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Biofeedback therapy for chronic constipation in a patient with Prader-Willi syndrome

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Abstract

Constipation is a common feature of Prader-Willi syndrome. Research exploring the prevalence, cause and treatment options for constipation is limited and lacks objective measurements such as anorectal manometry. We report a case of a 16-year-old lady with Prader-Willi syndrome presenting with rectal pain and constipation for 2 years despite multiple medications and weekly enemas. She also noted passive fecal incontinence that required frequent manual disimpactions. Anorectal manometry revealed an abnormal relaxation of the puborectalis and external sphincter muscles on push maneuvers suggesting dyssynergic defecation and rectal hypersensitivity. Contraction and relaxation of her pelvic muscles were recorded with electromyography. Relaxation of the puborectalis muscle improved significantly after three biofeedback sessions. Patient was successfully tapered off laxatives and has been maintained on linaclotide only. Dyssynergic defecation may be a common finding in Prader-Willi syndrome. In selected cases we recommend anorectal manometry to identify neuromuscular dysfunction and subsequent biofeedback therapy depending on the degree of mental retardation to minimize overuse of laxatives.

Keywords Prader-Willi syndrome, constipation, pelvic floor disorders

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Introduction

Prader-Willi syndrome (PWS) is a multi-systemic disease resulting from lack of gene expression on the paternally inherited chromosome 15 affecting 1 out of 10,000-30,000 newborns [1]. Gastrointestinal manifestations include overeating, rumination, inability to vomit and chronic constipation [2]. According to the limited evidence available, constipation is significantly more prevalent compared to the general population (40% vs. 11%) [3]. The etiology of constipation in PWS may be multifactorial including a low fiber/high fat diet, rectal evacuation dysfunction due to decreased rectal sensation, reduced muscle tone, dyssynergic defecation (DD) and slow transit constipation [3]. The only available report however lacks use of objective testing for pelvic floor disorders or neurologic etiology such as anorectal manometry or wireless motility capsule. Furthermore, due to the low prevalence of PWS itself, studies describing treatment options for constipation have been missing.

Case report

We present a case of a patient with PWS who was referred to our tertiary motility clinic for further evaluation of constipation. PWS was diagnosed in her second month of life after developing four major Holm criteria (neonatal hypotonia, feeding problems, facial features, and intellectual disability) and confirmatory genetic testing in an outside institution [4]. Patient was a 16-year-old female presenting with rectal pain and constipation of 2-year duration. Prior to that, she was having one bowel movement daily. She noted having one soft bowel movement every 5 days with a feeling of incomplete evacuation. Prior medications included polyethylene glycol, lubiprostone, milk of magnesia, and mineral oil leading to mild relief. Additionally, she used bisacodyl, magnesium citrate and enemas at least once weekly in order to have a bowel movement. Patient was not receiving any opioids, thyroid replacement therapy, or antipsychotics. She did not

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have any other past medical history and specifically no rectal or pelvic surgeries. She noted passive fecal incontinence and had to use manual disimpaction to aid with having a bowel movement. Patient's caretakers had not attempted any behavioral treatments like scheduled toilet visits. On physical examination, she was noted to have a body mass index of 30.4 Kg/m^2 (height 1.57 m and weight 75.3 Kg). Abdominal examination was unremarkable other than generalized fullness of abdomen with minimal distension on palpation. On digital rectal exam she had a normal anocutaneous reflex with normal sphincter tone but an abnormal relaxation of puborectalis muscle on Valsalva maneuvers. Fasting glucose, celiac serology and thyroid testing were normal. A colonoscopy was performed with no abnormalities found. Poor preparation precluded ileal intubation. Colonic and rectal mucosae were unremarkable. For further evaluation of anorectal function, an anorectal manometry with endorectal surface probe (MMS® EMG & CC-Simulator probe) was preformed showing the following: decreased resting pressure (52 mmHg, normal range 59-74 mmHg), normal squeeze pressure (120 mmHg), normal recto-anal inhibitory response and normal balloon expulsion with ability to expel a 50 cc balloon at <1 min. Rectal sensation testing was normal except for finding of rectal hypersensitivity (maximal tolerable volume of 160 mL, normal range 218-266 mL). An abnormal relaxation of the puborectalis and external sphincter muscles on push maneuvers was seen suggesting DD (Fig. 1A).

For evaluation of whole gut transit, given complaints also of nausea and abdominal bloating, a wireless motility capsule study (SmartPill®) was performed and it was within normal limits. Gastric, small bowel and colon transit times were normal (3:40, 4:51 and 47:00 h respectively). Whole gut transit was 55 h (normal <73 h). Motility indices were normal as well (Fig. 1B).

