Surgical management and outcome of jejunoileal atresia in Sohag University Hospital

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Abstract

Background and aims: Jejunoileal atresia is a frequent cause of intestinal obstruction in neonates. In our country, the socioeconomic status, lack of well equipped ambulance transfer, lack of neonatal preoperative management, this affect the relative time of presentation of neonates with this condition. For these reasons, our aim is to understand the way of management and to evaluate the surgical outcome of these procedures.

Patients and methods: 13 consecutive infants with jejunoileal atresia were included in this study from January 2007 to March 2009, to assess the relative outcome in relation to the way of management. Malrotation, Ladd's band and previous enterostomy were not excluded. All cases will be subjected to full clinical assessment, abdominal radiography, abdominal ultrasound, routine laboratory investigations and serum electrolytes.

Results: We identified in this study 13 neonates; there were 5 females and 8 males. The mean gestational age was 37.38 weeks, the mean birth weight 2750.2 grams and 5 babies had malrotations. Eight cases had ileal atresia and 5 with jejunal atresia. On exploration, type I was found in 7 babies, type II in 3 neonates, type IIIa in one, and type IIIb in 2 cases. There were three cases referred from other hospitals ,had ileal atresia with enterostomy, 2 of them reoperated by exploration and resection of the dilated part with end to end anastomosis, while the third case presented with peritonitis due to sigmoid colon perforation, closure of the perforation with proximal protective double barrel enterostomy. This protective enterostomy was successfully closed after 3 weeks. The other five cases with ileal atresia, four of them were operated by resection of the proximal dilated nonfunctioning part (7-10 cm) and end to oblique anastomosis, the last one developed peritonitis as a result of necrotizing enterocolitis. This case was managed by resection and reanastomosis with ileostomy but died from severe septicemia. Three cases with jejunal atresia were operated by resection with end to oblique anastomosis, one of them developed anastomostic leakage and died due to bilateral pneumonia and malnourishment. The remaining 2 cases with jejunal atresia type IIIb operated by tapering enteroplasty. Ladd's band was found in five cases that was divided and released with correction of malrotation (ladd's procedure). Postoperatively, all patients had total parenteral nutrition for 4 to 30 days. The post operative follow up period varied from 3-9 months (the mean, 5 months).Postoperative complications were encountered in 7 cases (54%). The postoperative mortality was 15.4%.

Conclusion: Initial care must be given to those neonates with intestinal atresia. The primary resection and reanastomosis is the procedure of choice if it is feasible; otherwise in cases of high jejunal atresia tapering enteroplasty is recommended. On the other hand double barrel enterostomy is an alternative if primary anastomosis is risky.

Introduction

Jejunoileal atresia is a congenital anomaly characterized by closure of the jejunum or ileum. The word atresia etymologically comes from the Greek a, which means no or without, and tresis, which means orifice. The site of the atresia can be anywhere from the ligament of Treitz to the caecum. At times there can be more than one atretic segment [(1)].

Jejunoileal atresia is a frequent cause of congenital intestinal obstruction; its incidence is 1 in 1500 live births and is more common than duodenal atresia [(2)].

There is controversy regarding the pathogenesis of congenital stenosis and atresia of the small bowel. The traditional explanation favored by Stowens (1966)[(3)] and Morrison (1970)[(4)] is that atresia and stenosis are caused by a failure of recanalization of the bowel lumen. Alternatively Louw and Bernard (1971) [(5)] suggested the development of atresia or stenosis is secondary to vascular insult [(6)]. Recently Hiroaki, et al (2004) reported that the placental vascular compromises were involved infrequently in jejunoilieal atresia [(7)]. Familial instances of jejunoileal atresia have also been observed suggesting that genetics may play a part in these cases [(8)].

The classification of jejunoileal atresia initially proposed by Louw[(9)] who recognized 3 types of lesions, the classification was latter refined by Martin and Zerella[(10)] and by Grosfeld et al[(11)] to include the apple peel deformity and multiple atresia. According to this classification, type I represents a mucosal defect with an intact mesentery. Type II defects consist of a fibrous cord connecting the atretic bowel ends. Type IIIa lesion denotes an atretic segment with a V – shaped mesenteric gap defect, while type IIIb defines the apple peel deformity, in which there is a proximal jejunal atresia and the distal bowel is supplied by a single retrograde blood vessel. Type IV describes instances of multiple atresias (a string of sausage)[(8)].

