

Laparoscopic Appendicostomy

DAVID B. TASHJIAN, M.D., KEVIN P. MORIARTY, M.D.,
RICHARD A. COURTNEY, M.D., and STANLEY H. KONEFAL, M.D.

ABSTRACT

Background and Purpose: Chronic constipation and encoporesis present many psychosocial problems for patients and their families. Therapy with the antegrade continence enema was initially described by Malone in 1990. We present a series of patients in which a Malone antegrade continence enema was created laparoscopically.

Patients and methods: Eight patients between 2 and 15 years of age presented for a laparoscopic appendicostomy for the use of antegrade continence enemas. Using an open Hasson technique, a 5-mm laparoscope was placed at the umbilicus. A second port was placed in the right lower quadrant for exteriorization of the appendix. The appendix was matured as originally described by Malone.

Results: Six of eight patients are continent postoperatively. Seven of eight patients' families were either extremely satisfied or satisfied with the results of the procedure.

Conclusions: The primary indication for the Malone antegrade continence enema is neurogenic overflow fecal incontinence. It has also been used for patients with anorectal malformations and idiopathic constipation. Patient selection is critical, especially in candidates less than 5 years of age. Laparoscopy offers patients a means to create an appendicostomy without a laparotomy.

INTRODUCTION

CHRONIC CONSTIPATION AND FECAL INCONTINENCE present multiple psychosocial issues for children and their families. Spina bifida, anorectal malformations, Hirschprung's disease, trauma resulting in spinal injury, and idiopathic constipation can lead to encoporesis. Since Malone and associates introduced the antegrade continence enema in 1990,¹ more than 100 cases have been reported in the literature² to substantiate the view of the Malone antegrade continence enema (MACE) as an effective treatment for children with fecal incontinence and intractable constipation. As modifications are placed on the original procedure, the role of laparoscopy and the MACE continues to rise.³ We present a series of patients in which the MACE was created laparoscopically.

Division of Pediatric Surgery, Baystate Medical Center Children's Hospital, The Western Campus of Tufts University School of Medicine, Springfield, Massachusetts.

Presented at IPEG 2000: The IXth International Congress for Endosurgery in Children, Atlanta, Georgia, March, 2000.

PATIENTS AND METHODS

Between July 1998 and May 1999, eight patients between 2 and 15 years of age underwent a laparoscopic MACE procedure. Three patients had anorectal malformations, four had idiopathic constipation, and one had neurogenic constipation. Success was judged according to the criteria set forth by Curry, Osborne, and Malone.⁴

Six of eight patients received a preoperative bowel preparation with polyethylene glycol electrolyte solution, and all received a preoperative dose of intravenous antibiotic. Using an open Hasson technique, a 5-mm laparoscope was placed at the umbilicus. A second 5-mm port was then placed in the right lower quadrant for exteriorization of the appendix. This trocar was tunneled medially to create an extraperitoneal tunnel for the appendix as described by Philip and Nicholas.⁵ The appendix was delivered through the right lower quadrant port site and matured as originally described by Malone⁶ (Fig. 1). Prior to maturation, an 8F Foley catheter was placed in the stoma, which remained in place for 2 to 4 weeks. The average operating time for the laparoscopic procedures was 80 minutes.

Postoperatively, the patients were immediately started on a daily regimen of saline enemas, 50 mL twice a day, which were increased to 100 mL per year of age at 1 week postoperatively. Subsequent modifications were made to the amount, frequency, and content of the enemas on the basis of the individual results.

RESULTS

Using the criteria set forth by Malone, five patients are a full success, one patient is a partial success, and two patients are failures. Both failures are less than 5 years of age and have anorectal malformations. Seven of eight families were either extremely satisfied or satisfied with the results, including the family of one of the failures. There was one incident of stomal stenosis and leakage. One patient required conversion to an open procedure because of nonvisualization of the appendix secondary to adhesions.

The partial success is a 6-year-old child with chronic constipation. The patient continued to have occasional rectal leakage and persistent constipation despite the MACE. The patient also leaked at the stoma. The patient underwent a laparoscopic cecal plication and a laparoscopically assisted sigmoid colectomy for a severely redundant colon and is now without stoma leak. The child has stools regularly without soilage.

DISCUSSION

The MACE procedure has become an accepted form of treatment for children with fecal incontinence and chronic constipation, with its primary indication being neurogenic overflow fecal incontinence.⁷ Its value in patients with chronic constipation is evident, although some reports suggest that it is less effective.^{4,7} In our series, three of four patients treated for intractable constipation had full success, with the fourth being a partial success. The families of these patients were all satisfied with the results of the procedure.

Patient selection for the MACE is critical. The two failures in our group resulted from noncompliance. Both the patient and family need motivation to obtain satisfactory results. The child and family must perceive the incontinence or constipation as a problem in order for the MACE to be successful. Failures attributable to noncompliance are often seen with young children.^{4,7-9} Curry and associates⁸ reported a failure rate of 70% in children under 5 years of age but only a 24% failure rate in older children regardless of the diagnosis. Our data confirm this point, as the two failures were ages 2 and 5 at the time of surgery. Therefore, caution needs to be taken when creating a MACE for children under the age of 5 and for patients from families without a full commitment.

