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Comparison of the Effectiveness of Transanal and Transoral Treatments for Rectal Fecal Retention Diagnosed using Handheld Ultrasonography in Palliative Care Inpatients

Shuntaro Sugimoto
International University of Health and Welfare Mita Hospital: Kokusai Iryo Fukushi Daigaku Mita Byoin
Thanh Huy Dang
University of Medicine and Pharmacy at Ho Chi Minh City
Yo Ishihara
Yokohama City University School of Medicine Graduate School of Medicine: Yokohama Shiritsu Daigaku Igakubu Daigakuin Igaku Kenkyuka
Kota Takahashi
Yokohama City University School of Medicine Graduate School of Medicine: Yokohama Shiritsu Daigaku Igakubu Daigakuin Igaku Kenkyuka
Naoki Tomita
Yokohama City University School of Medicine Graduate School of Medicine: Yokohama Shiritsu Daigaku Igakubu Daigakuin Igaku Kenkyuka
Mayu Horiuchi
International University of Health and Welfare Narita Hospital: Kokusai Iryo Fukushi Daigaku Narita Byoin
Hidenori Ohkubo
Yokohama City University School of Medicine Graduate School of Medicine: Yokohama Shiritsu Daigaku Igakubu Daigakuin Igaku Kenkyuka
Kento Imajo
Yokohama City University School of Medicine Graduate School of Medicine: Yokohama Shiritsu Daigaku Igakubu Daigakuin Igaku Kenkyuka
Shunsuke Oyamada
JORTC Data Center
Mikinori Kataoka
International University of Health and Welfare Mita Hospital: Kokusai Iryo Fukushi Daigaku Mita Byoin
Atsushi Nakajima
International University of Health and Welfare Atami Hospital: Kokusai Iryo Fukushi Daigaku Atami Byoin

Takaomi Kessoku

kessoku-tho@umin.ac.jp

International University of Health and Welfare Narita Hospital: Kokusai Iryo Fukushi Daigaku Narita Byoin https://orcid.org/0000-0002-5587-1386

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Abstract

Background

Constipation, which is common in patients receiving palliative care, reduces quality of life and pain control. Ultrasound aids in diagnosis and treatment monitoring; however, evidence on managing rectal fecal retention is lacking. We aimed to compare the effectiveness of transanal (TA) and transoral (TO) treatments for rectal fecal retention diagnosed using point-of-care ultrasound.

Methods

A prospective observational study was conducted from July 2023 to July 2024, at the International University of Health and Welfare Narita Hospital, Japan. Forty-two newly registered palliative care inpatients with rectal fecal retention were enrolled. Twenty-one participants received TA treatment (bisacodyl 10 mg or sodium bicarbonate and anhydrous sodium dihydrogen phosphate once) and 21 received TO treatment (sennoside 24 mg once). The primary outcome was defecation rate within 24 h. Secondary outcomes included improvement rate in incomplete evacuation, loss of defecation desire (LODD) within 24 h, and treatment satisfaction.

Results

Defecation within 24 h occurred in 71% of patients in the TA group versus 33% in the TO group ($P = 0.01$). Improvement in a sense of incomplete evacuation was achieved in 80% and 24% of patients in the TA and TO groups, respectively ($P = 0.001$). LODD improved in 67% of patients in the TA group versus 31% in the TO group ($P = 0.049$); treatment satisfaction was higher in the TA group (62%) than in the TO group (24%; $P = 0.01$).

Conclusions

TA treatment may be associated with improved bowel-related outcomes than TO treatment for rectal fecal retention in palliative care settings.

Introduction

Constipation is a prevalent comorbidity among patients with cancer receiving palliative care, with a reported frequency of 30%–90% [1]. In addition to lowering survival rates and quality of life (QOL), constipation increases healthcare costs and complicates pain management by restricting opioid use, making it a critical issue that requires intervention [2–6]. Chronic constipation is generally classified into two types: reduced bowel movement, characterized by the absence of fecal mass in the rectum and retention in the large intestine, and defecation disorder (DD), characterized by fecal retention (FR) in the

rectum. DD can be identified through digital rectal examination, ultrasound, or computed tomography (CT) imaging [7]. Recently, handheld ultrasound devices (HUDs) have enabled the confirmation and subclassification of rectal FR [8]. Although constipation diagnosis has traditionally relied on medical interviews, ultrasound now allows the identification of fecal mass distribution, even in patients with communication difficulties.

Ultrasound is valuable for diagnosing constipation and assessing the treatment response [9]. HUD, which is lightweight and easy to operate, can be used by co-medical staff and physicians. DD occurs in approximately 31% of patients receiving palliative care interventions [10], and transanal (TA) treatments, such as suppositories, enemas, and manual disimpaction, are recommended when rectal FR is detected [11]. However, evidence regarding the management of rectal FR in palliative care remains limited. Therefore, in this study, we aimed to examine the effectiveness of transoral (TO) and TA treatments for rectal FR diagnosed using point-of-care ultrasonography (POCUS).

Patients and Methods

Ethics and Study Registration

This study was approved by the Ethics Committee of the International University of Health and Welfare Narita Hospital (approval no. 23-Nr-009, June 27, 2023). The study was registered at the University Hospital Medical Information Network (UMIN) on July 16, 2023 (Registration No. UMIN000051617). Written informed consent was obtained from all participants before enrolment.

Study Participants

The study involved patients who were newly registered with the palliative care team between July 17, 2023, and July 31, 2024. Patients who reported or were suspected of having constipation were screened using POCUS, and those with rectal FR were enrolled in the study. The attending physician or the patient selected TO or TA treatment.

Inclusion Criteria

The inclusion criteria were as follows: 1) referral to the palliative care team at our tertiary care center; 2) complaints of constipation made by the patient, family, or healthcare staff; 3) no bowel movement for ≥ 2 days; 4) diagnosis of DD (difficulty in defecation type) according to the 2023 Bowel Dysfunction Guidelines [12]; 5) age ≥ 18 years; 6) no sex restrictions; 7) ability to provide written or verbal consent (patient or family); 8) suitability for handheld abdominal ultrasonography; and 9) rectal stool retention confirmed using HUD.

