Use of Peristeen® transanal colonic irrigation for bowel management in children: A single-center experience☆☆

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Aims: Transanal colonic irrigation has been shown to be effective in bowel management program in adults. However, there exist limited data in children. We appraised the effectiveness of this technique in a series of children with incontinence or constipation and overflow soiling.

Methods: Following ethical approval, a review of children with incontinence or constipation on a bowel management program with Peristeen® transanal colonic irrigation treated between 2007 and 2012 was performed. Irrigations were performed with a volume of 10–20 ml/kg of water with schedules depending on patient response. Data are reported as median (range).

Results: Twenty-three patients were reviewed. Median age at commencement of irrigations was 7 (2–15) years. Median follow-up is 2 (0.7–3.4) years. Diagnoses include the following: spina bifida (n = 11), anorectal anomaly (n = 6), Hirschsprung’s (n = 1), and other complex anomalies (n = 5). Sixteen (70%) patients had associated anomalies. Twelve (52%) had constipation and overflow soiling, and 11 (48%) had fecal incontinence. Twenty (87%) had associated urinary wetting. Sixteen (70%) children used alternate-day irrigations, 4 (17%) daily irrigations, and 3 (13%) every third-day irrigations. Nine (39%) patients were taking pharmacological maneuvers failed to be effective.

Conclusions: In our experience, Peristeen® transanal colonic irrigation is an effective method of managing patients with focal soiling in childhood. Majority (83%) of children achieve social fecal continence or a significant improvement with occasional soiling. This was accompanied by high parental satisfaction. Peristeen® transanal colonic irrigation is a valid alternative to invasive surgical procedures and should be considered the first line of treatment for bowel management in children with soiling where simple pharmacological maneuvers failed to be effective.

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The effective management of children with fecal soiling, secondary to a variety of congenital and acquired anomalies or to chronic idiopathic constipation, represents a significant challenge to families and carers. Incontinence has a significant impact on quality of life, leading to loss of self-esteem, social isolation and depression [1]. A variety of surgical techniques are available to manage the soiling child who has failed to improve with simple pharmacological measures.

The antegrade continence enema (ACE) described by Malone et al. [2] in 1990 is commonly regarded as an effective technique with case series reporting successful bowel management in >90% of children [3]. Several modifications, including the use of laparoscopy, have been proposed over the years in order to minimize complications [4–9]. Nonetheless, it remains an invasive surgical procedure with complications reported in >50% of children including leak, infection and stricture at the skin site, difficult catherization with risk of creation of a false passage and persisting soiling [6,10–13].

Transanal colonic irrigation has been known since at least 1500 BC [14] and was popularized in children with spina bifida in 1987 by Shandling and Gilmour [15]. Since then, other studies have documented the efficacy and safety of this treatment in children [16–20]. Different commercial systems are now available for transanal colonic irrigation using either a rectal balloon catheter (Peristeen® Anal Irrigation System; Coloplast A/S, Kokkedal, Denmark or Mallinckrodt, St. Louis, MO) or a cone-shaped colostomy tip (Alterna®, Coloplast A/S, Humlebaek, Denmark; Qufora® Irrigation System, Alleroed, Denmark; or Biotron® Irrimatic Pump, Braun). The use of Peristeen® has been more extensively investigated in adults and shown to...
provide good long-term results [21–23]. There are limited data available in children regarding the use of transanal colonic irrigation delivered with the Peristeen® system [24,25]. We introduced a bowel management programme with Peristeen® system 5 years ago. The aim of this study was to appraise the results of this technique in providing effective transanal colonic irrigation in children with incontinence or constipation and fecal soiling.

1. Materials and methods

A retrospective review of children with incontinence or constipation and fecal soiling on a bowel management program with Peristeen® transanal irrigations (Coloplast A/S, 3050 Humlebæk, Denmark) over a 5-year period (2007–2012) was performed. Patients’ characteristics and age at starting the treatment were reviewed from inpatient and outpatient records. The study was approved by the Oxford University Hospital Research Ethics Committee (Project Number 2206).

The Peristeen® irrigation system was used. Families and children were prepared through information leaflets, DVDs and meetings with specialist nurses where equipment was demonstrated. The system consisted of a control unit with pump, water bag and a rectal catheter (Fig. 1). The catheter being connected to a water pump to push the irrigation fluid in. Depending on mobility, dexterity, body habitus etc., the child assumes a position that makes it possible to self-insert, or have a carer insert, the catheter into the rectum. The catheter is inserted as far as the finger grip allows. When inserted, the balloon is inflated preventing leakage of fluid. Irrigations are performed with a volume of 10–20 ml/kg of water with schedules depending on patient response. After irrigation the balloon is deflated and the catheter is removed to empty the rectum and the left hemicolonic. Time taken to empty the bowel is individual but for most of our patients this process was completed in 20–40 minutes from start to finish. Washouts were initially performed daily but many children soon progressed to alternate-days washouts very quickly. The specialist nurses demonstrated the various parts of the system and described how to use it and followed up the families to answer any questions and explain any difficulties or complaints after the first use.

