; (4) blind surgery invites tragedy; (5) loop transverse colostomy is a risky first stage with little benefit; (6) every colostomy should be placed as near as possible to the disease process; and (7) resection of the disease is the ideal first stage. [Key words: Large bowel; Stoma; Colostomy, loop, transverse]

From the Department of General Surgery, St. Mary's Hospital and Medical Center, San Francisco, California

THE MOTIVATION for writing this paper comes from the frequency with which loop transverse colostomy appears at morbidity and mortality conferences and from patients and stomal therapists who note problems with these stomas that surgeons often ignore. Many consider loop transverse colostomy to be a simple and safe procedure that has "stood the test of time." The present series challenges this concept, and although the numbers are small, the conclusions are believed to be important and accurate. No other study is known of that is directed at the difficulties and hazards that transverse loop colostomy contributes to the staged management of colonic disease.

Methods and Results

The results of 29 patients who had transverse loop colostomies for the management of colorectal disease have been studied. The patients were treated between 1970 and 1980 in a 500-bed community hospital. During this period, a total of 198 colonic stomas were created. Indications for loop colostomy and the operative mortality for these procedures are shown in Table 1. The major complications related to the colostomy are shown in Table 2. The etiology of the five operative deaths is given in Table 3.

Exploratory laparotomy with loop transverse colostomy was performed on 16 patients, whereas "blind" loop colostomy was the procedure for 13 patients. Sixteen stomas were matured primarily. Thirteen patients had delay in colostomy opening of from two to seven days postoperatively, with the average time until opening being four days.

Colostomy closure following definitive bowel resection and anastomosis was achieved in 18 of the 29 patients (62 per cent). Closure of the colostomy was carried out between 32 days and ten years, with an average interval of 14 months. The technique of closure was by end-to-end anastomosis in 11 patients and by simple closure in six. The procedure was extraperitoneal in 13 patients and intraperitoneal in four. Complications of colostomy closure included two wound infections, one fecal fistula, and an incisional hernia.

Twelve patients in this series were treated for diverticular disease without mortality. Eleven of these had definitive resection and restoration of bowel continuity. Seven patients had three-stage procedures requiring an average of 55 hospital days. Four patients had two-stage procedures requiring an average of 36 hospital days. Complications in these patients included one paracolostomy hernia, one prolapse of the stoma, two ventral hernias, and two wound infections. Two patients suffered continued flare of diverticular disease despite a loop colostomy. One of these had a retroperitoneal abscess requiring drainage, and the other needed an emergent resection of the inflamed segment following loop colostomy. One patient had a ten-year delay in the resection, anastomosis, and final takedown of the loop because of a misdiagnosis of pelvic malignancy.

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Address correspondence and reprint requests to Dr. Volpe: 3838 California Street, Suite 616, San Francisco, California 94118.

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TABLE 1. *Loop Transverse Colostomy: Indications and Operative Mortality*

	Number	Deaths
Diverticular disease	12	0
Left colonic malignancy	10	2
Miscellaneous		
Gastric cancer	1	1
Endometrial cancer	1	
Cervical cancer	1	
Hemorrhage	1	
Toxic megacolon	1	
Undetermined	2	2
	29	5 (17%)

Ten patients had transverse loop colostomies performed in the management of left colonic cancer. There were two operative deaths, and two further patients died of carcinoma within six months of the colostomy formation. The remaining six patients had successful resection and closure of colostomy. The average hospital stay for the five patients managed by three-stage procedures was 45 days, and 33 days were needed for the single patient handled in two stages. Technical complications included one fecal fistula and one ventral hernia. Two patients died from colonic perforation after loop transverse colostomy. One of these was due to perforation of the cecum, and the other was from a perforated sigmoid segment. These patients had emergency resection but died of sepsis.

Seven patients had transverse loop colostomies for the miscellaneous indications shown in Table 1. There were three operative deaths in this group of patients. Two of these deaths occurred with patients with distal colonic obstruction of unknown etiology. Of the four patients who survived surgery, one was lost to follow-up, and one had the colostomy closed.

TABLE 2. *Loop Transverse Colostomy: Technical Complications (Formation and Closure)*

Paracolostomy hernia	1
Fecal fistula	1
Ventral hernia	3
Wound infection	2
Continuing diverticular sepsis	2
	9
TOTAL	(31%)

Discussion

Historical Perspectives: In 1899, Mr. Frederick Treves wrote that "it is less dangerous to leap from the Clifton Suspension Bridge [250 . . . feet . . .] than to suffer from acute intestinal obstruction and decline operation." Prior to the work of Treves, colonic obstruction was considered a medical problem and was treated with insufflation, oral metallic mercury, and cathartics.[1,2] The medical care of colonic obstruction in that era carried a disastrously high mortality, but physicians remained reluctant to offer surgical relief because surgery also was commonly fatal.