Exclusion Criteria

The exclusion criteria were as follows: 1) presence of a gastrointestinal stoma, 2) known or suspected bowel obstruction at enrollment, 3) receipt of regularly scheduled sennosides and suppositories, or 4) determination by the attending physician that participation was inappropriate.

Rome IV Criteria

Chronic constipation was defined as symptoms persisting for at least 6 months, with at least two of the following criteria present for 3 months: straining during > 25% of defecations, lumpy or hard stools in > 25% of defecations, a sense of incomplete evacuation after > 25% of defecations, difficulty in evacuation during > 25% of defecations, manual assistance during > 25% of defecations, and spontaneous bowel movements (SBMs) < 3 times per week. All diagnoses were confirmed by an expert gastroenterologist using the Rome IV criteria [12].

Defecation Records

Stool consistency was assessed using the Bristol Stool Form Scale (BSFS), which categorizes stool into seven types based on shape: types 1–2, “constipation”; types 3–5, “normal defecation”; and types 6–7, “diarrhea.” The proportions of patients with BSFS type 4 and type 3 + 4 stool were recorded. Defecation desire, a sense of incomplete evacuation, straining, and satisfaction were assessed using a Likert scale [13, 14].

Defecation desire and a sense of incomplete evacuation was determined using a five-point Likert scale (1 = always present, 2 = usually present, 3 = slightly present, 4 = rarely present, and 5 = not present at all). Scores of 1–3 indicated the presence of defecation desire and scores of 4–5 indicated loss of defecation desire (LODD). A sense of incomplete evacuation was assessed, with scores of 1–3 indicating the presence of symptoms and scores of 4–5 indicating their absence. Additionally, defecation-related satisfaction after treatment was scored on a five-point Likert scale (1 = very satisfied, 2 = somewhat satisfied, 3 = normal, 4 = somewhat dissatisfied, and 5 = dissatisfied), where scores of 1–3 indicated satisfaction and scores of 4–5 indicated dissatisfaction. The improvement rates of LODD and satisfaction with treatment were defined as a change from absence to presence of defecation desire and from dissatisfaction to satisfaction, respectively. Improvement rate in a sense of incomplete evacuation was defined as a change from presence to absence of incomplete evacuation.

Diagnostic Methods and Classification by Rectal Ultrasonography

Rectal FR was assessed using ultrasonography as previously described [8, 11]. Ultrasound assessment for chronic constipation involved placing a probe transversely at the superior edge of the pubic bone and tilting the beam caudally by 10°–30° to visualize the bladder. The bladder served as an acoustic window to visualize the posterior rectum. The ultrasound techniques for rectal evaluation were finalized at a consensus meeting [8, 11]. On transverse ultrasonography images, FR in the rectum appeared as a half-

moon-shaped moderate reflection with an acoustic shadow, hard FR as a crescent-shaped strong reflection with an acoustic shadow, and no FR or gas as lacking reflection. Accordingly, rectal ultrasonography findings were classified as R1 (no FR), R2 (soft FR), or R3 (hard FR) [8, 11]. Finally, all ultrasonography examinations were performed by a palliative care nurse with experience in performing > 10 rectal ultrasonography examinations and a board-certified specialist in gastroenterology and ultrasonography with experience in performing > 100 intestinal ultrasonography examinations.

Details of Procedures

The TA group patients received bisacodyl (BSD) 10 mg or sodium bicarbonate and anhydrous sodium dihydrogen phosphate (SB/SDP), whereas the TO group patients received senna 24 mg once. The attending physician and palliative care team determined treatment. Suppository treatment was considered ineffective if no bowel movement occurred within 24 h after administration. In such cases, manual disimpaction followed by a 60-mL glycerin enema was performed, and the proportion of bowel movements within 24 h was calculated.

Evaluation Items

The primary outcome was the defecation rate within 24 h after treatment. Defecation within 24 h was defined as the occurrence of a bowel movement within 24 h following TO or TA treatment. The secondary outcomes were improvement rate of LODD, a sense of incomplete evacuation, satisfaction with treatment after 24 h, reasons for treatment choice, and adverse events.

Endpoints Rationale

The endpoints were selected because the study targeted patients at a tertiary care center who were referred to the palliative care team for conditions such as cancer and heart failure and who had constipation symptoms reported by patients, their families, or medical staff. In clinical practice, there is no established standard for choosing between oral and TA treatments in patients with rectal FR, and this formed the basis of our research question. Therefore, to evaluate the short-term effect of a single intervention, we selected endpoints that reflect the rescue effect on bowel movements. Regarding the onset of action, stimulant laxatives typically act within 6–12 h [15, 16], whereas suppositories act within 10–60 min [17]. Accordingly, we selected the proportion of bowel movements within 24 h as the outcome measure to assess the effect of rescue therapy.

Statistical Analysis

Continuous variables are expressed as mean ± standard deviation; they were compared using the Welch t-test. Categorical variables were compared using the χ^2 test. Statistical significance was set at $P < 0.05$. Analyses were performed using the JMP Pro 17 software. Subgroup analysis was performed to compare treatment efficacy according to R2 and R3 ultrasound findings or suppository types among patients who received TA therapy.

Results

Patient Demographic

A total of 42 patients with rectal FR diagnosed using POCUS were enrolled (21 in the TO group and 21 in the TA group) (Fig. 1). The patient demographics are summarized in Table 1. The mean age (73 vs. 69 years old), proportion of men (52% vs. 38%), primary disease (non-cancer: 10% vs. 5%; cancer: 90% vs. 95%), mean performance status (2.3 vs. 2.4), and comorbidity (diabetes mellitus: 19% vs. 24%) were similar between the TO and TA groups. The types of opioids used were as follows: oxycodone (45% vs. 33%) and hydromorphone (18% vs. 7%). Regular laxatives included magnesium oxide (75% vs. 77%) and naldemedine (50% vs. 62%). The mean history of constipation was 11 vs. 9 years, proportion of opioid use was 52% vs. 71%, and mean oral morphine equivalent daily dose was 50 vs. 36 mg/day.