The presenting symptoms for patients with jejunoilieal atresia are consistent with bowel obstruction include bilious vomiting, abdominal distension and failure to pass meconium[(12)].

Prenatal ultrasonography may identify the presence of maternal polyhydramnios and distention of the stomach and part of the intestine, but generally it is not accurate in determination of distal intestinal obstruction [(13)].

Postnatal radiographic studies are useful in the diagnosis of intestinal atresia. The classic radiographic sign is that of a triple –bubble appearance that equivalent to the double bubble sign of duodenal atresia plus a third bubble which is caused by filling and distention of the jejunum by air. But the need for contrast study is of great help to determine the location of atresia [(8)].

During the past 2 decades, a better understanding of the etiologic factors and impaired intestinal function as well as refinements in pediatric anesthesia, operative technique, and preoperative and postoperative care especially in the era of nutritional support, have led to a significant improvement in survival rate [(14)].

In our country the socioeconomic status, lack of well equipped ambulance transfer, lack of neonatal preoperative management, these affect the relative time of presentation of

neonates with this condition. In addition to less experience of prenatal diagnosis that affects the early management of those live births. For these reasons, we aimed to understand the way of management and to evaluate the surgical outcome of these procedures.

Patients and Methods:

Over two years period (from January 2007 to March 2009), 13 consecutive infants with intestinal atresia were identified at the neonatal intensive care unit (NICU) in Sohag University Hospital. Only those with jejunoileal atresia; not associated with other system anomalies were included in this study for evaluation of the relative outcome in relation to the way of management. Those with gastrointestinal malrotation and ladd's band were included in the study. Our series also included patients that diagnosed primarily in our hospital or referred cases with or without enterostomy. All cases were subjected to full clinical assessment, abdominal radiography (fig.1), abdominal ultrasound, routine laboratory investigations and electrolytes.

Surgical management was established as soon as the clinical decision to operate and after correction of the general condition. The operative treatment was performed according to the type of jejunoileal atresia that was based on the intraoperative findings.

Results

This retrospective study had been conducted at Sohag University Hospital in Pediatric Surgery unite. The study included 13consecutive neonates that presented and treated in our hospital with proved jejunoileal atresia. They were 5 females and 8 males. The mean gestational age was 37.38 weeks, the mean birth weight 2750.2 grams and 5 babies had malrotation. All candidates were presented with manifestations of intestinal obstruction which had variable time of presentation (table 1).

Preoperative preparation was done by insertion of nasogastric tube to deflate the stomach and adequate intravenous fluid resuscitation with correction of electrolyte abnormalities and infusion of broad spectrum antibiotics. Intraoperative assessment showed that type I was found in 7 babies, type II in 3 neonates, type IIIa in one, and type IIIb in 2 cases. No detectable cases were found to have type IV.

We identified 8 cases with ileal atresia, three of them referred to us with enterostomy that was done in other hospitals, and the other five diagnosed and operated initially in our hospital. While the other five cases with jejunal atresia were primarily diagnosed and managed in our hospital.

The three referred cases of ileal atresia with enterostomy, 2 of them reoperated by exploration and resection of the proximal dilated part with end to end anastomosis (fig.2a and b), while the third case presented with peritonitis and pneumo-peritonium due to sigmoid colon perforation secondary to false passage of rectal tube, drainage was done with peritoneal toilet and closure of the colonic perforation after resection of the atretic segment with proximal double barrel protective enterostomy. This protective enterostomy was successfully closed after 3 weeks.

The other five cases with ileal atresia , four of them were operated by resection of the proximal dilated nonfunctioning part (7-10 cm) and end to oblique anastomosis,

the last one with late presentation (5 days) developed peritonitis as a result of multiple perforations in the proximal dilated loop most probably due to necrotizing enterocolitis. This case was managed by resection of the diseased part 10 cm and reanastomosis with double barrel ileostomy and mucous fistula (fig.3). This case was died in the second post operative day from severe septicemia.