Loop transverse colostomy became the most common surgical procedure for colonic obstruction, since it had the lowest mortality rate for an effective decompressive maneuver. Many surgeons adhere to transverse colostomy out of tradition and training.

In 1941, Gregg and Dixon[3] at the Mayo Clinic clearly established a principle of decompression prior to anastomosis in patients obstructed from carcinoma of the left colon. Of 2730 patients seen with carcinoma of the colon between 1907 and 1938, 102 presented with obstruction at or distal to the splenic flexure. Thirty-five patients who had resection without previous decompression had a 45.7 per cent hospital mortality. Sixty-seven patients were treated with staged procedures, with a 29.8 per cent hospital mortality. Similarly, Wangensteen[4] championed the use of transverse colostomy during his 50-year career.

In the era prior to antibiotics, fluid replacement, electrolyte management, muscle relaxants, and modern anesthesia, transverse colostomy enjoyed a deserved place in the surgeon's armamentarium. The authors believe that transverse colostomy, like insufflation and mercury, should be a thing of the past. More effective options exist for the management of the obstructed or perforated colon. *Transverse colostomy is a holdover from the past.*

A Misnomer in Surgery: Many surgeons and enterostomal therapists recognize that a transverse colostomy is difficult for the patient to manage.[5-11] This stoma is difficult due to the mass of the protruding colon and the large diameter of the loop. Initially the rod prevents a complete seal between appliance and skin. Skin breakdown and prolapse of the colostomy are common. Proponents of transverse colostomy state that these will be "temporary" problems since the colostomy will be closed.

How temporary is the problem? Colostomy closure was not accomplished in 42 per cent of 45 transverse colostomies performed for cancer in one series,[12] and closure was not carried out in 63 per cent of 248 transverse and left colostomies in another series.[13] In a combined series of 781 transverse colostomies, 36

per cent were never closed (Table 4).[12-18] For the authors' 29 private community hospital patients, the average time until closure was 14 months. Only 18 patients had closure, however, and 11 (38 per cent) had permanent stomas. Since many loops are permanent, *"temporary" loop colostomy is a misnomer.*

Delaying and Diverting: Thirteen patients in the present series had delayed opening of the loop colostomy. These were opened from two to seven days postoperatively, with an average delay of four days. The usual reason given for delayed opening is to prevent peritonitis, fascial contamination, and subsequent wound infection. The literature since 1905 has condemned delayed opening of a colostomy, but this practice persists.[19] Opening the colostomy at the bedside is at best very unpleasant and is sometimes terrorizing to the patient. Lighting and instruments are often inadequate, the colon may be edematous and friable, and there is risk of explosion.[20] The authors agree with Pemberton[21] and others[13,22] who feel that primary maturation of the colostomy with mucocutaneous suture best protects the skin and subcutaneous tissue from soilage, infection, skin breakdown, and stomal stenosis. Primary maturation allows for digital examination of the proximal stoma to assure patency and also allows immediate decompression of the colon. One death in the present series may have been related to delayed opening of the colostomy, thereby delaying decompression of the obstructed bowel.

Loop colostomies do not completely divert the fecal stream.[23,24] Multiple techniques have been described to prevent fecal flow into the distal segment of a loop colostomy.[25,26] Under controlled conditions, loop transverse colostomies produce a higher volume of liquid stool than do divided transverse colostomies at the same location in the colon.[27] *All colostomies should be end-bearing and matured primarily.*

Inadequate Exploration: Two patients in the present series died after colonic perforations were discovered shortly after the performance of a transverse loop colostomy. It is believed that these colonic perforations were probably present at the time of transverse colostomy. Since these procedures were "blind loops," the patients may have survived with adequate exploration and appropriate surgical treatment initially.

Hickey and Hyde[28] reported three cecal perforations in 43 cases of left colonic obstruction due to malignancy. In the series by Clark *et al.*,[14] of 42 loop transverse colostomies, two colostomies were placed distal to the obstruction, two carcinomas were missed in patients with multiple primary tumors, and three colonic perforations were not detected.