We assessed the therapeutic effectiveness of transanal irrigation based on general satisfaction, the presence of side effects during treatment and the use of laxatives. Children were followed up either in the pediatric surgical clinic or pediatric urology clinic by a consultant pediatric surgeon and two specialist children’s nurses. Data are reported as median (range).

2. Results

Over the 5-year period 23 patients were treated with Peristeen® transanal colonic irrigation. Median age at starting to use the system was 7 (2–15) years. Median follow-up was 2 (0.7–3.4) years. Patient characteristics are reported in Table 1.

Diagnoses include the following: spina bifida (n = 11); anorectal anomaly (n = 6); Hirschsprung’s (n = 1); other complex anomalies (n = 5). Sixteen (70%) patients had associated anomalies.

Twelve (52%) had constipation and encopresis and 11 (48%) incontinence. Twenty (87%) had associated urine incontinence. Sixteen (70%) children were on alternate-day irrigations, 4 (17%) on daily irrigations and 3 (13%) on every third-day irrigations. Nine (39%) patients were taking oral laxatives. Seven (30%) among the older children [median age 11 (7–15) years] were self-administering the washouts.

Sixteen (70%) reported to be clean and 3 (13%) reported a significant improvement although were having occasional soiling episodes. Three (13%) patients reported mild general discomfort and abdominal pain during the procedure but remained on treatment. During the study period, no serious adverse events relating to the anal irrigations were reported by patients or their parents.

Four patients (17%) were not satisfied with the irrigation procedure and had stopped using it. Reasons for discontinuing included difficulties and severe pain on insertion of the catheter and expulsion of the catheter during irrigation (n = 2), persistent significant soiling (n = 2), and requirement for more than two daily washouts to remain clean (n = 1). These four patients underwent subsequent stoma formation.

3. Discussion

Our results are in accordance with previous studies in adults and confirm that transanal colonic irrigation performed with Peristeen®
has a high success rate in children with fecal soiling secondary to various congenital or acquired conditions.

Different disorders can lead to incontinence including organic diseases, such as anorectal malformations, Hirschsprung's disease and neuropathic bowel (e.g. spina bifida) or functional diseases with severe constipation and encopresis. Irrespective of the cause, incontinence has a significant impact on quality of life, leading to loss of self-esteem, social isolation and depression in 20%–40% of patients at long-term follow-up [1].

The surgical management of children who have failed medical treatment represent a challenge for the paediatric surgeon. Malone at al. [2] in 1990 described the ACE procedure using an appendicostomy as an effective technique to manage fecal incontinence in children. Since then, various modifications (i.e., left-sided ACE, percutaneous ACE, button ACE, and laparoscopic cecal ACE) have been described with large series reporting successful bowel management in >90% of children [11]. Several studies confirm that this then significantly improves the child’s quality of life [26–28]. However, complications associated with the ACE technique have been reported in up to 50% of children [3,6,11–13]. For example, Curry at al. [10] reported their experience in a large series of patients with anorectal malformation with an overall success rate of 79% and complication rate of 41% (with stenosis observed in 30%). Rangel et al. [3] more recently reported a 25% incidence of complications in their large series, with complications being mainly stoma stenosis and leakage with 23% of children needing reoperation. The authors also reported that the use of the umbilical V-V appendicoplasty technique was associated with a lower incidence of strictures when compared with the traditional circular anastomosis.

In children where the appendix has been removed, the creation of an ACE requires a more invasive procedure usually based on the Mitrofanoff principle (e.g. reconfigured piece of small intestine [29,30] or tubularized colonic flaps [31]). Cecotomy and tubes and buttons have also been described with good results but these techniques have complications including local inflammation, granulation tissue and leakage and accidental dislodgement of the tubes in up to 50% of patients [32–34].

Transanal colonic irrigation was described in an Ancient Egyptian papyrus (Eber’s papyri dated 1500 BC) and it has certainly been in use since that time by many different cultures as a system for bowel cleansing [14]. More recently, Shandling and Gilmour [15] popularized the use of transanal irrigations in children with spina bifida in the 1980s. They used a rectal tube (“Shandling catheter”), with an inflatable balloon preventing the leakage of enema fluid, and reported 100% continence in 112 patients.

Since then, other studies have documented the efficacy and safety of this treatment in children [16–20]. Blair et al. [16] reported that in their experience transanal irrigations performed with ordinary rectal tubes provided different challenges and were deemed ineffective, too messy and uncomfortable to administer by the patients. The authors reported good results using a balloon-inflated silastic tube similar to the one used by Shandling and Gilmour that provides a seal in the lower rectum allowing administration of large volumes of fluid. More recently, a systematic review of studies describing the use of different methods of transanal colonic irrigation in children including a total of 672 patients, reported an overall success rate of 88% (81% in children with constipation, 90% in children with incontinence) [35].

