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REVIEW

Consensus review of best practice of transanal irrigation in adults

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Study design: Review article.
Objectives: To provide a consensus expert review of the treatment modality for transanal irrigation (TAI).
Methods: A consensus group of specialists from a range of nations and disciplines who have experience in prescribing and monitoring patients using TAI worked together assimilating both the emerging literature and rapidly accruing clinical expertise. Consensus was reached by a round table discussion process, with individual members leading the article write-up in the sections where they had particular expertise.
Results: Detailed trouble-shooting tips and an algorithm of care to assist professionals with patient selection, management and follow-up was developed.
Conclusion: This expert review provides a practical adjunct to training for the emerging therapeutic area of TAI. Careful patient selection, directly supervised training and sustained follow-up are key to optimise outcomes with the technique. Adopting a tailored, stepped approach to care is important in the heterogeneous patient groups to whom TAI may be applied.
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INTRODUCTION

Transanal irrigation (TAI) of the rectum and colon is designed to assist the evacuation of faeces from the bowel by introducing water into these compartments via the anus. In this article, we refer to the use of purpose-made device-assisted irrigation methods of which several are commercially available. By regularly emptying the bowel using TAI, controlled bowel function is often re-established to a high degree in patients with bowel dysfunction. This enables the users to develop a consistent bowel routine by choosing the time and place of evacuation. In patients with faecal incontinence, efficient emptying of the distal colon and rectum means that new faeces do not reach the rectum for an average of 2 days,[1] preventing leakage between irrigations. In patients with constipation, regular evacuation of the rectosigmoid region can accelerate transit through the entire colon.[2] There has, perhaps unsurprisingly, been a rapid uptake of TAI methods in highly symptomatic patient groups with refractory anorectal symptoms.[3]

The severity of neurogenic bowel dysfunction (NBD), caused by damage to the nerve tissue innervating the colon and rectum, correlates inversely with the quality of life.[4] Hence, in patients with spinal cord injury (SCI), the impact of NBD has been rated as being significantly greater than other aspects of the disorder,[5] and approximately half of all individuals with SCI have moderate-to-severe symptoms associated with NBD.[6] The use of TAI as part of the treatment armamentarium in both traumatic and genetic spinal cord-injured adults with NBD was established following a definitive randomised controlled trial.[7] Bowel dysfunction in patients with neurological disease beyond those affecting the spinal cord has also been studied. Over two-thirds of patients with multiple sclerosis develop bowel symptoms[8] and 37% of patients with Parkinson's disease experience constipation.[9] In a group of 30 patients with multiple sclerosis who failed to respond to maximal medical treatment for bowel dysfunction, TAI subjectively improved constipation and faecal incontinence in over 50%.[10,11] In patients suffering from Parkinson's disease developing severe constipation, TAI has been shown to reduce constipation symptoms.[12] Evacuation disorders and incontinence may also arise after surgery for rectal cancer probably because of the loss of rectal capacity following resection, as well as possible impairment of the anorectal reflexes controlling continence.[13] TAI can improve both faecal incontinence and defecation disorders in this group.[14–16] Moreover, resectional and ileo-anal pouch surgery may cause functional problems, and efficacy

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of TAI in this patient group has been shown too, with specifically enhanced ability to cope with the long-term consequences of surgery.[17] The effect of TAI varies considerably between patients: some report full satisfaction and great improvements in their quality of life, whereas others experience poor or no efficacy and abandon treatment. Among 211 patients with NBD who underwent TAI, 46% and 35% were successfully treated after a mean follow-up of 19 months and 3 years, respectively. The reasons for the differences in outcome are poorly understood.[18]

The intention of this article is to provide practical advice for health-care providers who are using this technique on their patients and to provide indications. It is emphasised that although TAI can be used in the treatment of several disorders, the pathophysiology, being both different and having a wide spectrum of severity, may sometimes warrant other therapeutic interventions than TAI.