CONCLUSION

Laparoscopy offers a minimally invasive approach to the MACE. This procedure can be performed with results comparable to those of the open technique.³ Other minimally invasive techniques exist,¹⁰ but no

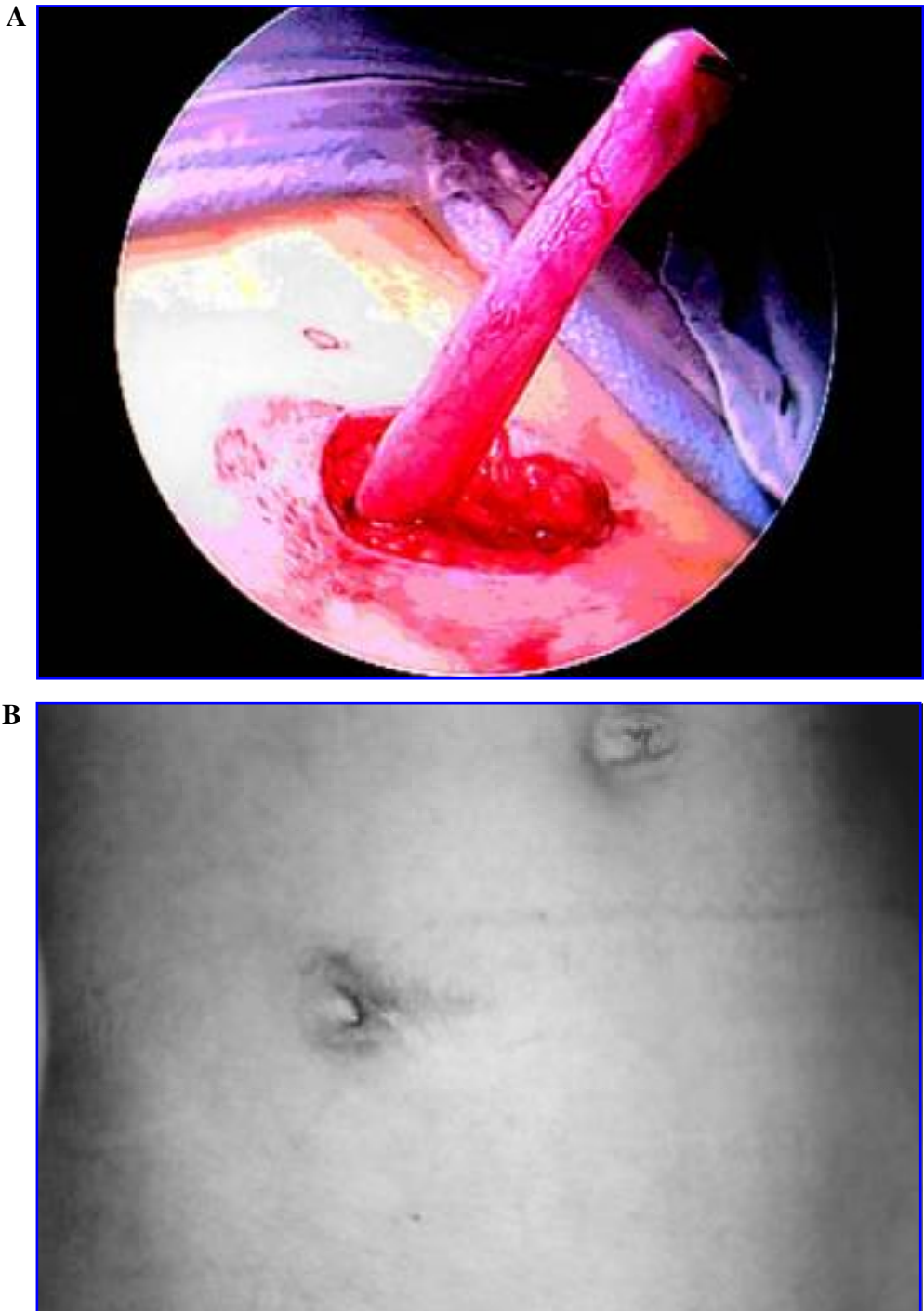


FIG. 1. Surgical technique. (A) Exteriorized appendix. (B) Matured appendicostomy.

long-term external device is required with a laparoscopic MACE. Conversion to an open technique can always be made if technical difficulties are encountered. With careful patient selection, a MACE can be created laparoscopically with satisfactory results, while sparing the patient a laparotomy.

REFERENCES

1. Malone PS, Ransley RG, Kiely EM. Preliminary report: The antegrade continence enema. *Lancet* 1990;336:1217-1218.
2. Graf JL, Strear C, Bratton B, Housley HT, Jennings RW, Harrison MR, Albanese CT. The antegrade continence enema procedure: A review of the literature. *J Pediatr Surg* 1998;33:1294-1296.
3. Webb HW, Barraza MA, Crump JM. Laparoscopic appendicostomy for management of fecal incontinence. *J Pediatr Surg* 1997;32:457-458.
4. Curry JJ, Osborne A, Malone PS. How to achieve a successful Malone antegrade continence enema. *J Pediatr Surg* 1998;33:138-141.
5. Philip I, Nicholas JL. Laparoscopic appendicostomy for management of fecal incontinence (letter). *J Pediatr Surg* 1998;33:670-671.
6. Griffiths DM, Malone PS. The Malone antegrade continence enema. *J Pediatr Surg* 1995;30:68-71.
7. Curry JJ, Osborne A, Malone PS. The MACE procedure: Experience in the United Kingdom. *J Pediatr Surg* 1999;34:338-340.
8. Squire R, Kiely EM, Carr B, Ransley PG, Duffy PG. The clinical application of the Malone antegrade colonic enema. *J Pediatr Surg* 1993;28:1012-1015.
9. Meier DE, Foster ME, Guzzetta PC, Coln D. Antegrade continent enema management of chronic fecal incontinence in children. *J Pediatr Surg* 1998;33:1149-1152.
10. Chait PG, Shandling B, Richards HF. The cecostomy button. *J Pediatr Surg* 1997;32:849-851.

Address reprint requests to:
Kevin P. Moriarty, M.D.
Pediatric Surgical Services
125 Liberty Street
Springfield, MA 01103

E-mail: kpmort@charter.net