Table 1
Characteristics of the patient

Characteristic	TO (n = 21)	TA (n = 21)	*P*-value
Age, average ± SD	73 ± 11	69 ± 9	0.2
Proportion of individuals aged ≥ 65 years, n (%)	18 (86)	16 (76)	0.4
Men, n (%)	11 (52)	8 (38)	0.3
Primary disease (benign/malignant), n (%)			
Non-cancer (chronic heart failure), n (%)	2 (10)	1 (5)	0.5
Cancer, n (%)	19 (90)	20 (95)	
Primary cancer site, n (%)			
Gastrointestinal	6/19 (32)	2/20 (10)	0.4
Hepato-biliary-pancreatic	3/19 (16)	6/20 (30)	
Lung	3/19 (16)	2/20 (10)	
Head and neck	3/19 (16)	5/20 (25)	
Other	4/19 (21)	5/20 (25)	
Abdomen, n (%)	11/19 (57)	10/20 (50)	0.6
Gastrointestinal diseases, n (%)	10/19 (53)	12/20 (60)	0.6
Metastasis, n (%)			
Lymph node	5/19 (26)	3 (15)	0.4
Lung	2/19 (10)	1 (5)	0.5
Brain	0	0	NA
Liver	1/19 (5)	2 (10)	0.5
Bone	4/19 (21)	1 (5)	0.1
Pleural dissemination	2/19 (10)	1 (5)	0.5
Peritoneal carcinomatosis	4/19 (21)	1/20 (5)	0.1

Data are presented as number (%) or mean ± standard deviation (SD).

Abbreviations: OMEDD; oral morphine equivalent daily dose. TA, transanal; TO, transoral.

Rectal ultrasonography findings were classified as R2 (soft fecal retention in rectum), or R3 (hard fecal retention in rectum).

Characteristic	TO (n = 21)	TA (n = 21)	*P*-value
Therapeutic interventions, n (%)			
Chemotherapy	9 (43)	11 (52)	0.5
Best supportive care	12 (57)	10 (48)	
Performance status, average ± SD	2.3 ± 1.4	2.4 ± 1.3	0.8
Performance status 3 + 4, n (%)	10 (47)	11 (52)	0.8
Comorbidity, n (%)			
Diabetes mellitus	4 (19)	5 (24)	0.7
Cerebrospinal disease	3 (14)	1 (5)	0.3
Hypothyroid	1 (5)	2 (10)	0.5
Mental disorder	2 (10)	0	0.1
Medical History, n (%)			
History of constipation	11 (52)	9 (43)	0.2
Number of years with a history of constipation	15 (21)	18 (19)	0.7
History of abdominal surgery	7 (33)	7 (33)	1
Presence of ascites	2 (10)	1 (5)	0.5
Opioid use, n (%)	11 (52)	15 (71)	0.2
OMEDD (mg), average ± SD	50 (11)	36 (30)	0.3
OMEDD ≥ 60 mg/day	4 (36)	4 (27)	0.6
OMEDD ≤ 60 mg/day	7 (64)	11 (73)	
Type of opioids, n (%)			
Oxycodone	5/11 (45)	5/15 (33)	0.7
Tapentadol	2/11 (18)	5/15 (33)	
Hydromorphone	2 (18)	1 (7)	
Data are presented as number (%) or mean ± standard deviation (SD).			
Abbreviations: OMEDD; oral morphine equivalent daily dose. TA, transanal; TO, transoral.			
Rectal ultrasonography findings were classified as R2 (soft fecal retention in rectum), or R3 (hard fecal retention in rectum).			

Characteristic	TO (n = 21)	TA (n = 21)	*P*-value
Morphine	1 (9)	1 (7)	
Tramadol	1 (9)	3 (20)	
Regular laxative use, n (%)	12 (57)	13 (62)	0.8
Magnesium oxide	9/12 (75)	10/13 (77)	0.9
Naldemedine	6/12 (50)	8/13 (62)	0.6
Other constipation-related concomitant medications, n (%)			
Anti-acid	10 (48)	10 (48)	1
Calcium antagonists	2 (10)	1 (5)	0.5
Diuretic	5 (23)	2 (10)	0.2
Anti-choline for benign prostatic hyperplasia	2 (10)	0	0.2
Anti-choline for depression	1 (5)	0	0.3
Anti-choline for psychiatry	1 (5)	0	0.3
Ultrasonographic findings			
Concordance rate for R2 and R3	21 (100)	21 (100)	1
R2	12 (57)	11(52)	0.8
R3	9 (42)	10 (48)	
Proportion meeting Rome IV criteria, n (%)	19 (90)	18 (86)	0.6
Straining	18 (86)	16 (76)	0.4
Stool consistency	18 (86)	16 (76)	0.4
Feeling of incomplete evacuation	18 (86)	15 (71)	0.4
Difficulty defecation	9 (43)	10 (48)	0.8
Manual assistance	5 (24)	4 (19)	0.7
Fewer than three bowel movements per week	17 (81)	15 (71)	0.5

Data are presented as number (%) or mean ± standard deviation (SD).

Abbreviations: OMEDD; oral morphine equivalent daily dose. TA, transanal; TO, transoral.

Rectal ultrasonography findings were classified as R2 (soft fecal retention in rectum), or R3 (hard fecal retention in rectum).