MATERIALS AND METHODS

The diverse nature of the conditions being treated with TAI, ranging from patients with SCI or neurological disorders to patients having post-surgical bowel dysfunction, and allied to the complex and intimate nature of the symptoms, means that the evidence base for defining practice is hard to arrive at.[19] Only a small number of high quality trials have been conducted and they have already been the subject of systematic reviews.[19,20] However, there is still a limited evidence base on which to recommend one method of bowel care in preference to others. Therefore, a consensus group of specialists from a range of nations (Denmark, France, Germany, Italy, the Netherlands and the United Kingdom) and disciplines (physicians, surgeons, physiology experts and rehab specialists) who have experience in prescribing and monitoring patients using TAI have worked together to produce this practical adjunct to training, assimilating both the emerging literature and rapidly accruing clinical expertise. Consensus was reached by a round table discussion process, with individual members leading the article write-up in the sections where they had particular expertise. A literature search strategy was agreed upon. Using PubMed or Athens, the following terms were used for the search by the lead author of each section: transanal irrigation, rectal irrigation, anorectal irrigation and neurogenic bowel dysfunction. We found 20 papers in non-paediatric populations. However, only one of high standard, involving a randomised controlled design, was identified.[7] It is for this reason that we have come up with this consensus review, in the absence of a stronger evidence base.

Indications and contraindications

Failure to achieve good bowel care with current bowel program should alert the clinicians to consider TAI. Table 1 summarises the situations in which TAI has been shown to improve bowel function in published studies. Individuals who may benefit from TAI include patients with NBD as well as patients with primary and secondary functional bowel disorders. In all these groups, it is important for the health-care professional to be alert to the clinical features that suggest a need for referral to a specialist service or to move up the therapeutic ladder and consider TAI. Absolute and relative contraindications are summarised in Table 2 and include stenosis, colorectal cancers, inflammatory bowel diseases and other. As the list may not be exhaustive, the clinician is recommended to always consider individual patient factors as well. Bowel dysfunction affects different individuals in different ways, and the subjective degree of bother and impact on quality of life is what is key in terms of making treatment decisions. The basis for focusing on these clinical features is to facilitate the patient progress through the empiric algorithm of care developed for patients using least invasive methods (Figure 1).

According to general recommendations, patients with any alarm symptoms (blood in faeces, weight loss, abdominal pain, or recent and persistent changes in bowel habits), familial history of colorectal cancer or inflammatory bowel disease, should have a flexible sigmoidoscopy or colonoscopy as part of their health screening. It is controversial whether every patient should have endoscopic evaluation before irrigation treatment. Endoscopic evaluation is costly, and not uniformly available. Bowel preparation and the endoscopy are unpleasant, and the risk of perforation during colonoscopy itself is one in 1000.[21,22] Flexible sigmoidoscopy is much better tolerated and regarded as a low-risk procedure with perforation in one in 40 000 procedures.[23] A decision of a pre-treatment endoscopic evaluation should balance the risk of TAI-induced perforation with the risk, cost and the availability of endoscopy. The ultimate decision is dependent on the patient's particular history, family history and anxieties, alongside issues of local service provisions. Endoscopic examination is regarded as mandatory if there has been colorectal surgery. Faecal calprotectin levels can also be considered to rule out inflammatory bowel disease in selected patients.

Table 1 Conditions for which published data on transanal irrigation are available

Neurogenic bowel dysfunction	*Functional disorders*	*Post surgical situations*
Spinal cord injury[7]	*Faecal incontinence*[3,17,34]	Low anterior rectal resection syndrome[14–16]
Supraconal	Idiopathic	
Caudaequina	Post-traumatic	
Spina bifida[30]	*Constipation*[3,17]	Ileo-anal pouch dysfunction[17]
	Slow transit	
	Rectal evacuation difficulty	
Multiple sclerosis[10]		

Table 2 Absolute and relative contraindications to transanal irrigation

Absolute contraindication	*Relative contraindication*
Anal or rectal stenosis	Severe diverticulosis:
	Diffuse disease
	Dense sigmoid disease
	Previous diverticulitis or diverticular abscess
Active inflammatory bowel disease	Long-term steroid medication
Acute diverticulits	Radiotherapy to the pelvis
Colorectal cancer	Prior rectal surgery
Within 3 months of rectal surgery	Faecal impaction
Within 4 weeks after endoscopic polypectomy	Painful anal conditions
Ischaemic colitis	Current or planned pregnancy
	Bleeding diathesis or anticoagulant therapy (not including aspirin or clopidogrel)
	Severe autonomic dysreflexia

