NEW INTESTINAL ANASTOMOSIS — LATERAL CROSSING ANASTOMOSIS OR λ -ANASTOMOSIS

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INTRODUCTION

The characteristic of conventional lateral anastomosis is in abutting parallelly either isoperistaltic or anti-peristaltic two intestinal loops to be opened. I call it lateral parallel anastomosis. Its two functional disadvantages are as follows: 1) The whole contents in the proximal intestinal loop do not pass through the anastomotic opening into the distal

Fig. 1.

loop, but the partial do. N. Senn's report (9) in the sense that faecal accumulation did not take place in the excluded portion of the intestinal canal and the excluded portion of the bowel underwent progressive atrophy, led many scholars to temporary misunderstanding, but Shiota (10), Nordmann (8), Melzner (6), Horsley (5), etc., noticed the partial contents in the proximal loop passing by the anastomotic opening and going on ahead. 2) Intestinal peristalsis of the distal loop declines owing to a broad cut parallel to longitudinal fibres. As to movement of the small intestine people admit that circular fibres take charge of peristalsis and longitudinal fibres do of pendulum rhythm. However as to movement of the large intestine, though it is very complicated, many scholars believe that degree of

peristaltic decline is larger at a cut parallel to longitudinal fibres than at a cut parallel to circular fibres in the aim of lateral anastomosis (Tonnis, Fischer (2), Melzner (6)).

ADVANTAGES OF LATERAL CROSSING ANASTOMOSIS

The characteristic of this method is in abutting vertically antimesenteric borders of two intestinal loops and in opening longitudinally the proximal loop and transversely the distal loop as Fig. 1.

As the first step of this method, I adopted the lateral crossing ileo-colostomy. The advantages are not only in decreasing degree of peristaltic decline, but also in making intestinal contents more likely to pass through the anastomotic opening owing to the following three conditions in the vicinity of the opening, i. e., 1) influence of gravity upon the intestinal contents (Fig. 2). At the dorsal position it is favourable even if

Fig. 2.

torsion of the transverse colon would happen, and at the standing position it is favourable only when torsion of the transverse colon would not happen. On the other hand, as to cases on which conventional lateral ileo-colostomy is adopted, gravity has not favourable influence upon passage of intestinal contents through the opening not only at the dorsal position with or without torsion of the transverse colon, but also at the standing position. 2) Though the contents in the proximal loop pass slowly owing to absence of peristalsis, the contents in the distal loop pass with normal peristaltic speed. 3) According to Bloch and Michon, the opening grows larger on account of tension of the taeniae to both directions.

REFERENCE TO TECHNIC OF LATERAL CROSSING ANASTOMOSIS

The technic resembles that of conventional lateral anastomosis, but there are several differences between them. The main problems are 1) how to manipulate the transverse colon and 2) how to open the two intestinal loops to be anastomosed.

1) As for how to manipulate the transverse colon, I have a conclusion that after

drawing out the transverse colon, I am used to hold it grossly and transversely with a intestinal clamp (Fig. 3), so both walls—fore and back—of the transverse colon may be held with it. It is better to hold it with a intestinal clamp promptly, in order that the transverse colon may not contract like a cord with slow and repeated manipulations.

2) Length of a incision in the ileum may be larger than a caliber of the portion of

Fig. 3.

Fig. 4.

Fig. 5.

the ileum. I am used to incise 1.2-1.6 times as large as it. Secondly, both ends of a incision in the transverse colon may be 3-5 mm distant from the mesenteric or omental border. For instance, a caliber of the portion of the ileum is 2.5 cm large, length of a incision in the ileum 3.5 cm, a distance between the mesenteric and the omental borders 4.0 cm, and length of a incision in the transverse colon 3.4 cm.

When a caliber of the ileum is much larger than that of the transverse colon on

inspection, there are a few measures to take, i. e., to evacuate in ileal canal by pumping up gab, to wet the ileal portion with warm physiological saline water, to accomodate both calibers either with interrupted traction sutures from both ends of posterior suture lines (Fig. 4) or with mixed suture method of Connel-Mayo and Schmieden (Fig. 5), or according to Stanton, to dilate the transverse colon by means of air injected through the rectum.

