Long-term results of Malone’s procedure with antegrade irrigation for severe chronic constipation

Original Article

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Summary

Aim. — The Malone antegrade colonic enema (MACE) procedure is a minimally invasive treatment for severe constipation, and the objective of the present study was to assess the long-term results and quality of life in patients undergoing such colonic irrigation.

Method. — Twenty-five adult patients underwent MACE between 1995 and 2002 for chronic constipation. After a mean follow-up duration of 55 ± 36 months, the patients answered questionnaires to assess stoma usage, constipation score (KESS) and quality of life (GIQLI).

Results. — The mean quality-of-life scores for these patients was 83 ± 28 (normal: 125), while their mean constipation score was 19 ± 9 (normal: < 7). Twelve patients stopped the irrigations, and eight underwent further surgical procedures, specifically, total colectomy with ileostomy (n = 2), ileorectal anastomosis (n = 3) or segmental colectomy (n = 3). Finally, five patients had permanent stoma. The 13 remaining patients continued to perform irrigations (4.6 per week). The patients’ mean KESS score was 18.3 ± 8 (normal: < 7), and the mean GIQLI score was 98 ± 20 (normal: 125). Continence status had no influence on success.

Conclusion. — In our series, MACE was successful in half the patients who were, thus, able to avoid more aggressive approaches. However, when MACE failed, other surgical procedures were often required.

Résumé

Objectif. — La technique de Malone (Malone antegrade colonic enema [MACE]) est une intervention mini-invasive utilisée dans le traitement de la constipation sévère. Cette étude évalue les résultats à long terme et la qualité de vie des patients ayant fait l’objet d’une MACE.

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**Méthodes.** — Vingt-cinq patients ont subi une MACE entre 1995 et 2002 pour constipation chronique. Avec un suivi moyen de 55 ± 36 mois, les patients ont répondu à un questionnaire afin d’évaluer son utilisation, le score de constipation (KESS), et la qualité de vie (GIQLI).

**Résultats.** — Parmi les 25 patients, le score moyen de qualité de vie était de 83 ± 28 (normal : 125), le score moyen de constipation était de 19 ± 9 (normal < 7). Treize patients pratiquaient régulièrement des lavements (4,6 par semaine en moyenne). Le score KESS était de 18,3 ± 8 (normal : <7) et le score GIQLI de 98 ± 20 (normal : 125). Douze patients ne réalisaient plus d’irrigations, huit ont nécessité une nouvelle intervention chirurgicale : colectomie totale avec iléostomie (n = 2), avec anastomose iléorectale (n = 3), ou colectomie segmentaire (n = 3). Finalement cinq patients sont porteurs d’une colostomie terminale. Le statut de continence des patients n’avait pas d’influence sur le succès de l’intervention.

**Conclusion.** — La MACE a permis une stabilisation de l’état chez la moitié des patients. En cas d’échec de la MACE, la qualité de vie des patients est restée significativament détériorée et d’autres procédures chirurgicales étaient nécessaires.

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**Introduction**

Constipation is a common condition that is usually treatable with conservative management using bulk laxatives and enemas [1]. However, if medical treatment fails in cases of severe chronic constipation with documented slow transit, then Malone antegrade colonic enemas (MACE) may be performed. This procedure has been in use since the early 1990s as a minimally invasive approach to improve the symptoms of severe constipation. Initially proposed for children and subsequently for adults, it is used particularly when constipation is associated with continence disturbances [2]. Several studies using technical modifications of the MACE procedure have reported its feasibility and low morbidity [3–5]. Nevertheless, there is little information in the literature concerning the long-term results with this technique for the specific indication of severe constipation [6]. Thus, the aims of the present study were to assess MACE success rates, causes of long-term failure, functional results (continence and constipation scores) and quality of life (QoL) for those patients still continuing to use their stoma after a long follow-up period.