Characteristic	TO (n = 21)	TA (n = 21)	*P*-value
Loss of defecation desire, n (%)	16 (76)	15 (71)	0.7
Data are presented as number (%) or mean ± standard deviation (SD).			
Abbreviations: OMEDD; oral morphine equivalent daily dose. TA, transanal; TO, transoral.			
Rectal ultrasonography findings were classified as R2 (soft fecal retention in rectum), or R3 (hard fecal retention in rectum).			

With respect to bowel status, the proportion of patients with constipation meeting the Rome IV criteria (90% vs. 86%) and LODD (76% vs. 71%) were comparable between the groups.

The distribution of ultrasound findings was also similar, with R2 observed in 57% vs. 52% and R3 in 42% vs. 48% of patients in the TO and TA groups, respectively. The inter-rater reliability for rectal FR assessed on ultrasound was 100% (21/21) in both the groups. No significant differences were observed between the groups before treatment.

Comparison of TO and TA Treatments

Regarding the primary outcome, defecation within 24 h occurred in 71% and 33% of patients in the TA and TO groups, respectively ($P = 0.01$, Fig. 2a). At baseline, there were no significant differences between the TO and TA groups in the proportion of patients with LODD (76% vs. 71%), a sense of incomplete evacuation (81% vs. 71%), or satisfaction with current constipation treatment (0% vs. 0%) (Online Resource 1). After treatment, the proportions of patients with LODD (67% vs. 33%, $P = 0.03$), a sense of incomplete evacuation (81% vs. 29%, $P = 0.001$), and satisfaction with constipation treatment (24% vs. 62%, $P = 0.01$) differed significantly between the TO and TA groups (Online Resource 1). Regarding improvement rates, the TA group showed significantly greater improvements in LODD (31% vs. 67%, $P = 0.049$, Fig. 2b, Online Resource 1), a sense of incomplete evacuation (24% vs. 80%, $P = 0.001$, Fig. 2c, Online Resource 1), and satisfaction with treatment than the TO group (24% vs. 62%, $P = 0.01$, Fig. 2d, Online Resource 1).

Safety

No serious adverse events were observed in either group. Treatment-related adverse events included abdominal pain in nine cases (43%) in the TO group and two cases (10%) in the TA group (**$P = 0.01$**, Table 2**)**.

Table 2
Adverse events

Type	TO (n = 21)	TA (n = 21)	*P*-value
Severe adverse events	0	0	14
Treatment-related adverse events	9 (43)	2 (10)	0.01
Adverse events			
Perforation	0	0	1.0
Abdominal pain	9(43)	2(10)	0.01
Data are presented as number (%) or mean ± standard deviation.			
Abbreviations: TA, transanal; TO, transoral			

Reasons for Drug Selection

In the TO group, 67% (n = 14) of patients selected oral therapy for convenience and 33% (n = 7) because of embarrassment. In the TA group, 67% (n = 14) of patients chose TA therapy because a suppository seems more likely to induce a bowel movement and 33% (n = 7) chose it to avoid abdominal pain associated with stimulant laxatives **(**Table 3**)**.

Table 3
Reasons for treatment selection

Reason	TO (n = 21)	TA (n = 21)	*P*-value
Easy to use	14 (67)	0	< 0.0001
Embarrassment associated with exposing the buttocks during suppository use	7 (33)	0	0.004
Suppository seems more likely to induce a bowel movement	0	14 (67)	< 0.0001
Previous experience of abdominal pain with stimulant laxatives	0	7 (33)	0.004
Data are presented as number (%).			
Abbreviations: TA, transanal; TO, transoral			

Effect of Suppositories Based on Ultrasound Findings

The effectiveness of suppositories was also analyzed according to ultrasound classification. Among patients with R2 findings, suppositories were effective in 91% (n = 10) and ineffective in 9% (n = 1). Among those with R3 findings, suppositories were effective in 50% (n = 5) and ineffective in 50% (n = 5). The R2 group demonstrated significantly higher effectiveness than the R3 group (91% vs. 50%, *P* = 0.04, Fig. 3a, Online Resource 2**)**. In the analysis by suppository type, no significant differences were observed between BSD and SB/SDP in either the R2 or R3 group (Fig. 3b). Among the five patients in the R3 group in whom suppositories were ineffective, all (5/5, 100%) achieved bowel movements within 24 h following manual disimpaction and glycerin enema (Fig. 3c).

Discussion

The findings of this study demonstrate the clinical value of ultrasonography as an objective tool for assessing constipation and guiding treatment, even among patients with impaired communication. Standard constipation management typically relies on patient history and symptom-based criteria, such as the Rome IV criteria [18]. However, the use of this approach is limited in palliative care [19, 20] and among older adults [17, 21–23] with dementia, impaired consciousness, or delirium, where communication may be compromised.

Ultrasonography enables a non-invasive and objective assessment of rectal FR [8], providing clinicians with reliable data to guide treatment decisions. This enhances patient-centered bowel management and allows administration of targeted therapy based on the type and severity of FR [11]. According to the Japanese clinical practice guidelines for chronic constipation, the condition is divided into two primary types: decreased defecation frequency (impaired colonic transit), in which stool retention in the rectum is absent, and DD (impaired rectal evacuation), in which stool retention is present [12]. Pharmacologic management differs accordingly. For decreased defecation frequency, oral therapy is preferred, such as osmotic laxatives as first-line agents, followed by secretagogues or bile acid reuptake inhibitors. For DD, TA treatments, such as suppositories, enemas, or manual disimpaction, are recommended [12]. Despite these recommendations, supporting evidence has been limited.

To our knowledge, this is the first study to demonstrate that, in palliative care settings, TA treatment is associated with improved bowel-related outcomes compared with TO treatment in patients with rectal FR of the DD type. However, shame was a common reason for declining TA interventions. Therefore, even when imaging confirms FR, oral therapy may be preferred if the patient expresses significant discomfort or emotional distress. This preference highlights the need for patient-centered decision-making that considers physiological findings and psychological well-being (Fig. 4).