Optimal patient selection

To optimise patient selection for TAI, a few studies have attempted to identify factors that are significantly related to a successful outcome. One cohort study, including patients with a diverse range of pathophysiological conditions, used multivariate regression analysis to show that patients with NBD or faecal incontinence did better than patients with idiopathic constipation or patients with sequelae to anorectal surgery.[3] 'Low rectal volume at urge to defecate' and 'low maximal rectal capacity' were significantly associated with a successful outcome. Another study on NBD patients found successful outcome to be related to male gender, mixed constipation and faecal incontinence symptoms, and prolonged colonic transit time.[18] However, other studies have failed to

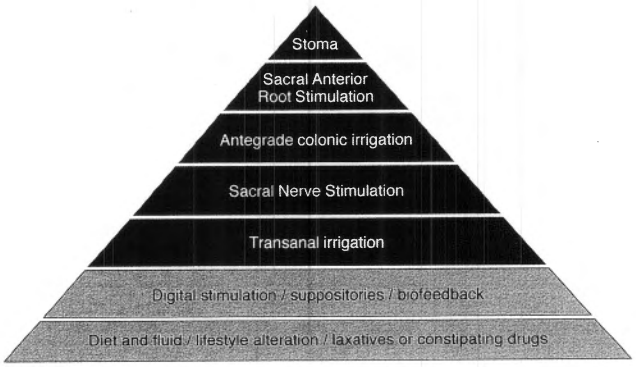

Figure 1 A proposed stepped approach to treatment of bowel dysfunction. Pale grey layers represent 'conservative', mid grey layers represent 'minimally invasive' and black layers represent 'more invasive' treatment options.

find consistent characteristics among presenting symptom and anorectal physiology parameters.[24,25] It is generally agreed that the response to treatment depends not only on choosing the correct indications, but also on aspects of the patient's psyche and motivation. The psychological profile and demonstrated compliance of the patient with regard to other hospital follow-up is highly likely to influence their safe and long-term use of TAI, and these factors should be included as part of baseline assessment. The individual's degree of manual dexterity is also important. It is unclear whether, as for clean intermittent bladder catheterisation, a predictive factor for adherence is independence from carers. In essence, although several factors have been associated with a positive outcome, no consistent and readily explainable predictors of outcome have yet been identified. Nonetheless, NBD patients seem to do better than those with functional disorders. It is the opinion of the authors that a trial-and-error strategy for the introduction of TAI should be applied, individualised to each patient with specific attention towards initial faecal impaction and stool consistency. Furthermore, TAI for patients with idiopathic constipation and faecal incontinence should only be considered after appropriate conservative therapies, including biofeedback (where available) have been tried without success. Anorectal physiological parameters have not been shown to influence outcome or deteriorate with time after TAI.[26] Importantly, there is no compromise of sphincter function with medium term use of TAI in patients with SCI. There is one publication suggesting that anorectal physiology studies may predict potential responders to TAI in a cohort of patients with multiple sclerosis,[11] in as much as patients with more complete sensory loss on testing do better with TAI. However, this is a single study only to date. In the absence of any confirmatory data and any evidence of decline of anorectal function with time, and with the variable availability of such physiological testing, it is not mandated that such studies are routinely undertaken before initiating TAI.

Clinical examination and preparation

A specialist health-care professional should be consulted before instigating the irrigation procedure. Use of bowel diaries and symptom scoring systems may help to quantify symptoms and estimate the quality of life. A careful medical history should be taken not only to access the severity of the functional bowel problems but also to explore any of the potential precautions or contra-indications towards use of irrigation (Table 2). If diarrhoea is a prominent symptom, the cause should be sought. A digital rectal examination is mandatory to exclude localised anal disorders, to assess faecal impaction, anal sphincter function and coordination.