RESULTS OF OPERATION

I operated on twelve cases, which consisted of ten simple lateral crossing ileo-colostomies and two lateral crossing ileo-colostomies with ileo-cecal resection.

1) Tables 1 a, 1 b, and 1 c show the clinical results.

Table 1 a.

No.	Age	Diagnosis	Operation
1	45	faecal fistula	ileo-cecal resection + + drainage
2	33	traumatic perforation of intestine	closing the pole + + drainage
3	31	cecum mobile	appendectomy +
4	57	cecum mobile with gang renous appendicitis	appendectomy + + drainage
5	34	cecum mobile with appendicitis	appendectomy +
6	52	cecum mobile with perforative ap- pendicitis and general peritonitis	appendectomy + + drainage
7	24	faecal fistula	
8	18	cecum mobile with perforative ap- pendicitis and general peritonitis	appendectomy + + drainage
9	33	intestinal tuberculosis	
10	35	intestinal tuberculosis	ileo-cecal resection +
11	20	intestinal tuberculosis	appendectomy +
12	24	cecum mobile with appendicitis and circumscribed peritonitis	appendectomy +

Table 1 b.

No.	Indican in urine			Blood sedimentation rate, one hour value		
	before operation	2nd days after operation	6th day after operation	before operation	2nd day after operation	6th day after operation
1	—	—				
2						
3					25	
4					75	75
5	—	—	—	4	30	23
6	—	—	—	59	102	80
7	—	—				
8	+	+	—	4	40	24
9	+	+	—			
10	—		—			
11	—	—	—	24	40	55
12	—		—		47	3

Table 1 c.

No.	Positive apply of penicillin	Day when podyoprystive flatus appears	Accompanying disease	Process	Complication
1	200,000 u.	2nd		healed	
2	200,000 u.	3rd		healed	
3		2nd		healed	
4		1st		healed	
5		1st	hypertrophy of right epididymis	healed	
6	200,000 u.	4th		healed	
7		2nd		healed, fistula suffered no change	
8	200,000 u.	4th		healed	
9		2nd	pulmonary tuberculosis	healed	strangulation occurred.
10		1st	pulmonary tuberculosis	healed	
11		2nd	pulmonary infiltration	healed	
12		2nd		healed	

2) Table 2 and photographs 1, 2, 3 and 4 show roentgenological results and Tables 3 a, b and c show the premised conditions for roentgenological examinations.

Photo. 1.

No. 3. Diagnosis: cecum mobil, 31 y. aged. The whole barium meal passes directly through the anastomotic opening from the ileum to the transverse colon.

Table 2.

D* Position	None	Very little	Little	Much	Half of barium meal	A large quantity	Total
At dorsal position after this method	7 times (6 patients)	4 times (4 patients)	once	0	0	0	12 times (10 patients)
At standing position after this method	0	0	0	once	once	twice (2 patients)	4 times (4 patients)
At dorsal position after conventional lateral ileo-colostomy recently	0	0	0	0	twice (2 patients)	twice (2 patients)	4 times (4 patients)

* D=Dosis of barium meal passing by the opening and going on ahead.

Photo. 2.

No. 12. Diagnosis: cecum mobile with appendicitis and circumscribed peritonitis, 24 y. aged. Barium residue is still present spotly in the upper part of small intestine, and the larger quantity of barium meal has passed directly through the opening.

Table 3 a. Use of purgative—magnesium sulphate 30 g.

Position	When was it used	The last night	Together with barium meal	No use	Total
At dorsal position after this method		5 times	0	7 times	12 times
At standing position after this method		twice	twice	0	4 times
At dorsal position after conventional lateral ileo-colostomy recently		twice	0	twice	4 times

Table 3 b. Dosis of barium meal, together with water twice in weight.

Position \ Dosis of barium meal	25 g	50 g	100 g	Total
At dorsal position after this method	once	10 times	once	12 times
At standing position after this method	0	twice	twice	4 times
At dorsal position after conventional lateral ileo-colostomy recently	3 times	once	0	4 times

Photo. 3.

No. 11. Diagnosis: intestinal tuberculosis, 20 y. aged. No barium meal passes by the opening and goes on ahead.