As regards the five cases with jejunal atresia, three of them(2 case, type II and 1, type IIIa) were operated by resection of the proximal non functioning dilated part with end to oblique anastomosis (fig.4a and b), one of them developed anastomostic leakage in the fifth postoperative day and died due to bilateral pneumonia and malnourishment. The last two cases with jejunal atresia type IIIb operated by tapering enteroplasty by resection of triangular shape patch in the antimesenteric border (7cm) with closure by continuous running suture in two layers using hand sewn technique and then the two stumps sutured end to end together by one layer interrupted stitch using Vicryl 5/0 (fig.5a and b).

In all cases the the rest of intestine distal to the atretic segment was revised and tested for patency by insertion of small plastic tube and injection of saline to detect intraluminal web or obstruction. Ladd's band was found in five cases that was divided and released with correction of malrotation (ladd's procedure).

Postoperatively, all patients had total parenteral nutrition (TPN) for 4 to 30 days, and for those with double barrel enterostomy; we tried to collect the proximal intestinal spilling and inject it into the distal stoma to activate its motility and for nutrition.

The post operative follow up of our series varied from 3-9 months with the mean 5 months . Early postoperative complications were encountered in 7 cases (54%), while the postoperative mortality occurred in 2 babies (15.4%) (Table 2).

Table (1) summary of main features of cases

NO.	Sex	Gestation (week)	Birth weight (grams)	Age at onset of symptoms(day)	Type of atresia	Associated malrotation	Postoperative follow up (months)
1	M	38	3210	2	I	+	3
2	M	38	2920	4	I		4
3	F	36	2890	5	I	+	5
4	M	39	3130	3	II		4
5	M	38	2350	4	I		3
6	F	37	3110	7	I		9
7	M	38	2830	1	II	+	8
8	F	36	2710	1	IIIb	+	7
9	M	37	2160	8	I		4
10	F	38	3010	2	IIIa	+	3
11	M	36	1950	9	IIIb		5
12	M	38	2650	3	I		4
13	F	37	2820	4	II		6
mean		37.38	2750.2	4.1			5

M=male, F=female

Table (2) postoperative surgical outcome.

Type of complication	No of cases (%)	management	Deaths(%)
Peritonitis	2	Drainage and Repair with double barrel enterostomy	1, From sever septicemia
Anastomotic leakage	1	Conservative treatment	1, Due to mal nourishment and bilateral pneumonia
Post operative hemorrhage	1	Resuscitation and exploration with control of hemorrhage	-
Wound sepsis	3	Control of infection	-
Total	7 (54%)		2 (15.4%)