**Patients and methods**

**Study design (retrospective single-center study)**

Twenty-five patients (22 women and three men) underwent the MACE procedure for severe chronic constipation between 1995 and 2002. The mean age of the study group was 51 ± 11 years. The etiology of the constipation included slow-transit (n = 17), degenerative disease leading to severe colonic motility alterations (n = 3) and previous anoperineal surgery for chronic severe constipation (n = 5). All patients had increased colonic transit time (mean 120 ± 20h), and had previously undergone unsuccessful conservative management with bulk laxative medications and enemas. The Malone procedure was proposed before any other surgical approach. Among the 25 patients, symptoms of constipation were associated with fecal incontinence in 10 cases. Patients underwent physical examination, and the possibility of using the MACE procedure was routinely assessed. At the time of review, a self-administered questionnaire was mailed to each patient who was still performing enemas to evaluate the outcome according to stoma usage, frequency of irrigation with volume of solution administered, functional results in terms of constipation symptom control (KESS constipation score) [7], improvement of incontinence where the patient experienced both constipation and incontinence, and global satisfaction and QoL (GIQLI) [8,9].

**Surgical technique and postoperative course**

After full mechanical bowel preparation, MACE was performed through a median celiotomy. The procedure was initiated with calibrated tube preparation, using the appendix, cecum (when the appendix tube was not available because of previous appendectomy) or, more recently, ileum, as reported by Monti et al. [10]. The tube was pulled through a wound in the lower-right quadrant of the abdomen, and a V–Y skin flap created, as reported elsewhere [4]. The tube remained catherized with a Foley catheter for a postoperative period of 5 days, and patients were discharged after 8 days. Under the supervision of a stoma care nurse, the patients initiated their first irrigations by themselves during a short hospital stay 6 weeks after the operation.

**Follow-up**

The frequency and quantity of fluid (tap water) administered during the enemas were adapted to each patient to offer the most satisfactory colonic emptying. During the first few weeks, enemas were performed once every 48 h, using 1 L of tap water. Subsequently, the patient adjusted the treatment according to familial and social requirements. In cases of soiling, a gastrostomy button was proposed to the patient (MIC-KEY®, Kimberly-Clark, Utah, USA).

The entire study population was followed-up for a mean duration of 55 ± 36 months, while those patients still performing irrigations were followed for 69 ± 31 months.
Malone's procedure for chronic constipation

Statistical analysis

Results are expressed as means ± standard deviation. Comparisons were performed using a paired t test (SPSS software).

Results

The MACE procedure was performed with a cecal tube in 18 cases, an appendiceal tube in three cases and an ileal tube in four cases, and the mean surgery time was 83 ± 34 min. Postoperative morbidity during the first 30 days was local skin inflammation in seven cases. All patients could start irrigations after a mean period of 6 weeks and with complete local cicatrization. Long-term complications of the MACE procedure were transient soiling (n = 18) with skin inflammation (n = 7), stenosis (n = 7) and prolapse (n = 2). Among the 25 study patients, surgery was necessary during the follow-up for reflection of the stoma in five cases (prolapse and stenosis), three patients underwent repeated dilations due to stenosis, four patients had a permanent gastrostomy button inserted into the stoma to avoid soiling and two patients died during the follow-up period (due to suicide and cardiac failure, respectively, which were considered unrelated to the constipation and treatment).

The mean QoL score for the entire study population (83 ± 28) remained lower than normal values gathered from the general population (normal: 125; P < 0.05), whereas the mean constipation score was high at 19 ± 8 (normal: < 7). Twelve patients (48%) stopped performing irrigations at a median of 18 (range: 2–100) months. Of these patients, 10 obtained surgical closure of the stoma, while spontaneous closure occurred in the remaining two. A further surgical procedure to treat severe constipation symptoms was necessary in eight (67%) patients. This included total colectomy with ileostomy (n = 2), conservative total colectomy with ileo-rectal anastomosis (n = 3) and segmental colectomy (n = 3).

At the end of the study, five patients in this group had subsequent end colostomy, and the mean QoL score was 60 ± 23 at the time of review.

In addition, 13 patients (52%) were still performing irrigations with a mean number of 4.6 (range: 1–7) enemas per week; the mean amount of tap water administered per enema was 800 mL (range: 500–1500) over a mean duration of 20 min (range: 5–30).