Pharmacologically, suppositories stimulate rectal peristalsis, whereas enemas provide peristaltic stimulation and a water influx effect [17, 24]. In patients classified under R2 (soft stool) on ultrasonography, suppositories were effective, whereas in R3 (hard stool) cases, efficacy was markedly reduced. Therefore, when ultrasonography indicates R3-type retention, enemas—owing to their hydration and mechanical stimulation—are considered more effective. Expert consensus further supports the use

of suppositories for R2 findings and enemas for R3 findings [11]. Thus, appropriate TA therapy should be guided by ultrasonographic classification, and further studies are warranted to validate this approach.

Here, two types of suppositories were used. SB/SDP suppositories induce bowel movements by generating carbon dioxide, which mechanically distends the rectum and triggers the defecation reflex. BSD stimulates colonic motility by directly activating the enteric nervous system and enhancing electrolyte and water secretion, thereby promoting bowel movements. Although these agents have different mechanisms of action, there was no difference in efficacy.

A key strength of this study lies in treatment selection based on objective ultrasound findings combined with prospective data reflecting clinical expertise. However, this study has certain limitations: (1) the small cohort size limits the generalizability of the findings; (2) restricting participants to those receiving palliative care may have introduced selection bias, limiting the applicability of the results to the broader population with constipation; (3) if the ultrasound assessors were not blinded to the treatment or outcomes, observer bias may have occurred; (4) long-term outcomes, such as recurrence of fecal impaction and the need for repeat interventions, were not evaluated; and (5) as this was a non-randomized observational study, treatment was determined by the attending physician in consultation with the patient, potentially introducing selection bias. In the future, although anonymizing between TO and TA treatments is challenging, conducting randomized controlled trials, minimizing observer bias, and evaluating long-term outcomes, such as recurrence of fecal impaction and the need for re-intervention, would enable the generation of higher-quality evidence.

In conclusion, in palliative care patients with DD, TA treatment may be associated with improved bowel-related outcomes compared with TO treatment. However, suppositories may be less effective for rectal FR involving hard stool. When ultrasonography reveals hard stool in the rectum, enemas or manual disimpaction would have to be considered before suppository administration.

Declarations

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Data Availability Statement: Data supporting the conclusions of this study are available from the corresponding author on reasonable request.

Ethics Approval: This study was approved by the Ethics Committee of the International University of Health and Welfare Narita Hospital (approval no. 23-Nr-009, June 27, 2023).
Patient Consent: Written informed consent was obtained from all participants before enrolment.

Study Registration: The study was registered at the University Hospital Medical Information Network (UMIN 000051617) on July 15, 2023.

Author contributions:

Conceptualization: SS and TK.

Methodology: YI, AN, and TK.

Formal analysis: SO.

Investigation, YI, AN, and TK.

Validation, THD, YI, KT, NT, HO, KI, and MK.

Data curation: SO.

Writing—original draft preparation: SS and TK

Writing—review and editing: SS, THD, YI, KT, NT, MH, HO, KI, SS, MK, AN, and TK

Visualization: AN and TK.

Supervision: AN.

Project administration: SS, THD, YI, KT, NT, HO, KI, SS, MK, AN, and TK.

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References

1. Clark K, Currow DC (2012) Assessing constipation in palliative care within a gastroenterology framework. Palliat Med 26:834–841. https://doi.org/10.1177/0269216311414756
2. Kalso E, Edwards JE, Moore AR et al (2004) Dec) Opioids in chronic non-cancer pain: systematic review of efficacy and safety. Pain 112:372–380. https://doi.org/10.1016/j.pain.2004.09.019
3. Panchal SJ, Müller-Schwefe P, Wurzelmann JI (2007) Opioid-induced bowel dysfunction: prevalence, pathophysiology and burden. Int J Clin Pract 61:1181–1187. https://doi.org/10.1111/j.1742-1241.2007.01415.x

4. Bell TJ, Panchal SJ, Miaskowski C et al (2009) The prevalence, severity, and impact of opioid-induced bowel dysfunction: results of a US and European patient survey (PROBE 1). Pain Med 10:35–42. https://doi.org/10.1111/j.1526-4637.2008.00495.x
5. Tuteja AK, Biskupiak J, Stoddard GJ et al (2010) Opioid-induced bowel disorders and narcotic bowel syndrome in patients with chronic non-cancer pain. Neurogastroenterol Motil 22:424–430. https://doi.org/10.1111/j.1365-2982.2009.01458.x
6. Hjalte F, Berggren A-C, Bergendahl H et al (2010) Nov) The direct and indirect costs of opioid-induced constipation. J Pain Symptom Manage 40:696–703. https://doi.org/10.1016/j.jpainsymman.2010.02.019
7. Ihara E, Manabe N, Ohkubo H et al (2025) Evidence-based clinical guidelines for chronic constipation 2023. Digestion 106:62–89. https://doi.org/10.1159/000540912
8. Matsumoto M, Misawa N, Tsuda M et al (2022) Jan) Expert consensus document: diagnosis for chronic constipation with faecal retention in the rectum using ultrasonography. Diagnostics (Basel) 12:300. https://doi.org/10.3390/diagnostics12020300
9. Manabe N, Kamada T, Kusunoki H et al (2019) Mar) Usefulness of ultrasonographic evaluation of stool and/or gas distribution for the treatment strategy of chronic constipation. JGH Open 3:310–315. https://doi.org/10.1002/jgh3.12162
10. Yamamoto A, Kessoku T, Ogata T et al (2024) Jul) A handheld ultrasound device can predict constipation with rectal fecal retention in a palliative care setting. Diagnostics (Basel) 14:1626. https://doi.org/10.3390/diagnostics14151626
11. Kessoku T, Matsumoto M, Misawa N et al (2024) Expert consensus document: an algorithm for the care and treatment of patients with constipation based on ultrasonographic findings in the rectum. Diagnostics (Basel) 14:1510. https://doi.org/10.3390/diagnostics14141510
12. Ihara E, Manabe N, Ohkubo H et al (2024) Evidence-based clinical guidelines for chronic diarrhea 2023. Digestion 105:480–497. https://doi.org/10.1159/000541121
13. Likert R (1932) A technique for the measurement of attitudes. Arch Psychol 140:1–55
14. Sullivan GM, Artino AR Jr (2013) Dec) Analyzing and interpreting data from Likert-type scales. J Grad Med Educ 5:541–542. https://doi.org/10.4300/JGME-5-4-18
15. Ford AC, Moayyedi P, Lacy BE et al (2014) Aug) American College of Gastroenterology monograph on the management of irritable bowel syndrome and chronic idiopathic constipation. Am J Gastroenterol 109(Suppl 1):S2–S26 quiz S27. https://doi.org/10.1038/ajg.2014.187
16. Müller-Lissner SA (1993) Effect of laxatives on the intestinal flora. Dig Dis 11(Suppl 1):56–59
17. Bharucha AE, Pemberton JH, Locke GR 3rd (2013) Jan) American Gastroenterological Association technical review on constipation. Gastroenterology 144:218–238. https://doi.org/10.1053/j.gastro.2012.10.028
18. Camilleri M, Ford AC, Mawe GM et al (2017) Dec) Chronic constipation. Nat Rev Dis Primers 3:17095. https://doi.org/10.1038/nrdp.2017.95