Faecal impaction must be excluded and treated before starting TAI. This is for reasons of safety and to provide the basis of a successful outcome. Efficacy of TAI in patients with constipation may be improved by having a clear colon at the start also allowing gradual up-titration of laxatives and irrigation volumes if needed. Furthermore, the stool form should be optimised (for example, manipulating diet or osmotic laxatives). These conditions favour the action of irrigation besides stimulating stool formation for a regular timing of bowel routine. One important factor for a successful outcome with TAI is training with expert operators to establish an individualised routine. Such a relationship allows fine tuning of the irrigation regime to optimise the outcome (see below). Colonic transit studies are by no means mandatory but may guide treatment from a pragmatic point of view, specifically in patients with constipation, to help manipulate laxatives and identify right colonic loading. In some patients in whom abdominal discomfort and disordered defecation persist despite TAI being regularly performed, radiological evidence for the clearing of radio-opaque marker after an irrigation session allows evaluation of the completeness of evacuation induced.[2]

Patient training

Comprehensive training of the patient is central to a safe and efficient long-term use of TAI. The hands-on training process should be supported by locally produced written information in an accessible form, and may be supplemented by commercial digital information. Information should include explanation of risks as well as patient benefits. Informed verbal consent to commence TAI should be documented in the medical chart before hands-on use of the irrigation system. Although patients who are able to undertake irrigation independently should be taught how to self-administer the TAI, patients who are unable to do so should have a carer undergo training to undertake all or parts of the irrigation procedure for them. However, the drive for independence in bowel care should not be underestimated.

Patients should be taught to recognise the symptoms of colonic perforation and what actions to take (Table 3). Some patients may require support and training during several episodes of TAI before they are confident to continue alone. Training should provide the patient and carer with an understanding of how TAI works, why they are using it and how it can benefit them. This is important in encouraging patients to persist with TAI until they establish an effective routine. There should be an emphasis on practical safety and effectiveness. Patients without anorectal sensation should be taught to digitally check that their rectum is empty before inserting the catheter or cone. If stool is present, this should be digitally evacuated so that the catheter or cone can be safely and correctly inserted. This is particularly important during early use of the system; when well established, the rectum will usually be empty when conducting TAI.

Most patients will be taught how to conduct irrigation as outpatients, either in the outpatient clinic or in their own home, especially when teaching of local carers is needed. When possible, teaching in the patient's own home has the advantage of allowing practical issues arising out of the home setting to be identified and addressed during training, and teaching of local carers can be facilitated; this may be difficult for patients with functional disorders but often more appropriate for patients with NBD. Infrequently, a patient's medical history may demand extra caution, and teaching may therefore be undertaken in an inpatient setting. The first irrigation should in most cases be undertaken under supervision as part of the training. This allows the trainer to evaluate the patient–carer's understanding and abilities and to reinforce the salient safety aspects, and for the patient–carer to ask the questions, which inevitably arise when first using a new procedure. In individuals with impaired or absent anorectal sensation, or when there is a risk of autonomic dysreflexia in response to irrigation, supervised first use is mandatory.

Complications

Introduction of a catheter into the rectum and administration of water under pressure carries the risk of a potentially lethal bowel perforation. Anecdotal reports of irrigation-induced perforation have been published[27–29] and based on the reporting of perforations compared with catheters dispensed, the estimated risk of irrigation-induced perforation has been calculated as one per 50 000 (0.0002%).[3] However, this is only an estimate as the true incidence of perforation in this community-provided treatment is not accurately quantifiable. Perforation may occur from one of three mechanisms: first direct impaling trauma, second over-inflation of the balloon or finally exaggerated hydrostatic pressure during water instillation. An impaling trauma following catheter insertion will usually be located in the rectum or in the anal canal. Perforation into extra-peritoneal perirectal space may be

Table 3 Trouble-shooting

Bleeding
- A small amount of bleeding is to be expected
- More copious or regular bleeding requires further investigation
- Haemorrhage with or without pain suggests a probable perforation, which should be treated as a medical emergency

Pain
- If cramps, discomfort or pain occur while instilling the irrigation, pause instillation for a few moments and continue more slowly once the discomfort has subsided, ensure that irrigant is warm enough—at body temperature, around 36–38 °C
- If pain is severe/persistent stop irrigating—possible bowel perforation—medical emergency