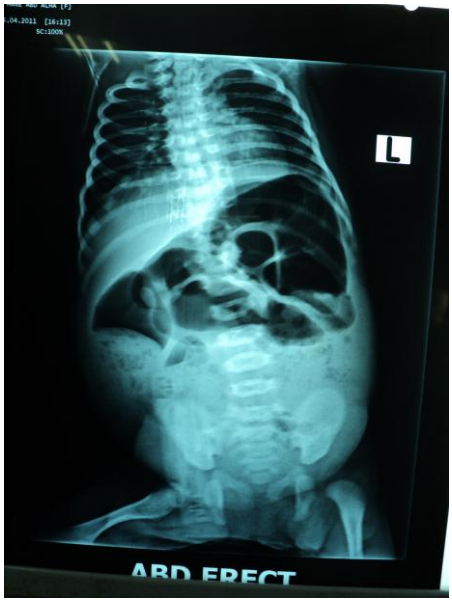

Figure (1) Plain X-ray erect radiography

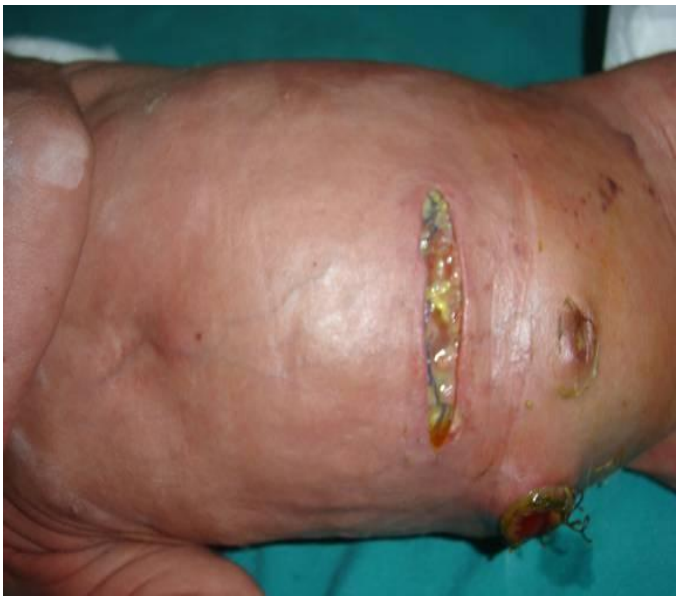

Figure (2a) Referred case with iliostomy

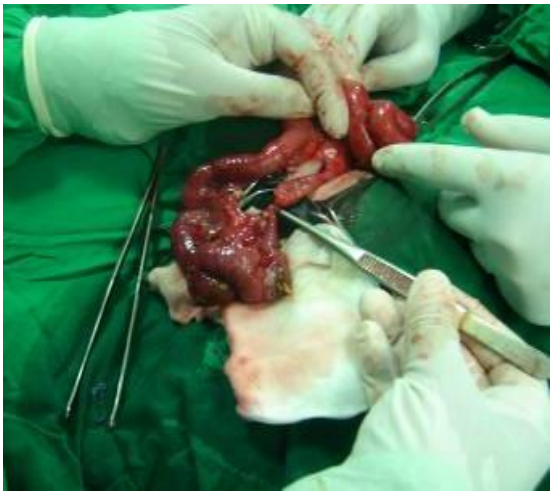

Figure (2b): The same patient on exploration

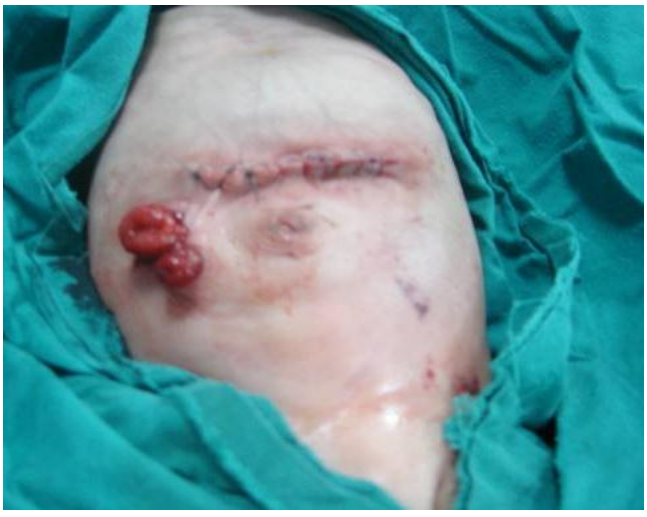

Figure (3): Patient with double barrel stoma

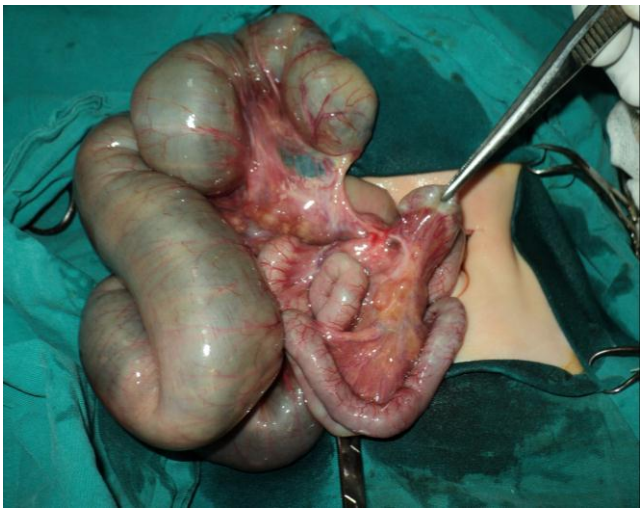

Figure (4a): Neonate with V-shape mesenteric defect (type IIIa)

