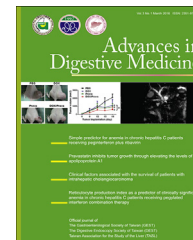


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ORIGINAL ARTICLE

Utility of balloon expulsion test in patients with constipation: Preliminary results in a single center

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Summary *Background:* Pelvic floor dyssynergia can be a cause of idiopathic constipation. Although pelvic floor dyssynergia can be diagnosed by rectal balloon expulsion (BE) and anorectal manometry, the utility of BE in the evaluation of constipation in clinical practice remains to be determined. To this end, we examined the role of BE among different body positions in Taiwanese people with constipation.

Methods: Fourteen Taiwanese adults (age range, 19–61 years), including six healthy volunteers (4 male, 2 female) and eight patients with chronic constipation (1 male, 7 female) underwent solid-state anorectal manometry and BE. The demographic data of all individuals were recorded at enrollment.

Results: Compared to healthy volunteers, patients with chronic constipation had a numerically lower threshold for mean resting pressure ($p = 0.052$), squeeze pressure, maximal squeeze pressure, and lower threshold volumes for urge, but higher threshold pressures for compliance. Successful BE seemed to be associated with lower mean resting pressure ($p = 0.061$), lower mean threshold volumes for urge, and higher mean maximal squeeze pressure for compliance. Although patients with chronic constipation had a numerically lower successful rate of rectal BE than healthy controls, the differences did not reach statistical significance.

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Conclusion: In Taiwanese individuals, results of BE seems consistent with anorectal manometry parameters, and patients with chronic constipation have a trend of lower successful rate of rectal BE than healthy controls. However, future work to confirm the use of BE in differentiating subtypes of chronic constipation is needed.

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Introduction

Pelvic floor dyssynergia (PFD) can be a cause of idiopathic constipation, and is defined as paradoxical contraction or failure to relax the pelvic floor muscles during attempts to defecate [1]. Identification of PFD is of value because it has therapeutic implications in clinical practice, and at least, two-thirds of patients may learn to relax the pelvic floor muscles appropriately when provided with biofeedback training [1]. Although a focused history and digital examination are key components in diagnosing PFD, physiological findings, including anorectal manometry and rectal balloon expulsion (BE) test, may help in categorization and management of patients [2].

BE is a test performed by measuring the time required to expel a rectal balloon filled with water or air and is a useful, sensitive, and specific test for evacuation disorders [3–5]. Compared to anorectal manometry [6], BE is a simpler procedure to identify impaired evacuation in constipated patients and has been recommended as part of the diagnostic workup of PFD or for excluding constipated patients without PFD. Usually, patients with a normal BE result may not need to receive other functional studies, which are more expensive and difficult to perform, to rule out PFD. Therefore, BE is a useful screening test in clinical practice for the evaluation of constipation [3].

Although several Western studies have examined the clinical utility of BE in patients with constipation, its use in Taiwanese patients remains largely unknown. To this end, we intended to investigate the role of BE among different body positions in Taiwanese constipated patients.

Methods

Ethical considerations

The study was performed in accordance with the principles of the Declaration of Helsinki and was approved by the Ethical Committee of the Hualien Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Hualien, Taiwan. Informed consent was obtained from each patient and control at the time of initial interview.

Participants

A total of 14 Taiwanese volunteers, eight with chronic constipation (patients were required to comply with the relevant diagnostic Rome III criteria) and six healthy

individuals, participated in this study from January 1, 2014 to June 30, 2015. All individuals enrolled had to meet the following inclusion criteria: (1) both men and women aged 18–65 years; (2) not taking drugs that promote or inhibit defecation (e.g., laxative and antidiarrheal drugs), agents that increase or decrease gastrointestinal motility, or diet pills within a week of the study; and (3) normal hearing and able to cope with those tests. All individuals were enrolled from gastroenterology clinics of Hualien Tzu Chi Hospital and interviewed about their general health and gastrointestinal symptoms. Chronic constipation was diagnosed based on Rome III criteria [1,7]. In brief, a patient must have experienced: (1) at least two of the following symptoms for the past 3 months with symptom onset at least 6 months prior to diagnosis: (i) straining during at least 25% of defecations; (ii) lumpy or hard stools in at least 25% of defecations; (iii) sensation of incomplete evacuation for at least 25% of defecations; (iv) sensation of anorectal obstruction/blockage for at least 25% of defecations; (v) manual maneuvers to facilitate at least 25% of defecations (e.g., digital evacuation, support of the pelvic floor); and (vi) fewer than three defecations per week; (2) loose stools rarely present without the use of laxatives; and (3) insufficient criteria for irritable bowel syndrome. Of note, patients with PFD were not excluded from the study.

Healthy volunteers were enrolled from a university student population without a history of an underlying medical condition, previous gastrointestinal surgery, or gastrointestinal symptoms. All participants were evaluated and confirmed by a questionnaire that was used to assess any abnormality in the bowel and anorectal function. Normal anorectal and bowel function was defined as the passage of stools not less than three times per week or not more than three times per day, no difficulty or pain during defecation, and no current bowel habit change. None of the women had a history of abdominal surgery. None of the participants took any drug that may have affected gastrointestinal motility at least 48 hours prior to the study.

Anorectal manometry and BE test

All participants received a Fleet's enema (C.B. Fleet company, Lynchburg, VA, USA) to evacuate the rectum before the test. Fleet contains sodium biphosphate and sodium phosphate and is a combination medicine used in adults to clean the bowel before colonoscopy. The probe was a 4.5 mm diameter, solid state catheter with multiple pressure transducers (Sandhill Scientific, Highlands Ranch, CO, USA), and a lumen for balloon inflation. A 5-cm balloon was

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