19. Larkin PJ, Cherny NI, La Carpia D et al (2018) Oct) Diagnosis, assessment and management of constipation in advanced cancer: ESMO clinical practice guidelines. Ann Oncol 29(Suppl 4):iv111–iv125. https://doi.org/10.1093/annonc/mdy148
20. Candy B, Jones L, Larkin PJ et al (2015) May) Laxatives for the management of constipation in people receiving palliative care. Cochrane Database Syst Rev 2015:CD003448. https://doi.org/10.1002/14651858.CD003448.pub4
21. Gallagher P, O'Mahony D (2009) Constipation in old age. Best Pract Res Clin Gastroenterol 23:875–887. https://doi.org/10.1016/j.bpg.2009.09.001
22. Camilleri M (2021) Gastrointestinal motility disorders in neurologic disease. J Clin Invest 131:e143771. https://doi.org/10.1172/JCI143771
23. Wald A, Bharucha AE, Cosman BC et al (2014) Aug) ACG clinical guideline: management of benign anorectal disorders. Am J Gastroenterol 109:1141–1157 quiz 1058. https://doi.org/10.1038/ajg.2014.190
24. Wald A (2016) Jan) Constipation: advances in diagnosis and treatment. JAMA 315:185–191. https://doi.org/10.1001/jama.2015.16994

