Laparo-Assisted Treatment of Intestinal Atresia: a single center experience

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ABSTRACT

Introduction Jejuno-ileal atresia is the most common cause of congenital intestinal occlusion in newborns and the duodenal atresia is the most common cause of high bowel obstruction in the neonatal period. Nowadays the minimally invasive approach has been widely diffused and these surgical options are possible: circumbilical incision, the video-assisted and totally laparoscopic treatment. We present our experience with the video-assisted approach for the correction of intestinal atresias.

Material and Methods Seventeen patients with bowel atresia were treated by video-assisted procedure at our Institution. Surgical procedures consisted of identifying and exteriorization of the affected tract followed by traditional bowel atresia correction outside the abdomen.

Results All cases were successfully completed. There were no conversions to open surgery. One patient required a second procedure for an incomplete distal web that hadn’t been previously identified and another one experienced occlusion for intra-abdominal adhesions.

Discussion and Conclusions Our study supports the value of laparoscopy in the management of small bowel atresia providing a definitive diagnosis and directing subsequent surgical approach. The video assisted technique for the correction of small bowel atresia is safe, effective, and adds the advantages of the classic laparotomic procedure to the laparoscopic ones.

1. INTRODUCTION

Introduction

The Jejuno – ileal atresia is the most usual cause of congenital intestinal occlusion in newborns and the duodenal atresia is the most usual cause of high bowel obstruction in the neonatal
In most cases, prenatal diagnosis is possible thanks to ultrasound monitoring of the pregnancies. Early diagnosis together with the neonatal assistance and nursing has reduced the incidence of the classic clinical presentation. The traditional treatment is classically performed by a transverse sovraumbilical laparotomy (1). The first “minimally-invasive” approach was performed at the end of the seventies. Nowadays, we may consider in the surgical treatment of intestinal atresia three minimally invasive procedures: open technique with a circumbilical incision (2, 3), totally laparoscopic (4-8) or video-assisted technique (9,10). We present our experience in laparo-assisted treatment of small bowel atresia.

We reviewed clinical charts of 17 newborn infants with intestinal atresia managed by laparoscopically assisted procedure at our hospital. Postnatal evaluation was performed with abdominal x-ray and contrast enema in order to confirm the diagnosis.

Surgical techniques:

The surgical treatment was performed under general anaesthesia. The patient was placed at the end of the table in supine position. The first surgeon stood at the patient’s feet. The second and the third surgeons were positioned on the left and on the right side of the first surgeon respectively.

A pneumatic anchorage Hasson type 10 mm trocar for the camera was inserted through the umbilicus using an open technique.
Pneumoperitoneum was obtained with carbon dioxide at a 6-7 mmHg pressure and a 0.5 L/min flow. An operative optic was introduced through the umbilical trocar. Two additional 3mm operative trocars were necessary to correct duodenal atresia (one in the right lower abdominal quadrant and the other in the left superior quadrant) (Fig 1,2,3).

The abdominal cavity was inspected and when the atresic bowel was identified, the umbilical trocars was removed and the pathological portion of the bowel was exteriorized (Fig. 4,5,6,7).

The second step of the operation was realized by open technique.

In one patient, duodenal atresia was supported by a complete web in its second portion.
Figure 8: Tapering of the dilated tract and direct anastomosis.
The web was resected outside the abdomen (vertical enterotomy and transverse suture) after laparoscopic duodenal mobilization. Resection of the atresic intestine, tapering of the dilated tract and direct anastomosis (Fig. 8) were performed in case of jejunal-ileal atresia.

Bowel irrigation searching for other atresic segments was done outside the abdomen in all cases.

Figure 9: Laparoscopic visualization of the complete anastomosis.
The anastomosis was replaced in the peritoneal cavity and the last evaluation (position of the anastomosis, absence of bleeding and other pathological conditions) was done by a laparoscopic exploration (Fig. 9).