Autonomic dysreflexia and autonomic symptoms during irrigation (sweating, palpitations and dizziness)
- Instil the irrigant slowly
- Limit time on toilet depending on tolerance
- If symptoms are bothersome, ensure the patient is not alone when irrigating until symptoms at each TAI are reduced/absent
- If patient is at risk of AD medication should be immediately available in the home setting
- If AD occurs, stop irrigation immediately. Further assessment and possibly other interventions are required before continuing with TAI

Leakage of water around the catheter/cone
- Ensure catheter/cone is properly located
- Check water temperature
- Where used, increase balloon inflation up to maximum of five pumps
- Instill water more slowly
- Reflex expulsion of the catheter, where used
- Check water temperature
- Ensure rectum empty of stool
- Inflate balloon more slowly
- Minimise inflation to avoid triggering reflexes
- Check for and treat constipation

Difficulty inserting catheter/cone or instilling irrigant
- Digital rectal check and removal of stool if present
- Increase frequency and/or volume of transanal irrigation to ensure evacuation is adequate

Irrigant is not expelled
- Repeat irrigation
- Use adjunctive measures as described
- Ensure patient is adequately hydrated
- Assess for constipation and treat if necessary

No stool is evacuated after transanal irrigation
- Repeat irrigation or split the irrigation into two consecutive episodes, 10–15 min between episodes, using half the irrigant each time
- Use adjunctive measures
- Consider use of laxatives
- Check for constipation and treat as required
- Ensure the patient is well hydrated
- No stool may be present if a good result was obtained at last irrigation; if this happens regularly consider reducing frequency of irrigation
- If no stool for several days, suspect constipation/impaction, assess and treat accordingly

Faecal incontinence between uses of transanal irrigation
- Increase volume of water by small increments (100 ml) until satisfactory evacuation achieved with no faecal incontinence
- Split the irrigation into two consecutive episodes, 10–15 min between episodes, using half the irrigant each time
- Increase frequency of transanal irrigation
- Consider laxative use

Leakage of water between irrigations
- Ensure patient allows sufficient time on toilet following transanal irrigation
- Encourage use of adjunctive measures to encourage emptying
- Reduce or decrease amount of water instilled
- Split the irrigation into two consecutive episodes, 10–15 min between episodes, using half the irrigant each time
- An Anal Plug (Coloplast) can be tried if problem persists

Abbreviation: AD, autonomic dysreflexia.

either asymptomatic or go unrecognised, or present with acute pain. Perforation into the intra-peritoneal cavity is an emergency medical condition, which requires prompt action, admission to a hospital and often there is a need for acute abdominal surgery with formation of a stoma. The clinical experience is that enema-induced perforation is most likely to occur in the first few months after treatment has been initiated; in other words the perforation rate is not cumulative. Therefore, the perforation rate is not cumulative. Associated risk factors are severe diverticulosis, recent rectal surgery, long-term steroid use, faecal impaction and mishandling of the irrigation device. In addition, the bowel wall is more vulnerable in patients with prior irradiation therapy in the abdominal or pelvic region, recent endoscopic biopsy or polypectomy. Any anal condition, which may cause pain or bleeding, for example, anal fissure, anal fistula and third- or fourth-degree haemorrhoids may in some patients cause pain during irrigation. In this respect, there are some strong risk factors for perforation, which represent absolute contraindications for irrigation (Table 2). There are also conditions where perforation or haemorrhage risk is increased (Table 2). Irrigation is regarded as safe to use, with individual consideration, in patients with renal failure, heart failure, hyponatraemia or other electrolyte imbalances. As more systems for TAI come to the market, it is important to clarify which are safe to use in patients with latex allergy.