Figures

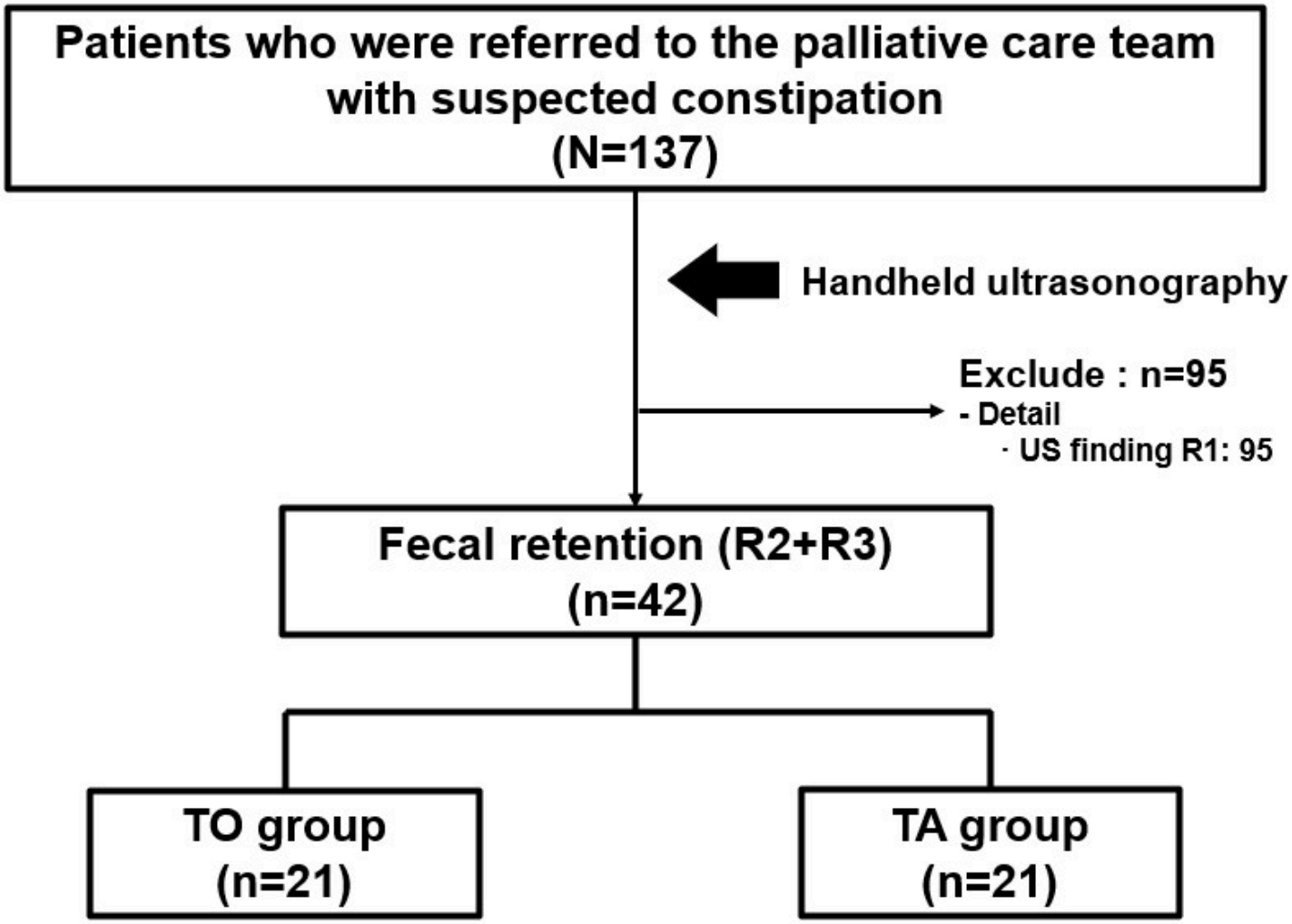


Fig.1

Figure 1

Study flow

Abbreviations: TA, transanal; TO, transoral

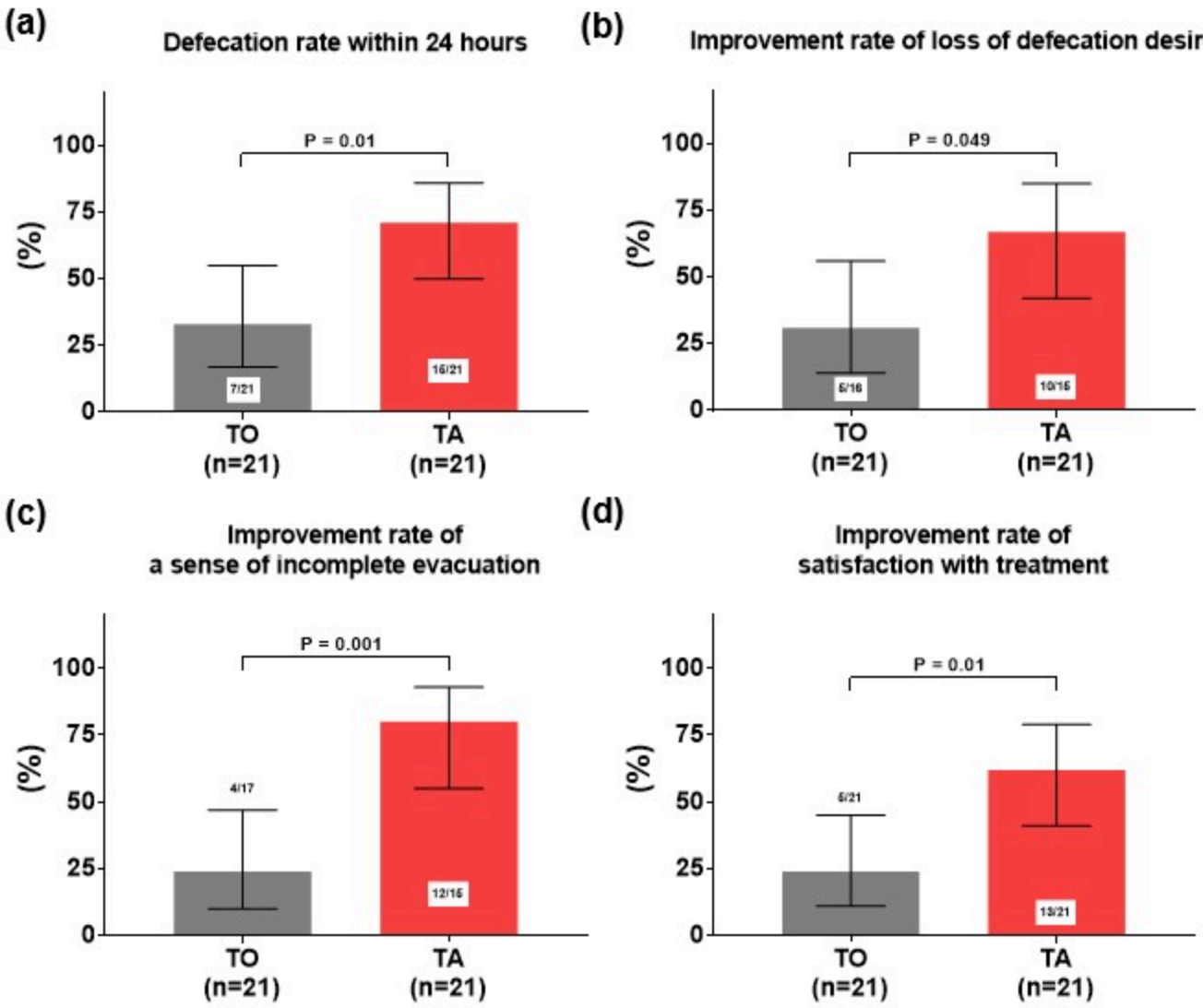


Fig.2

Figure 2

Comparison between transanal and transoral treatments

(a) Defecation rate within 24 h; (b) improvement rate of loss of defecation desire; (c) improvement rate of a sense of incomplete evacuation; (d) improvement rate of satisfaction with treatment.

Data are presented as percentage with 95% confidence interval.

The improvement rates of loss of defecation desire and satisfaction were defined as a change from absence to presence of defecation desire and from dissatisfaction to satisfaction, respectively. Improvements rate of a sense of incomplete evacuation was defined as a change from presence to absence of straining or incomplete evacuation.

