

Ultrasonographic follow-up of functional chronic constipation in adults: A report of two cases

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Koichi Yabunaka¹, Gojiro Nakagami¹, Kazunori Komagata² and Hiromi Sanada¹

Abstract

Chronic constipation is a disorder frequently encountered in clinical practice. Here, we describe the use of ultrasonography as a new approach to the follow-up of adult patients with functional chronic constipation. Specifically, we report two cases of functional chronic constipation: fecal retention in the rectum and not fecal retention in the rectum. In the not fecal retention in the rectum patient, ultrasonography showed no evidence of fecal retention in the rectum, including no rectal fecaloma, whereas in the fecal retention in the rectum patient, fecal retention in the rectum was clearly recognized. Moreover, ultrasonography can guide the choice of laxative, enema, or appropriate manual maneuver to treat chronic constipation. As a simple and noninvasive method for assessing functional chronic constipation in adults, ultrasonography not only provides important clinical information but can also aid in determining the location of fecal retention.

Keywords

Ultrasonography, chronic constipation, fecal retention, slow-transit constipation, anorectal dysfunction

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Introduction

Chronic constipation in adults greatly compromises the quality of life in affected patients, as it is often unsatisfactorily treated by laxatives. In general practice, plain abdominal radiography, barium enema, colonoscopy, defecography, abdominal computed tomography (CT), and magnetic resonance imaging (MRI) have been used to identify the pathophysiologic abnormalities in patients with constipation.^{1–3} However, these procedures may provide inadequate information. Moreover, several of them (plain abdominal radiography, barium enemas, defecography, and CT) are unsuitable for follow-up testing because of problems related to radiation exposure. Barium enema and defecography require the use of contrast medium; colonoscopy is often poorly tolerated by patients; and MRI and defecography are costly and lack standardization. Several authors have proposed the use of transabdominal ultrasonography (US) as a first-line clinical imaging and initial diagnostic technique,^{4–6} but the follow-up of adult patients with functional chronic constipation is a novel application. The benefits of US as a clinically relevant alternative for the assessment of fecal retention in

adults⁷ include the fact that it is noninvasive and uses non-ionizing radiation.

Here, we present two cases of functional chronic constipation in one patient with fecal retention in the rectum (FR) and another with not fecal retention in the rectum (NFR). Both were successfully diagnosed with US.

Ultrasound technique

The large intestines of the two patients were scanned using our systematic scanning method⁵ and an US system

¹Department of Gerontological Nursing and Wound Care Management, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan

²Department of Nursing Administration and Advanced Clinical Nursing, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan

Corresponding Author:

Hiromi Sanada, Department of Gerontological Nursing and Wound Care Management, Graduate School of Medicine, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan.