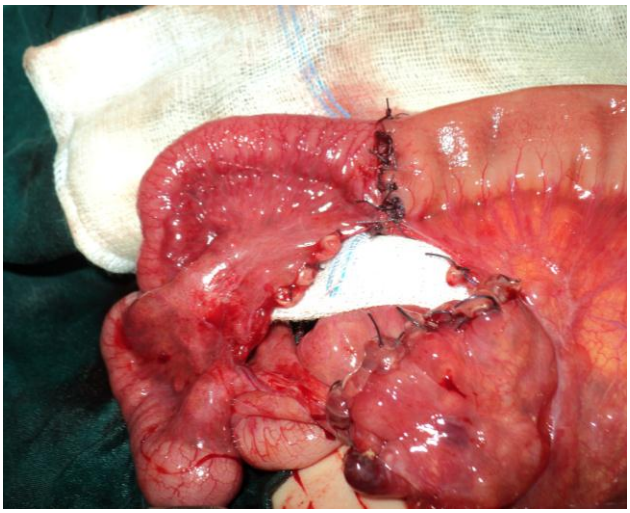

Figure (4b): End to oblique anastomosis

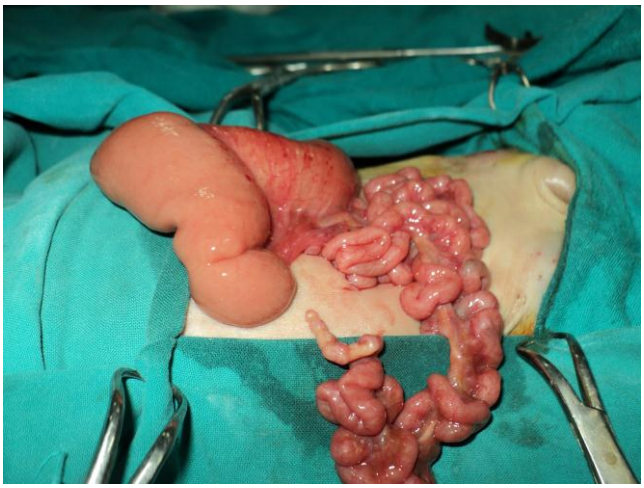

Figure (5a): Jejunal atresia type IIIb (apple peal appearance)

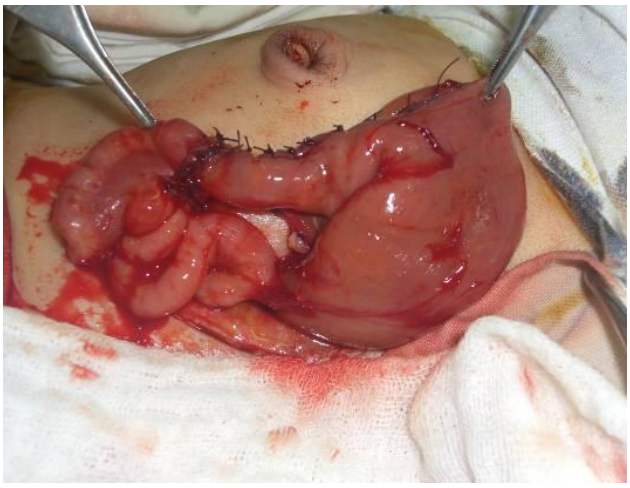

Figure (5b): High jejuna atresia after tapering enteroplasty

Discussion

Intestinal atresia is a well-recognized cause of intestinal obstruction in the newborn; the management of the neonates born with this condition has been improved in recent years due to many new advances in neonatal intensive care and anesthesia, operative procedures and use of TPN. The challenge in management of these cases is surgical technique and postoperative care. Mironescu et al[15], reported that different new techniques have been described to get better results with intestinal atresia and diminish as much as possible the consequences of the short bowel syndrome.

In our series, we resected short segment of the dilated proximal atretic jejunoileal loop (7-10 cm) which may be associated with disturbed transit. This is consistent with many other authors [8,11,20]. Otherwise, in cases of high jejunal atresia tapering enteroplasty was performed to avoid the possibility of anastomotic malfunctioning and also to avoid

postoperative sort bowel syndrome this is suggested by other authors [5,20].

At the time of operative repair, we passed a small plastic catheter distally through the distal stump and inject saline to check the patency of the distal segment of bowel, because a second mucosal web exists in 1% to 3% of cases, which, if missed, may result in a postoperative obstruction distal to the anastomosis as recommended by Laura et al[8].

Dysmotility in small bowel atresia may be related to damaged smooth muscle cells from ischemia [16] hypoplasia of enteric nerves, and reduced smooth muscle immuno-reactivity [17]. So TPN was mandatory in all our cases postoperatively for variable time till the baby can tolerate full enteral feeding.