2. RESULTS

Results
From January 2007 to September 2012 seventeen neonates came to our attention with a diagnosis of small bowel atresia. Fifteen of them had a prenatal diagnosis that was confirmed after birth, two of them presented with increasing abdominal distension and biliary vomiting. Laparoscopic assisted procedures were performed to correct the anomaly. Intraoperative findings were: 5/17 duodenal atresia, 1/17 obstruction due to anular pancreas, 10/17 jejunal or ileal atresia and 1/17 ileal stenosis.

Laparo-assisted surgery was performed between 24 and 48 hours of life except in the case of ileal stenosis, in which it was performed within 24 hours from the diagnosis of bowel obstruction.
In all cases the procedure was successfully completed. There weren’t any intraoperative complications or conversions. The atresic bowel was identified, isolated when necessary (duodenal atresia) and exteriorized without difficulties due to the elasticity of the abdominal skin and umbilicus. One patient required a second intervention for an incomplete distal web that hadn’t been identified in the first surgical procedure and another one experienced intestinal occlusion 27 days after surgery for adhesions. The mean operative time was 90 minutes. Table 1 resumes the patients’ data. Nowadays the patients are in good clinical conditions, feed on a normal diet and are thriving with minimal abdominal scars (Fig 10).

3. DISCUSSION

Discussion

Congenital duodenal atresia has become a clinical challenge in the first half of the 18th century, but the first patient who survived to a corrective treatment was reported at the beginning of the 20th century. This malformation has always been of surgical interest and the traditional technique, codified by Ladd and Gross, is performed by a sovraumbilical transverse laparotomy.

The first description of ileal atresia is to refer to Goeller but the first patient, who survived to a surgical treatment, was reported in 1911 by Fockens (1).

Laparotomic approach always assured good diagnostic and surgical results in spite of long operating times, long hospitalizations, high risk of intestinal adhesions and finally not undervalued scars.

The first minimally invasive correction of small bowel atresia has been reported in 1978 when an endoscopic treatment of duodenal atresia was attempted using a snare or a papillotome. But this technique was associated with a high risk of stenosis recurrence, and then it was promptly given up. Currently, three minimal invasive approaches have been outlined. The intestinal continuity can be established with a circumbilical incision (2), a totally laparoscopic (4-8), or a video-assisted technique (9,10).

The first use of circumbilical incision was reported by Tan and Bianchi for pyloromyotomy in 1986. This transumbilical technique has been adopted by many paediatric surgeons and considered safe, feasible and virtually scarless. Today it is used to treat a broad spectrum of other abdominal pathologies, including small bowel atresia (2,3). In this approach, bowel mobilization isn’t done under direct vision and is not possible to verify the absence of extrinsic malformations (such as classic Ladd’s bands, annular pancreas or as an anterior portal vein) that potentially coexist in patients with these gastrointestinal malformations.

Totally laparoscopic technique, reported for the first time in 2001, consists of making a diamond-shaped anastomosis using an intracorporeal suturing technique. This procedure carries all the advantages of the laparoscopic surgery, but has a longer operative time, even when performed by skilled laparoscopic surgeons; we believe that extracorporeal anastomosis is safe, simple and inexpensive. Moreover, this added the benefits of avoiding the potential risk of intra-abdominal spillage.

The advantages of the totally laparoscopic approach are also present in the video-assisted technique with very good surgical and aesthetic results. In fact the video assisted approach, unlike the laparoscopic procedure, allows to remove completely and safely the intestinal atresia with shorter operative time and, unlike the circumbilical approach, allows to evaluate the presence of extrinsic malformations and to perform bowel mobilization and exteriorization under direct vision.
4. Conclusion

In conclusion, we think that video-assisted approach combines the advantages of traditional laparotomy to the laparoscopic technique. We think that the cosmetic results of minimally invasive surgery are of great benefit, but they must be considered in concert with clinical results. Based on our experience, laparoscopic assisted surgery for bowel atresia should be considered the main option for the treatment of small bowel atresia.

5. TABLE 1: Patiens' data

Table 1:

<table>
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<tr>
<th>Surgical findings</th>
<th>Sex</th>
<th>Prenatal diagnosis</th>
<th>Gestational age (weeks)</th>
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<th>Day of surgery</th>
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6. References