There were no differences in terms of age, etiology, preoperative colonic transit time and postoperative complications between patients who stopped performing irrigations and those who continued. As for patients with both constipation and incontinence, continence status was improved in all cases, although this had no influence on the functional results or success rate of the MACE procedure. The mean Cleveland Clinic Florida incontinence score [11] at the time of review was 4 ± 2.

Discussion

In rare circumstances and if conservative management fails, surgical procedures are proposed to improve the symptoms and QoL of patients with severe chronic constipation. Subtotal and segmental colectomy can offer patients satisfying results, but the success rate is still a matter of controversy; often, it requires invasive surgery with a significant morbidity rate [1,12,13].

The Malone procedure is a technique proposed as an alternative to major surgery [2,14], and the results of the present study support the use of this less aggressive approach, which is associated with a low morbidity rate in the postoperative period and even after several years, as has been generally reported in the literature for adult and pediatric patients [3,15,16]. The limited severity of the procedure represents its true advantage over surgery when considering functional disorders. Nevertheless, its minor localized morbidity was significant, and included stenosis and prolapse, necessitating repeat intervention in five cases. Similar results have previously been reported in studies of both adults and children [6,14,16]. Herndon et al. [16] reported a need for 13 surgical revisions because of complications among 127 patients after a mean follow-up period of 26 months, and Bani-Hani et al. [17] recently reported on the long-term results with Malone’s procedure in 236 children at a single institution, which included a mean 17% rate of surgical revision.

The present study included a homogeneous population with chronic constipation that had not been successfully treated with conservative methods, and Malone’s procedure was proposed as an alternative to major surgery or colostomy. In this series, half the patients were still doing regular irrigations after 5 years of follow-up. It is worth noting that only a few studies have reported on the long-term results of MACE specifically for chronic constipation. Poirier et al. [18] reported that 14/18 patients were still using MACE after 18 months of follow-up. Not surprisingly, given the disabling nature of chronic constipation, the QoL of these patients remained below that of the general population. However, as the French version of the QoL questionnaire had not been validated when the present study began, we were not able to compare QoL scores before and after the procedure.

One of the main reported complaints of the MACE procedure was peristomal soiling. However, several studies have reported high success and satisfaction rates, as well as reduced soiling rates with this technique when applied specifically for fecal incontinence [5]. It appears likely that constipation is more difficult to treat with MACE than is incontinence. Incomplete colonic fecal emptying presents a challenge for the optimization of enema frequency and quantity of fluid administered. It may be hypothesized that a motility disturbance of the colon in our patients was responsible for their difficulty in achieving complete colonic evacuation compared with patients with isolated fecal incontinence, thereby decreasing the success rate with this approach for severe constipation. Also, although the operative technique is well standardized, modifications have been recently proposed [6,10] to limit any adverse effects. In the present study, none of the patients with an ileal tube experienced soiling. In addition, obturation of the tube with a modified gastrostomy button provided a satisfactory solution in four patients.

However, 13 of the 25 patients in our series stopped using the stoma after a mean follow-up period of 18 months, and all of these patients required further invasive surgical procedures with uncertain results. Their QoL scores remained...
far below normal values and, ultimately, 30% required end colostomy.

On the other hand, and considering the low morbidity rate and minimally invasive nature of the MACE procedure, half the patients were still using it after 4.5 years. The functional results and QoL were acceptable, albeit still below the normal range. Unfortunately, however, there was no difference between the patients still using the stoma and those who stopped the irrigations, thus permitting no predictive factor of success to be identified.

Nevertheless, our results suggest that Malone’s procedure has a definite place in the treatment of severely constipated patients. It may be considered as either the first step towards a permanent stoma for those who fail to respond to MACE or a long-term treatment for those coping with MACE. Recently, we introduced a new and even less invasive endoscopic approach [19] that, in future studies, will be compared with the MACE procedure described here.

Conflicts of interest

There are no present or potential conflicts of interest.

References