In this study, cases with sepsis and bad general condition, we preferred to do double barrel enterostomy and reanastomosis was delayed until subsidence of the risk factors and improvement of the general condition to avoid the possibility of anastomotic leakage or disruption. This is in agreement with other current studies [15, 19].

Early postoperative mortality after correction of intestinal atresia has been reported by many studies- Martin and Zerella[10] 36%, Cywes et al[18] 22%, Rescorla and Grosfeld[13] 23% Laura[8] 16%, Stollman et al[19] 11%. The mortality rate in our study was (15.4%); it is fairly considered to be acceptable, considering our recorded results performed in a small number of investigated cases with late presentation.

Inspite that the period of follow up for those patients was short in our study (mean,5 months), these patients require follow-up into their adult life. Because among the long-term complications noted in literature, were short bowel syndrome, adhesive intestinal obstruction and stricture of the anastomostic line [8]. These observations indicate that long-term follow-up is essential for infants treated for jejunoileal atresia.

Conclusion:

Initial care must be given to those neonates with intestinal atresia in the form of good antibiotic coverage, early transfer to tertiary hospital center. The primary resection of the dilated nonfunctioning proximal part and reanastomosis is the procedure of choice if it is feasible; otherwise in cases of high jejunal atresia tapering enteroplasty with anastomosis is recommended. On the other hand double barrel enterostomy is an alternative if primary anastomosis is risky due to bad general condition.

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الملخص العربى

المعالجة والنتائج الجراحية لرتق الأمعاء الدقيقة فى مستشفى سوهاج الجامعى

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يعتبر رتق الامعاء القيقة أحد العيوب الخلقية الرئيسية المتسببة للإنسداد المعوى للاطفال

وحيث اننا كثيرا ما نفتقر للتشخيص المبكر والمعالجة السريعة لهذه الحالات، مما يؤثر على النتائج الجراحية المترتبة على ذلك.

وقد أجريت هذه الدراسة على ١٣ طفلا حديثى الولادة ممن بعانون من مرض رتق الامعاء الدقيقة من يناير ٢٠٠٧ حتى مارس ٢٠٠٩ بهدف تقييم الدور الجراحى لمعالجة مثل هذه الحالات.

وقد تم تشخيص المرض عن طريق الفحص السريرى وإجراء أشعة عادية على البطن. وبعد العمل على تحسين الحالة الصحيةلهؤلاء المرضى ، ثم عمل استكشاف للبطن . ووجد أن ثمانية منهم يعانون من الرتق المعوى اللفائفى ، حيث أجريت لهم عملية إستئصال لنهاية الجزء المنتفخ للإنسداد مع إستئصال الجزء الرتقى المنسد من الأمعاء وتوصيل جانبى الأمعاء من كلا الطرفين السالكين.

أما فى حالات رتق الصائم المعوى(٥ حالات) فقد تم أستئصال الجزء الرتقى مع عمل توصيل للأمعاء بعد تقويم الجزء المنتفخ بطريقة مائلة حتى تتناسب مع توصيله بالجزء الضيق للطرف الآخر من الصائم.

وقد أجريت هذه العمليات على مرحلة واحدة فيما عدا الحالات التى تعانى من إلتهاب بريتونى أو من سوء الحالة الصحية العامة، فقد تم عملها على مرحلتين ، المرحلة الاولى لتصريف الإنسداد عن طريق عمل فتحة جانبية للأمعاء بجدار البطن ، وعملية التوصيل تم تأجيلها لحين تحسن الحالة الصحية للأطفال.

ونستنتج من هذه الدراسة :يجب أن تكون أولوية العلاج هو تحسين الحالة الصحية لمرضى الرتق المعوى قبل التدخل الجراحى.إستئصال الرتق المعوى مع توصيل طرفى الأمعاء هو الإجراء المفضل إذا كان ممكنا. فى حالات رتق الصائم ، يجب عمل تقويم لنهاية الجزء المسدود والمنتفخ بطريقة مائلة حتى تناسب توصيله مع الجزء الضيق للطرف الآخر للأمعاء.كما ينصح للحالات التى تعانى من سوء الحالة الصحية، أو وجود التهاب بريتونى بأن تجرى مثل هذه العمليات على مرحلتين.