Patient was considered to have DD with rectal hypersensitivity and she was referred for biofeedback therapy. Contraction and relaxation (via Kegel and Valsalva maneuvers) of her pelvic muscles were measured and recorded with electromyography. Push pressure of the puborectalis muscle improved significantly (paradoxical pressure peaks disappeared) after only 3 sessions (Fig. 2). Rectal manometry was not repeated after biofeedback therapy. Patient was successfully tapered off many of her laxatives. At a three-month follow-up appointment, she was maintained on linaclotide once daily, only along with continued biofeedback sessions recommended on her last visit. Patient was advised to complete 8 sessions of biofeedback to achieve maximal response but she was lost to follow up.

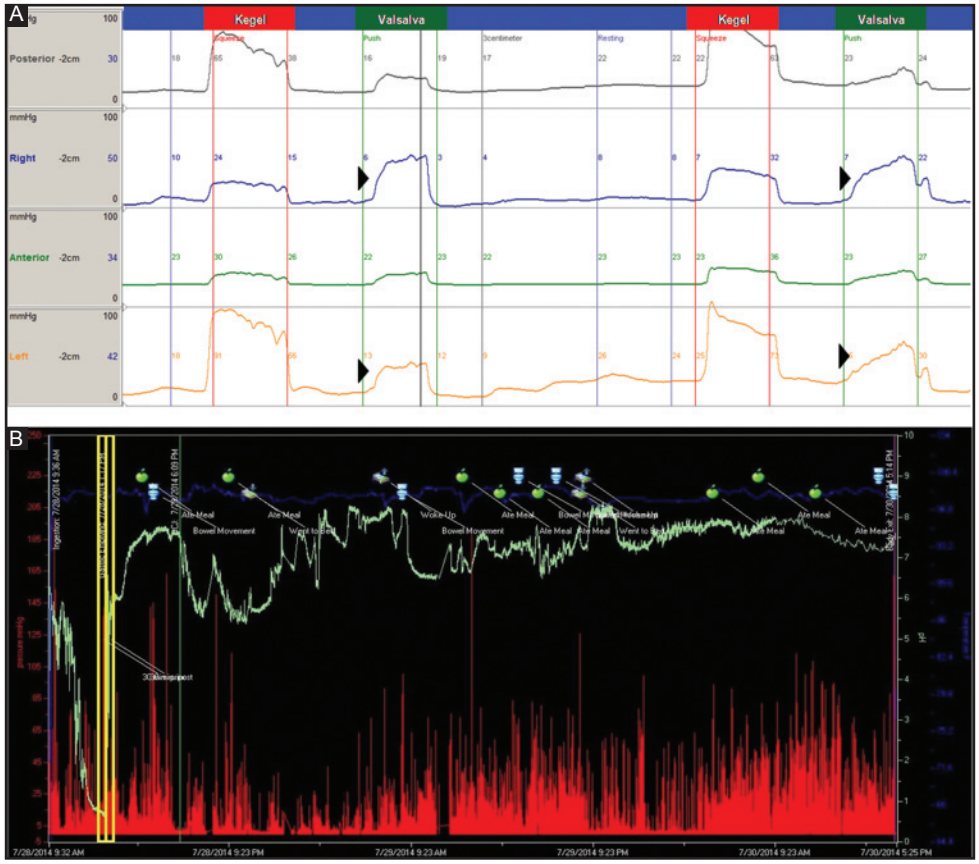

Figure 1 (A) Anorectal manometry, four view measurements: Dyssynergic defecation is seen in Valsalva as puborectalis pressure (internal sphincter) increased in push maneuver (arrow heads). (B) Normal Wireless Motility Capsule (SmartPill®) study: red are pressure, blue temperature and green pH readings. First tracing is oro-gastric transit, yellow box is duodenal, and remaining tracing is small and large bowel transit