Practical considerations

Different commercial systems are now available for TAI using either a rectal balloon catheter (Peristeen Coloplast A/S, Humlebaek, Denmark or Mallinckrodt, St Louis, MO, USA), or a cone shaped tip (Alterna, Coloplast A/S, Denmark; Qufora Irrigation System, MBH, Allerod, Denmark; Biotrol Irrimatic Pump, Braun, Kronberg, Germany). The balloon on the rectal catheter utilised by some systems is intended to allow the catheter to be self-retaining, while a cone is held in place manually throughout instillation. The rectal balloon is also intended to create a seal within the rectum to facilitate retention of irrigant. However, inflation of a rectal balloon can provoke reflex rectal contractions. A cone is held firmly against the anus to help retain the irrigant; the slim cone tip is unlikely to provoke reflex contractions of the rectum.

It remains to be ascertained whether one system outperforms the other. The specific needs and response of the patient to irrigation will often guide the choice of equipment. The process by which supplies will be delivered, and if relevant, the reimbursement issues, need to be clarified before initiating therapy. The patient needs to be aware of the number of pumps of air that have been used. Excessive inflation may cause the balloon to burst, and there is potential for anorectal trauma. This is especially the case for patients with prior rectal surgery. The speed of introduction of the water should also be discussed. If it is infused too rapidly, abdominal cramps, pain or strong reflex rectal contractions may limit the volume of water instilled. On the other hand, if water is introduced too slowly, the stimulation provided by stretching the

colon may be lost and the duration of the irrigation needlessly extended. Where a manually pumped system is used, one pump of water every 5–10 s or for a gravity-fed or electronically pumped system 200–300 ml min^{-1} is an acceptable rate. The volume of irrigant will usually begin at 500 ml but can be gradually increased to a maximum of 1000 ml. It is recommended to inflate the rectal balloon (that is, Peristeen), if used, only as much as considered necessary for preventing leakage during irrigation. Finally, although water is generally the recommended irrigant, there are reports of the use of saline,[30] phosphate[31] and other laxatives.[31,32] Such additions to the irrigating fluid have never been formally investigated. Where tap water is not drinkable, bottled water is recommended.

A suggested step-by-step approach to treatment and follow-up of TAI patients is provided in Figure 2. Many patients will achieve the goal of emptying the irrigation fluid and stool from their rectum without further intervention. However, some patients, such as those with NBD, will often need to use adjunctive interventions such as abdominal massage, raising intra abdominal pressure (through leaning back, forward or to the side, or through bracing of the abdominal muscles), digital rectal stimulation as well as evacuation of stool. The need for these interventions may gradually reduce as an effective routine is established. If the patient is using laxatives when starting TAI, these should be continued until TAI is well established. Gradual reduction can then be attempted while monitoring for continued effectiveness.

Setting realistic expectations for patients commencing TAI is crucial. Otherwise, the sometimes slow process of establishing a routine can result in frustration, a sense of failure and early discontinuation. The patient should understand that it may take 4–12 weeks to establish a reliable and effective routine, and that during this time they should expect to undergo a process of trial-and-error to establish their optimal individualised parameters for irrigation.