In view of the high morbidity and mortality for abscess and peritonitis secondary to colonic perforation, every patient requiring surgery for an acute colonic problem should have abdominal exploration. The location and small size of the incision for a transverse loop colostomy preclude adequate exploration and assessment of the abdomen. *"Blind" surgery invites tragedy.*

Risk of Loop Transverse Colostomy: The morbidity and mortality reported in a combined series of transverse colostomies, including 781 patients, has been compiled (Table 4). The reported operative mortality ranges from zero to 34 per cent.[12,15] The mortality for the combined series is 14 per cent.[12-18] Technical complications, including prolapse, hernia, and wound infection, were reported to be as high as 33 per cent.[14] The incidence of technical complications in 495 transverse colostomies was 23 per cent.[12-14,17] For 400 patients, the combined morbidity of transverse loop colostomy, including infection, pulmonary problems, and technical complications, was substantial. It varied from 40 per cent to 71 per cent, with an overall morbidity of 48 per cent.[13,14,17]

In the present series, the operative mortality was 17 per cent, and the technical complication rate for colostomy formation and closure was 31 per cent (Tables 1, 2). These statistics are consistent with the collected series. Clark *et al.*[14] summarized the present authors' opinions in his paper thus: "It is accepted teaching that a decompressing transverse loop colostomy through a small incision is an atraumatic first stage operation conferring maximum benefit. Our series does not support the claim that such a procedure carries minimal morbidity and mortality."

A close reading of the combined series illustrates that transverse loop colostomy itself, and not the underlying disease process, is responsible for much of the morbidity and mortality of staged management of colonic pathology. Abrams *et al.*[13] summarized their series by stating, "Seventy-four percent of all complications were directly related to the performance of the colostomy, representing either failure to control

TABLE 3. *Loop Transverse Colostomy: Operative Deaths*

Sepsis	1
Colonic perforation following colostomy	2
Pulmonary embolus	1
Delayed opening, aspiration	1
	5
TOTAL	(17%)

TABLE 4. *Loop Transverse Colostomy: Recent Reports*

Author	Year	Indications	Operative Mortality		Colostomy Not Closed (Per Cent)
			Number	Per Cent	
McSherry *et al.**[17]	1969	CA, TICS, miscellaneous	150	6	6
Hopkins*[12]	1971	CA	45	0	42
Welch and Donaldson[18]	1974	CA	52	1.9	—
Clark *et al.*[14]	1975	CA	42	24	31
Classen *et al.*[16]	1976	TICS	203	7.8	25
Fielding *et al.*[15]	1979	CA	41	34	39
Abrams *et al.*†[13]	1979	Trauma, CA, TICS	248	24	62
TOTAL			781	14	36
Present study	1981	CA, TICS	29	17	38

* Statistics include all three stages.
† Report includes 46 sigmoid colostomies.

local infection or failure of the technique of the operative procedure itself." Eighty per cent of the colostomies in Abrams' series were loop transverse colostomies. One in six patients required reoperation for stomal complications in this series.

Closure of loop colostomy contributes additional morbidity and mortality to the staged management of colorectal problems. Classen *et al.*[16] reported a 3.9 per cent mortality in 103 separate operations for colostomy closure. Extensive review of the morbidity and mortality of transverse loop colostomy closure appears in the literature. Knox *et al.*[29] reported a mortality of 2.2 per cent with a 23 per cent incidence of fecal fistula in 179 colostomy closures. Others have shown that the procedure can be done with low mortality, but wound infection, fecal fistula, ventral hernia, and prolonged hospitalization comprise a significant morbidity in all series.[30–37] There were no deaths related to colostomy closure in the present series, but there was morbidity, including fecal fistula and wound infection.

Two of the five deaths in the present series resulted from cecal and sigmoid perforations (Table 3), requiring laparotomy soon after the colostomy. A third death from aspiration occurred prior to the delayed opening of a transverse colostomy. These deaths may have been prevented by an adequate first operation. *Loop transverse colostomy is a risky first stage with little benefit.*

Fecal Burden: The high morbidity and mortality when transverse loop colostomy is used for the management of left colonic peraforation is, in part, caused by the fecal burden remaining in the distal colon. Lavenson and Cohen[38] reviewed surgical experience in Vietnam with distal colon and rectal injuries. When the distal colon and rectum were irrigated free of fecal matter at the time of colostomy for acute trauma, mortality and morbidity were improved. This study and others underscore the importance of removing the fecal mass.[38–40]

Byrne and Garick[41] presented a series of 41 patients with sigmoid diverticulitis and abscess or peritonitis that were treated with transverse colostomy or transverse colostomy and drainage. There was an overall 35 per cent mortality. Of the eight patients with abscess that received transverse loop colostomy, five died.