Peristeen®, a commercially available transanal colonic irrigation system, uses the principle of the inflated rectal tube described by Shandling and Gilmour and represents a simple and effective system of delivering transanal irrigation with assistance by the parents in young children or self-administered in older children. The system allows administration of large volume of fluid and its retention for a period of time. The use of Peristeen® has been more extensively investigated in adults and shown to provide good long-term results [21–23]. These studies show an initial good response in up to 98% of patients but the long-term efficacy varies according to the underlying neurological pathology (62% of successful outcome in case of spinal cord injury, 67% in case of spina bifida, and 50% in case of multiple sclerosis) with a decreasing overall success rate over time (47% after 1.8 years) [21]. In a recent multicenter randomized controlled trial in adults with spinal cord injury, Christensen at al. [36] demonstrated that compared with conservative bowel management, transanal irrigation improves constipation, fecal incontinence, and symptom-related quality of life. Experience in children is more limited but results in patients with spina bifida appear comparable to those in adults with 60% of patients having relief from constipation and 75% from fecal incontinence [24]. López Pereira at al. [37] also reported a significant improvement in fecal continence in children with mean grade of satisfaction with the Peristeen® system of 7.3 of 10. Patient independence also improved from 28% to 46% and no adverse events were recorded. Our series demonstrates good response in 83% of children, which is persisting at 2-year follow-up with only 4 (17%) patients discontinuing the washouts and undergoing stoma formation.

Possible complications with the use of Peristeen® have been reported including significant rectal bleeding, intolerance with vomits after administration and bowel perforation (0.002% of irrigations) [21,38]. In our series, no serious adverse events related to the Peristeen® use were reported.

Minor complications include occasional leak around the balloon and abdominal cramps during enema administration and balloon failure and have been described in adults resulting in discontinuation of its use [38]. Similar “technical problems” related to the catheter were the reason that two of our patients abandoned the use of Peristeen®.

Importantly, our population includes patients with organic diseases and multiple associated anomalies and generally we found that the use of transanal colonic irrigation is well accepted in these patients. Our findings confirm that Peristeen® transanal colonic irrigation is an effective method of managing children with incontinence and constipation even at young ages. Over 80% of our children achieve social continence or a significant improvement in bowel habit with occasional soiling with a high degree of parental satisfaction.

We suggest that Peristeen® should be considered the first line of treatment and is a valid alternative to invasive surgical procedure for bowel management in children as it is well tolerated and effective and has no significant complications.

References

Discussant: David Croaker (Canberra, Australia): Do you do anything to assess the colonic transit time before you start their management? I know some people especially Pena think this is a good thing to do?

Response: Dr. Pacilli: No this was a retrospective study. We started the programme 5 years ago. Our population is mixed so this would be useful information to have. But there are studies reporting the use of Peristeen that show the emptying of the left colon following the procedure. But we haven’t done that study so far.

Discussant: Gregor Shepherd (Glasgow): What proportion of your patients that were completely clean were spina bifida patients. The evidence is that children with spina bifida do well with Peristeen.

Response: Dr. Pacilli: Yes, there were 4 failures, 2 were in the spina bifida group and 2 in the other, so pretty much 85% of the spina bifida group were clean.

Gregor Shepherd: Do you think this will affect your results knowing that a proportion of your patients will do well already? So 9 of your spina bifida patients were completely clean.

Response: Dr. Pacilli: Yes managing spina bifida patients with constipation is difficult, they have reduced mobility, and having an ACE in a child who is sitting all day is difficult. We offer Peristeen to all patients regardless of primary problem, as a first offer and then if they are not happy we offer other measures.

Discussant: Ali Keshtgar (Evelina Childrens Hospital, London): In those patients with spina bifida who failed where the tube was displaced did you try not inflating the balloon during irrigation, because often there is neuropathy and impairment of external sphincter in these patients, so when you inflate the balloon you are triggering the reflex and the tube just pops out.

Response: Dr. Pacilli: We do try that. We have 2 specialist nurses working on this programme, and they have very close relationships with the patients and parents and this is the key. They try pretty much everything before abandoning the Peristeen.

Discussant: Stefano Guilliani (St George’s Hospital, London): What is the cost compared to ACE procedure? In terms of the paperwork, how easy it is to get funded?

Response: Dr. Pacilli: Initially we had some support from Coloplast while waiting for the programme to get funded. Once the programme was up and running, we established a good relationship with DGHs and local authorities, and patients now obtain the equipment within a couple of weeks. Anecdotally, the ACE procedure which might need to be revised 2 or 3 times, is more expensive, but I don’t have exact figures.

Discussant: Richard Stewart (Nottingham): 70% still needed help with an ACE procedure. In the children I look after it is about making them independent, and this doesn’t seem to do that.

Response: Dr. Pacilli: A lot were of reduced mobility but we do have a 7 year old doing his own washouts which is quite remarkable. With support over time they will get better.