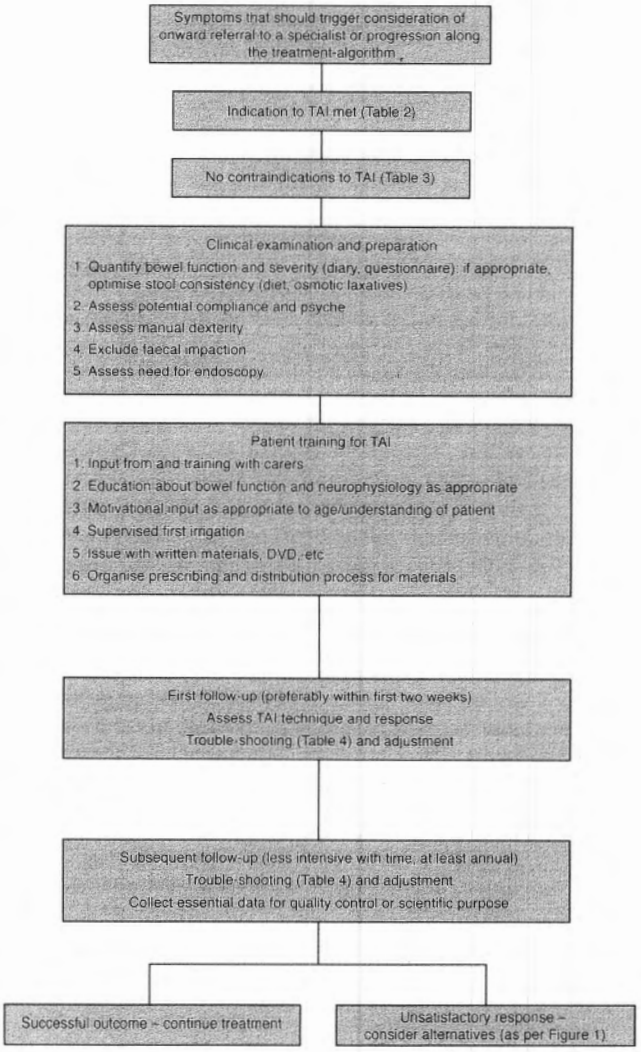

Figure 2 A suggested step-by-step approach to treatment and follow-up of TAI patients.

Parameters that can be individualised include adjustments to laxatives and the trial of adjuncts as described above. In addition, alterations to the frequency of irrigation can be made. TAI should be performed daily in the beginning, and should then be reduced to alternate days where possible after approximately 10–14 days. Furthermore, maintaining a regular routine of irrigation is beneficial, and undertaking irrigation 20–30 min after a meal will take advantage of the gastrocolic response. Pertinently, the time of day should be chosen to fit with the lifestyle of the patient. Approaches to 'trouble-shooting' a range of difficulties that may arise during irrigation are given in Table 3.

Adherence and follow-up

As stated, a relative large proportion of patients do not continue TAI after 3 years.[3] The most common causes of poor treatment adherence include lack of effect, soiling between TAI periods, leakage of irrigation fluid, repeated expulsions of the catheter and rectal balloon bursts. These need to be considered at each contact. Although primary education and training is central to long-term adherence with TAI, this needs to be supplemented by ongoing support. To maintain a safe long-term use of TAI, it is essential that a designated health-care professional provides structured follow-up of the patient, even when the patient is managing well. It is also important that the patient knows that they have open access back to the service in between scheduled contacts. This may be by telephone, e-mail, postal questionnaires or in person, according to local services. Follow-up needs to be frequently scheduled after treatment onset, and can be gradually reduced thereafter. If success has not been achieved by 8–12 weeks, a re-evaluation needs to be undertaken. This needs to incorporate the views of the user and carer to identify problems and practical issues for failure. With such methodical review, a number of patients will be able to safely and effectively re-start or continue with TAI. Once bowel management is established satisfactorily, follow-up is required to maintain user motivation and/or to identify possible changes in bowel function and response to TAI use over time.[33] Follow-up needs not be frequent or in-person, but should ideally be with the same professional for each individual patient. Alarm features should be highlighted to the patient to allow them to seek help urgently. When TAI is unsuccessful, factors that may be beneficially modified should be considered: the bowel routine as a whole, key bowel symptoms (Table 3), dietary and fluid ingestion patterns, any changes in concomitant medication, and carer opinions.

Future areas of study in TAI

The evidence base for using TAI is still limited. As stated, this review article is based on both available literature and the consensus of experts with a special interest in this area. Moreover, as the technique of TAI is now being applied beyond the clinical area for which there is the strongest evidence base, NBD, the authors recommend that the topic urgently needs to be addressed.

Since half of the patients who try TAI are discontinuing the technique in the longer term, it is important to identify potential predictive criteria (physiological or psychological) that may help with patient selection and adherence with treatment. Before extending the technique to new disease areas, it would be ideal to undertake randomised controlled trials of TAI in other neurological diseases. Further information is needed in patients who are pregnant and those with ileo-anal pouches. Finally, studies of the acute colorectal and anal physiological changes that occur secondary to TAI may help both with optimising treatment outcomes but also with increasing understanding of the pathophysiology of the alimentary tract. The current status of research in TAI lacks the strength that comes from prospective long-term patient series with well-defined inclusion criteria and validated outcome measures. This calls for the set-up of multicentre, international databases.