With the continuing fecal burden imposed by a loop transverse colostomy, these patients fare very poorly. *Every colostomy should be placed as near as possible to the disease process.*

Alternative to Loop Colostomy: In the authors' ten-year study, not one loop transverse colostomy was created by a surgeon specializing in colorectal surgery. Other surgical options, including primary resection or end distal colostomy, were preferred. A complete discussion of alternatives to loop transverse colostomy is beyond the scope of this paper, but this is discussed at length in the current literature.[42,43]

The fundamental principle of decompression prior to anastomosis is easily and safely accomplished with end-bearing colostomy.[44] Also, a cecostomy will decompress the selected patient without the morbidity of a loop colostomy.[45]

The merits of resection of the diseased segment at the initial operation are gaining wide support in the current literature.[46–50] As Liebert and DeWeese[48] aptly stated, "The more severe the contamination, the greater the necessity to exclude the inflamed colon from the peritoneal cavity and to perform a colostomy." *Resection of the disease is the ideal first stage.*

Conclusions

Transverse loop colostomy is a holdover from the past. It was developed at a time when antibiotics and modern anesthesia were not available. Surgeons continue to employ transverse loop colostomy out of tradition and training in spite of preferable surgical alternatives.

Since many loops are permanent, "temporary" loop colostomy is a misnomer. In a combined series of 781 loop colostomies, 36 per cent were never closed. In the present series, the average interval until closure was 14 months. Eleven of these 29 patients (38 per cent) did not have colostomy closure.

All colostomies should be end-bearing and matured primarily. Delayed opening of loop colostomies is condemned. Primary maturation decreases wound sepsis and allows immediate decompression. Loop colostomy often fails to divert the entire fecal stream.

"Blind" surgery invites tragedy. The small incision commonly used for transverse loop colostomy does not permit adequate assessment of the underlying pathology.

Loop transverse colostomy is a risky first stage with little benefit. In the combined series presented, the mortality rate was 14 per cent and morbidity approached 50 per cent. A transverse loop colostomy will not drain or diminish paracolic extraluminal infection.

Every colostomy should be placed as near as possible to the disease process. Transverse colostomy fails to relieve the fecal load in the defunctionalized colon. The inflammatory process of diverticulitis and peritoneal soilage in acute perforation will continue unchecked.

Resection of the disease is the ideal first stage. Primary anastomosis following resection can be safely done in selected patients. When contamination or obstruction is present, resection of the pathology is the procedure of choice, combined with end colostomy and distal mucous fistula or closure. Transverse colostomy pales in comparison with these options.

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Memoir

Ochsner, Edward William Alton, New Orleans, Louisiana; born May 4, 1896, in Kimball, South Dakota. Dr. Ochsner attended the University of South Dakota where he received his B.A. in 1918 and, two years later, received his M.D. at Washington University in St. Louis, Missouri. Dr. Ochsner served his medical internship and assistant residency at Barnes Hospital, St. Louis, Missouri, and surgical residency under Dr. A. J. Ochsner of Chicago, Illinois. He spent two years as an exchange surgical resident at the University of Zurich, Switzerland, and the University of Frankfurt, Germany.

Dr. Ochsner, a world renowned heart surgeon, made countless clinical contributions to medicine, including his work in Zurich on blood transfusions and his research on the diagnosis and treatment of bronchiectasis which saved countless lives. He performed significant experimental studies on the production and treatment of adhesions in the peritoneal cavity and the pericardium. His research work included peptic ulcers, gas gangrene infection, tuberculosis, and thrombophlebitis. Moreover, he was first credited with linking smoking to lung cancer in the 1930's. In 1942, Dr. Ochsner was one of the original founders of the Ochsner Medical Foundation Hospital in New Orleans of which he was director for 24 years.

Dr. Ochsner's interests and contributions are well known in many fields of medicine, and because of his outstanding work in the field of colon and rectal surgery, he was elected in 1955 to Honorary Fellowship in the American Society of Colon and Rectal Surgeons. Dr. Ochsner was a Founder Member of the American Board of Surgery and was a Past President of the American College of Surgeons, American Cancer Society, Southern Surgical Association, and American Association for Thoracic Surgery. He held membership in numerous medical societies including the American Surgical Association, Society of Vascular Surgery, International Cardiovascular Society, American Medical Association, Pan American Medical Association, Southeastern Surgical Congress, and Southern Medical Association. His Honorary Memberships included Fellowship in the Royal College of Surgeons in Ireland and England, Society of University Surgeons, American Academy of Orthopedic Surgeons, and countless others.

Dr. Ochsner was Emeritus Professor of Surgery at Tulane University School of Medicine in New Orleans, Emeritus President of the Alton Ochsner Medical Foundation, and Senior Consultant in Surgery at the Ochsner Clinic.

Dr. Ochsner underwent surgery for a heart ailment September 5, 1981, at the Ochsner Medical Foundation Hospital. He experienced a brief recovery, but died September 24, 1981.