Abbreviations: TA, transanal; TO, transoral

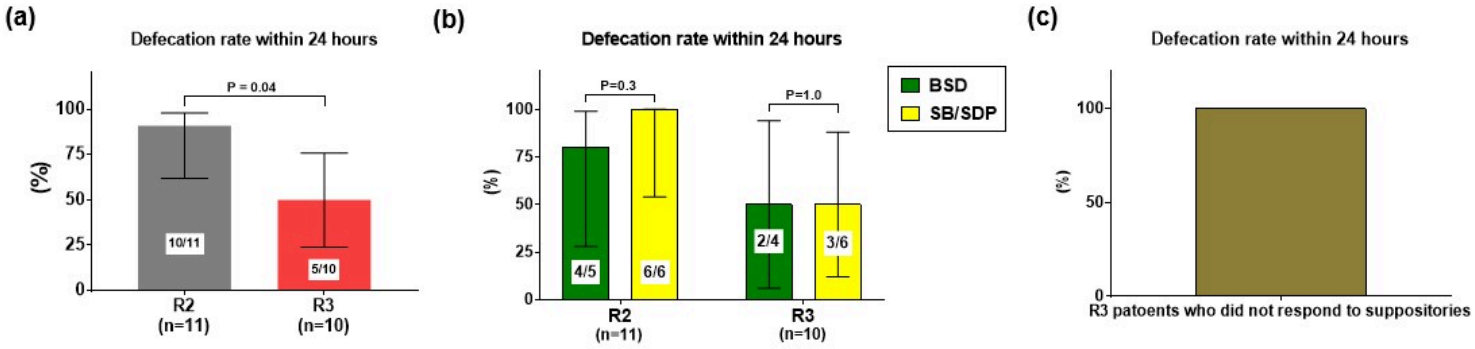


Figure 3

Subgroup analysis of defecation rate within 24 h following transoral and transanal treatments for rectal fecal retention

(a) Defecation rate within 24 h stratified by rectal ultrasonography findings (R2 and R3). (b) Defecation rate within 24 h by suppository type in R2 and R3. (c) Defecation rate within 24 h following enema administration in R3 patients with an inadequate response to suppositories.

Data are presented as percentage with 95% confidence interval.

Abbreviations: BSD, Bisacodyl; SB/SDP, sodium bicarbonate and anhydrous sodium dihydrogen phosphate; TA, transanal; TO, transoral

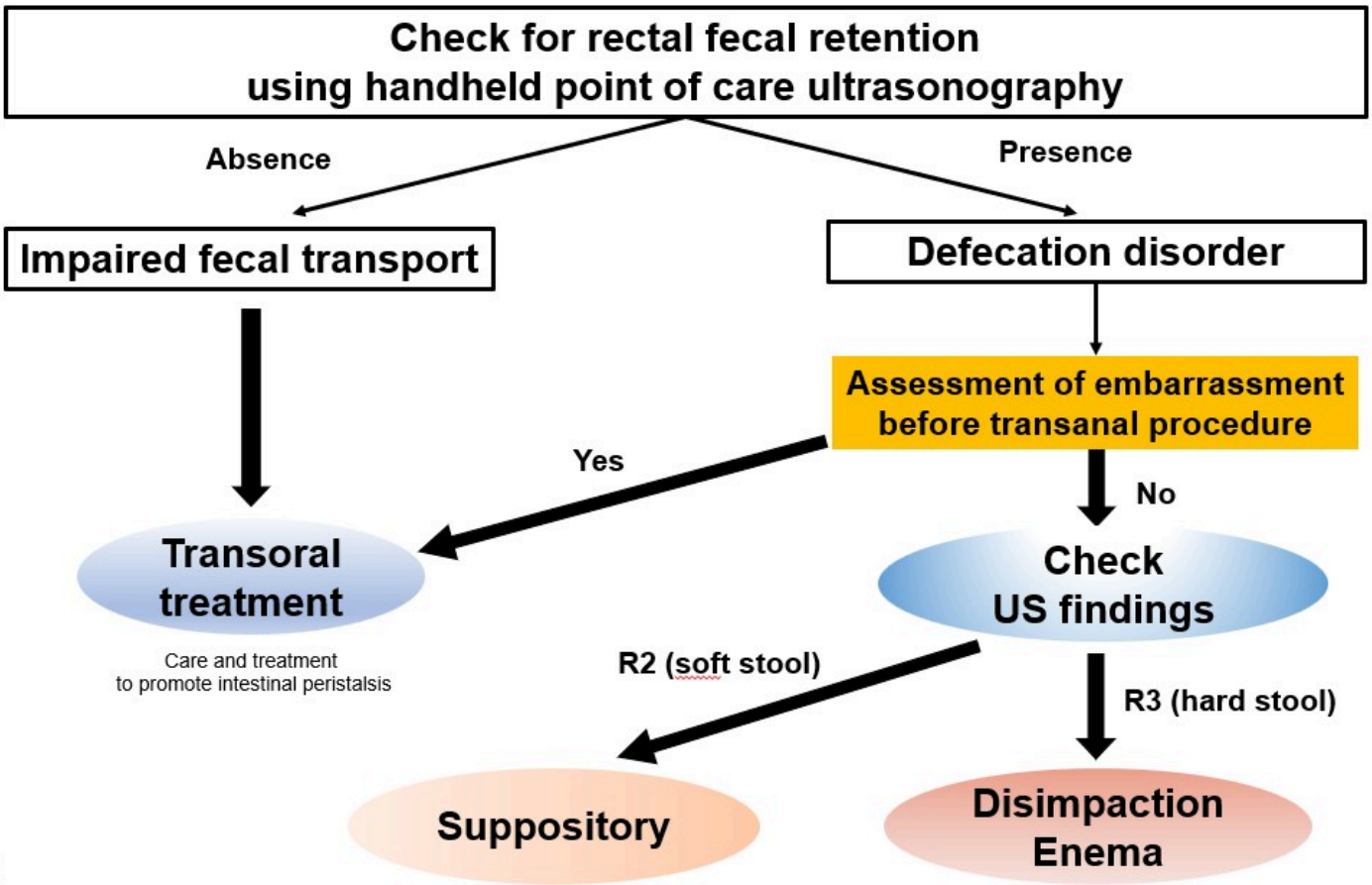


Fig.4

Figure 4

Flowchart of constipation treatment based on rectal fecal findings on handheld point-of-care ultrasonography

Abbreviation: US; ultrasonography

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