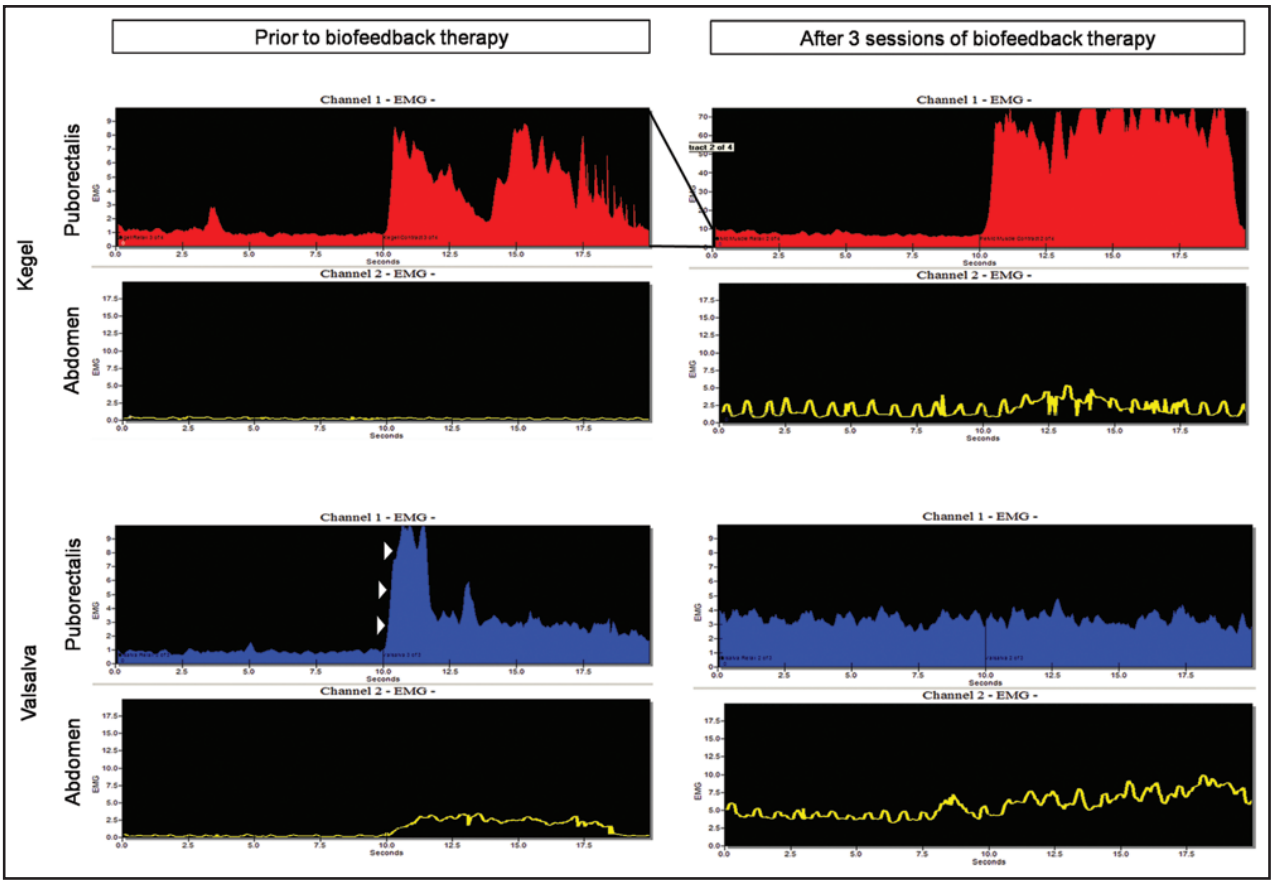

Figure 2 Electromyogram readings before and after biofeedback. Dyssynergic defecation seen initially (arrow heads) disappeared with biofeedback. Puborectalis pressure increased during Kegel maneuvers (different scales, 9 mmHg pre and 70 mmHg post biofeedback) and abdominal pressure increased in Valsalva (scale 17.5 mmHg)

Discussion

The clinical manifestations of PWS are a result of hypothalamic dysfunction, multiple endocrine disorders, intellectual disability and behavioral problems among other things, leading to hyperphagia, obesity and its complications. Patients with this condition also develop gastrointestinal dysmotility including delayed gastric emptying and difficulty vomiting [1,5]. Our patient in particular did not complain of early satiety and had a normal to increased appetite. Severe cases have been reported presenting with acute gastric distention and gastric necrosis with perforation [6,7]. Constipation associated with painful defecation or sensation of anorectal obstruction are likely common in PWS (37% patients reported pain and 42% obstructive symptoms in a case series of 21 patients) [3].

The etiology of constipation in PWS is likely multi-factorial, DD was the principal mechanism in our case. Even though our findings cannot be extrapolated to other patients with PWS, DD may be common in patients with PWS who frequently have compulsive behaviors like skin picking and difficulty in changing established routines [1]. This association between rigid-compulsive behavior and constipation has been previously documented in patients with autism-spectrum disorders [8]. In patients with mild-to-moderate cognitive impairment and other selected patients, we recommend anorectal manometry to identify neuromuscular dysfunction or evaluate for pelvic floor disorders. If DD is found, we advocate for biofeedback therapy to minimize overuse of laxatives. In clinical trials enrolling adults (mean age 46-52, 85% women) that met Rome II criteria for pelvic floor dyssynergia, biofeedback was twice or three times more effective in relieving constipation than pelvic floor exercises, diazepam, or placebo at 3-month follow up [9,10]. Even though there is high-quality evidence showing biofeedback can successfully treat detrusor-sphincter dyssynergia in children, randomized studies addressing constipation have been missing [11,12]. Regardless of age, the ability of biofeedback in normalizing defecation habits will largely depend on the severity of mental retardation and behavioral challenges. Complete motility studies should be considered to rule out other causes of constipation or coexisting upper gastrointestinal motility disorders such as gastroparesis or slow transit constipation. We achieve this by using the wireless motility capsule which helps identify both gastroparesis and slow transit constipation [13].

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