Email: hsanada-tky@umin.ac.jp



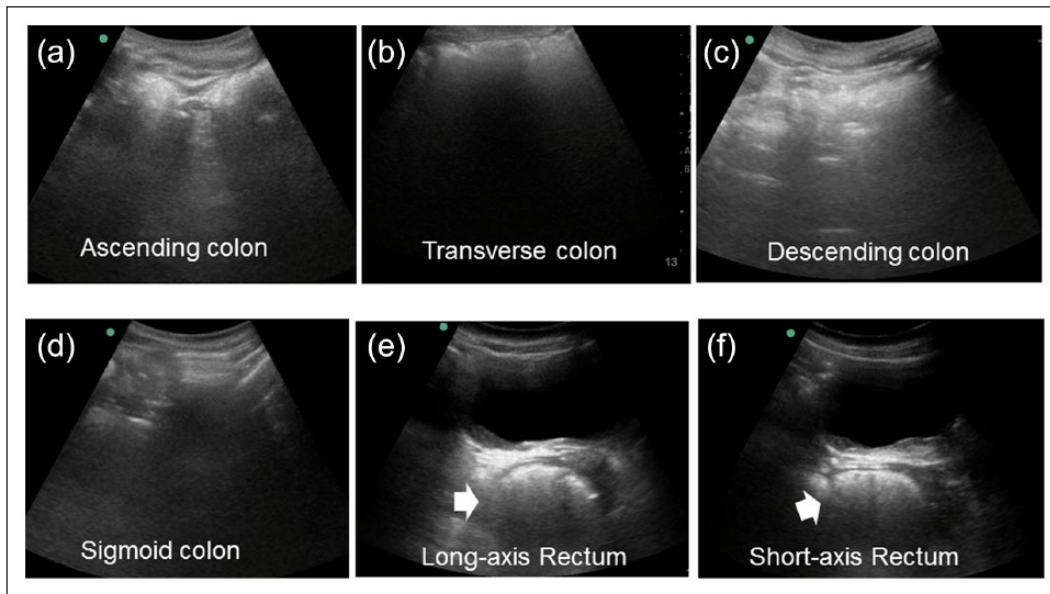


Figure 1. Fecal retention in the rectum case. An 82-year-old woman with chronic constipation evaluated by ultrasonography (US). (a–d) Long-axis US images show moderate amounts of gas or small feces in the colon, without fecal retention. (e and f) Fecal retention in the rectum is clearly seen as a crescent-shaped acoustic shadow (arrows).

(M-Turbo, Sonosite, Bothell, WA, USA) with a curved-array (2–5 MHz) probe. The resulting images were supplemented by transverse and longitudinal sonographic scans. The sonographic examinations lasted for a total of approximately 10 min. All sonographic examinations were performed by a certified sonographer with 30 years of experience. The static images were interpreted by a gastroenterologist.

Case 1: FR case

An 82-year-old woman with subarachnoid hemorrhage who had been bedridden for a long time was seen at our hospital. She had chronic constipation that was being treated periodically by stool extraction, without laxative administration. US follow-up was performed every day for 11 days until defecation. The US images of the colon showed a moderate amount of gas or small feces but no fecal retention; however, US clearly visualized FR during the observation period (Figure 1). This was confirmed by the detection of hard stool during the rectal examination. After defecation by stool extraction, the US findings indicating fecal retention disappeared.

Case 2: NFR case

A 46-year-old man with polyneuropathy and paraplegia of the lower half of his body was evaluated at our hospital. He had spent most of his life in a wheelchair and had chronic constipation, which was being treated with glycerin enema once every 4–5 days. US follow-up was performed every day for 20 days, until defecation. US images of the colon showed fecal retention from the ascending colon to the sigmoid

colon, but there was no evidence of FR at any time during the observation period (Figure 2), nor was hard stool detected during the rectal examination. Rather, FR was detected only just before defecation, with US showing a crescent-shaped acoustic shadow with haustrations and yielding strong high echoes off the descending wall of the colon.

Discussion

In the patients described in this report, US allowed the identification of functional chronic constipation, FR in one patient and NFR in the other patient. In the FR patient, FR was clearly recognized. In the NFR patient, however, US did not detect any signal indicating FR, nor was there a fecaloma. Constipation in the elderly can be divided into normal transit, slow transit, and anorectal dysfunction (AD) types,^{8–10} with appropriate treatment depending on their recognition. In slow-transit constipation (STC), the rate of movement of the bowel contents from the proximal segment to the distal segment of the colon is slower than normal and rectal sensation is reduced. STC can reflect primary dysfunction of the colonic smooth muscle, its innervation, or both. AD is a prolonged stagnation of the bowel contents in the rectum that is typically the result of dyssynergic defecation,^{10,11} most commonly due to dysfunction of the pelvic floor muscles or anal sphincters.¹² In this study, US clearly recognized the presence or absence of FR, whether due to FR or AD, but also NFR versus STC.

Understanding the underlying etiology of chronic constipation is necessary to determine the most appropriate therapeutic option. It is therefore important to distinguish STC