Table 3 c. Interval between operation and roentgenologic examination.

Position \ Interval	10-19 days	20-29 days	30-39 days	40-59 days	Total
At dorsal position after this method	twice	5 times	twice	3 times	12 times
At standing position after this method	twice	twice	0	0	4 times
At dorsal position after conventional lateral ileo-colostomy recently	twice	twice	0	0	4 times

3) As a complication, I must mention a case of strangulation. The patient was admitted to the hospital with a main complaint of epigastric pain and the operative diagnosis was admitted as intestinal tuberculosis. Being at the dorsal position during thirty days after the lateral crossing ileo-colostomy, he was reoperated with complaints

of abdominal pain and constipation and diagnosed as strangulation owing to a cord. The cord combined the mesenteric root and the anti-mesenteric border of the portion of the ileum four centimetres orally to the anastomotic opening. Three intestinal loops were encircled by the cord and the ileal loop and cyanosed. The portion of the ileum distal

Photo. 4.

No. 9. Diagnosis: intestinal tuberculosis, 38 y. aged. Very little barium meal is going to the terminal of ileum.

Fig. 6.

to the anastomotic opening underwent the atrophy to one-third of the portion of the ileum oral to the opening in diameter.

It might well be said that the lateral crossing anastomosis was not directly responsible for the occurrence of strangulation.

DISCUSSION

The reasons why such simple lateral anastomosis have never been adopted in literatures during a century since Maisonneuve (1845) might be as follows:

1) The idea that the two intestinal loops should be abutted parallelly on the occasion of lateral anastomosis is adopted since the report of v. Hacker who wrote the method of the conventional lateral anastomosis and the v. Frey's report in the sense that when half a year has passed after lateral anastomosis with intestinal resection, the two intestinal segments which were anastomosed near their cut ends are situated in the same straight line.

2) Is there any feat of reflex when the portion of the ileum abuts on the transverse colon vertically? We have never heard such feat of reflex on the occasion of end-to-side ileo-colostomy. And according to Tönnis the oral portion of the ileum is used to be directed to the transverse colon vertically one and a half years after conventional lateral ileo-colostomy. Moreover, from an anatomical point of view, the terminal of the ileum is directed to the cecum vertically and, furthermore, Bauhin's valve is constructed parallelly to ring fibres of the cecum.

These facts suggest us non-presence of any fear of reflex.

3) Is insufficiency of suture liable to appear owing to the transverse incision on the transverse colon?

Bloch and Michon who reported their end-to-side anastomosis and A. W. Fischer who reported his lateral anastomosis with the transverse incisions on both intestinal loops, they have never experienced insufficiency of suture on account of their technics. My experiences show the same results.

4) Is there any difficulty in doing anastomosis owing to annular contraction of the transverse colon? In addition to extensibility of intestinal wall, it is admitted that the colon is larger than the ileum in diameter on X-ray examination and on autopsy. According to Tönnis, the length of incision on the proximal intestinal loop should be larger than its diameter, and Melzner insisted on that the length of incision on it should be smaller than its diameter, so as to decrease degree of peristaltic defect on the distal intestinal loop.

So it is possible to do lateral crossing anastomosis even between two portions of the small intestine according to Melzner. As for various means to accomodate both calibers of two intestinal loops, I have already mentioned.

5) Does omentum major give an obstacle to lateral crossing ileo-colostomy? Omentum major may press upon the distal portion of the ileum to the anastomotic opening—and play favorable for physiological exclusion. Moreover there may happen cicatrized contraction of omentum major after operation. Mesentery does not give an obstacle too.

SUMMARY AND CONCLUSION

As the first step of lateral crossing anastomosis instead of conventional lateral anastomosis, I have successfully adopted lateral crossing ileo-colostomies on twelve cases, and examined them clinically and roentgenologically. The advantages of this method are presumed as follows. 1) Safety of anastomosis: That is generally an advantage of lateral

anastomosis in comparison with end-to-end anastomosis. 2) As for peristaltic defect, this method lies between conventional lateral anastomosis and end-to-end anastomosis. 3) Physiological exclusion may be attained during a period to be necessarily at the dorsal position after ileo-colostomy without resection of a piece of intestine.

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