The authors stress the importance of working with the medical device industry to develop new technologies for irrigation. As these become available, it is important to undertake a comparative study of these modalities in terms

of safety and efficacy in the long-term. Second, a comparative study of the tolerability and effect of different irrigation fluids would be an important expansion of the knowledge base. In addition, although often empirically tried, as they are generally very well tolerated, it would be helpful to have clinical trial evidence of the effect of probiotics and prebiotics on TAI. Finally, it would be important to define the optimal training/education interventions in comparison with providing training more generically.

CONCLUSION

The primary intention of this review paper is to offer practitioners a clear, comprehensive and simple guide to practice for the emerging therapeutic area of TAI. Careful patient selection taking indication and contraindications into account, directly supervised training by experienced health-care personnel and sustained follow-up to improve adherence are key to optimising outcomes with the technique. We have thus stressed the importance of adopting a tailored, stepped approach to care in the heterogeneous patient group to whom TAI may be applied.

DATA ARCHIVING

There were no data to deposit.

CONFLICT OF INTEREST

All the authors of this paper have received compensation as members of Coloplast A/S Global Advisory Board for Bowel Management. Authors' declaration of personal interests: *AV Emmanuel* (i) has served as a speaker, a consultant and an advisory board member for Coloplast A/S and Coloplast Ltd; (ii) is an employee of University College London Hospital; (iii) owns no stocks and shares; (iv) owns no patent. *K Krogh* (i) has served as a speaker, a consultant and an advisory board member for Coloplast A/S and has received research funding from Novartis, Denmark; (ii) is an employee of Department of Hepatology and Gastroenterology, Arhus University Hospital; (iii) owns no stocks and shares; (iv) owns no patent. *G Bazzocchi* (i) has served as a speaker, a consultant and an advisory board member for Coloplast A/S; (ii) is an employee of Bologna University; (iii) owns no stocks and shares; (iv) owns no patent. *A-M Leroi* (i) has served as an advisory board member for Coloplast A/S; (ii) is an employee of Hôpital Charles Nicolle, Rouen; (iii) owns no stocks and shares; (iv) owns no patent. *A Bremers* (i) has served as a speaker and an advisory board member for Coloplast A/S; (ii) is an employee of UMC St Radboud, Nijmegen; (iii) owns no stocks and shares; (iv) owns no patent. *D Leder* (i) has served as a speaker and as an advisory board member for Coloplast A/S; (ii) is an employee of Chirurgische Klinik, Beckenbodenzentrum, München; (iii) owns no stocks and shares; (iv) owns no patent. *D van Kuppevelt* (i) has served as an advisory board member for Coloplast A/S; (ii) is an employee of Sint Maartenskliniek, Nijmegen; (iii) owns no stocks and shares; (iv) owns no patent. *G Mosiello* (i) has served as a speaker and an advisory board member for Coloplast A/S; (ii) is an employee of Bambino gesuospedale peditrico, Rome; (iii) owns no stocks and shares; (iv) owns no patent. *M Vogel* (i) has served as an advisory board member for Coloplast A/S; (ii) is an employee of BG-Unfallklinik Murnau, Murnau; (iii) owns no stocks and shares; (iv) owns no patent. *B Perrouin-Verbe* (i) has served as an advisory board member for Coloplast A/S and speaker for Coloplast A/S and Coloplast Laboratoires; (ii) is an employee of University hospital of Nantes; (iii) owns no stocks and shares; (iv) owns no patent. *M Coggrave* (i) has served as an advisory board member for Coloplast A/S; (ii) is an employee of Stoke Mandeville Hospital, Aylesbury; (iii) owns no stocks and shares; (iv) owns no patent. *P Christensen* (i) has served as an advisory board member for Coloplast A/S and has previously received a research grant from Coloplast A/S; (ii) is an employee of Department of Surgery, Arhus University Hospital; (iii) owns no stocks and shares; (iv) owns no patent. Editorial support was provided by Dr Jacob Thyssen, Denmark, who was financially supported by Coloplast A/S, Denmark.

DISCLAIMER

The content has not been published previously and is not otherwise submitted for publication.

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