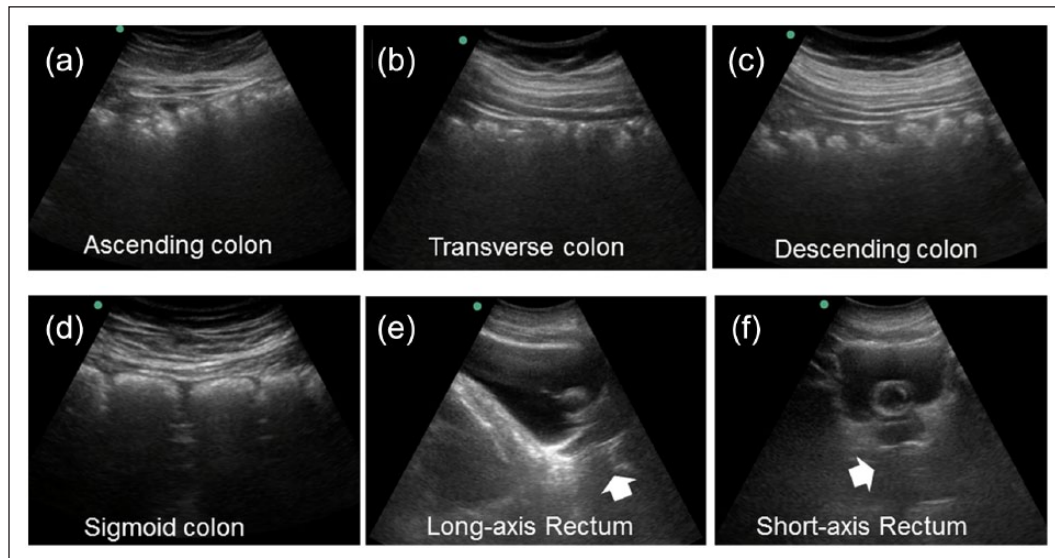


Figure 2. Not fecal retention in the rectum case. A 46-year-old man with chronic constipation underwent US. (a–d) Long-axis US images show fecal retention from the ascending colon to the sigmoid colon. (c and d) Images of the descending and sigmoid colon clearly show a crescent-shaped acoustic shadow with haustrations and strong high echoes off the wall of the descending colon. (e and f) US images show no evidence of fecal retention in the rectum (arrows).

from AD,¹³ even though the pathophysiology of chronic constipation is still poorly understood.^{12,14} In addition, studies on constipated adults have been unable to confirm a relationship between rectal evacuation and colonic transit time, as real-time observations of the large intestine and its contents are not technically possible. It is also difficult to clinically distinguish STC from AD only on the basis of symptoms alone.^{15,16} Here, we showed that US provides important information in adult patients with chronic constipation, especially regarding the location of fecal retention.⁷ It can thus aid in selecting the appropriate treatment (laxatives or enemas, appropriate manual maneuvers). In particular, in patients with fecal impaction, US of the rectum can be performed before and after defecation care, for example, to monitor its efficacy.

STC is most commonly diagnosed using the radiopaque marker test, given its simplicity and cost-effectiveness.¹⁷ The small amount of barium used in the examination allows STC to be distinguished from the other subtypes.¹⁸ However, it results in radiation exposure and is therefore difficult to use as a follow-up examination. Moreover, there is insufficient evidence to support the routine use of barium enema in the diagnostic evaluation of a patient presenting with functional constipation.² The anorectal physiologic studies used to evaluate patients with obstructive defecation include electromyography, anorectal manometry, and the balloon expulsion test.¹⁹ Each one enables a comprehensive assessment of the pressure activity in the rectum and anal sphincter region, together with evaluations of rectal sensation, rectoanal reflexes, and rectal compliance.² However, because constipation is a heterogeneous condition, no single test provides

an explanation of its pathophysiologic basis; instead, several tests are needed to define the underlying mechanisms.³ Our study showed that US can be a suitable tool for the diagnostic screening and follow-up of patients with chronic constipation. It also allowed the monitoring of defecation care, including the appropriate duration and whether it was possible to effectively accelerate defecation to prevent or cure constipation.

This study was also limited by the fact that US alone is not sufficient for the diagnosis of chronic constipation. These patients must undergo a comprehensive diagnostic evaluation based on their clinical condition and other examination findings. A second limitation was that the primary types of constipation may overlap in an individual patient.²⁰ An additional consideration is the dependence of the efficacy of US on operator skill and technique.

Conclusion

US is simple and noninvasive and can be used concomitantly with a physical examination to assess chronic constipation in adult patients. Our study demonstrated its potential in the follow-up examination of patients with chronic constipation.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

Ethical approval to report this case series was obtained from The University of Tokyo of Ethics Committee (#10789).

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Informed consent

Informed consent for the study was obtained from all patients or from their guardians, as approved by the Ethics Committee of our hospital. A copy of the written consent is available for review by the editor of this journal.

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