

Iatrogenic Diarrhea Caused by Sorbitol

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A case of severe diarrhea with devastating effects in a young patient with a head injury is reported. The cause was found to be sorbitol used as an inactive ingredient in a commonly prescribed medication. Sorbitol is present in many prescription and over-the-counter medica-

tions and should be considered in the differential diagnosis of patients who present with abdominal complaints.

Key words. Iatrogenic; diarrhea; sorbitol. *J Fam Pract* 1992; 36:95-96.

Family physicians see many patients who present with abdominal symptoms. The differential diagnosis is often long and includes conditions that are minor nuisances as well as life-threatening diseases. Several studies have suggested that products containing sorbitol may be the cause of abdominal complaints in some patients.¹⁻⁴ Screening for sorbitol intolerance can be done quickly and can save the patient discomfort and the expense of routine laboratory tests.

Case Report

A young white male patient with a closed head injury, which resulted in a persistent vegetative state and subsequent seizure disorder, was treated with 4 g of liquid valproic acid (Depakene) daily by gastric tube. He developed chronic diarrhea for which repeated laboratory tests were done over a 6-month period, including stool studies for ova and parasites, enteric pathogens, *Clostridium difficile* toxin, and fecal osmolarity; an upper gastrointestinal series; and a gastric tube dye study. Blood studies included amylase, lipase, sedimentation rate, zinc, gastrin, vasoactive intestinal polypeptide, calcitonin, and antinuclear antibodies; urine serotonin was also checked. All of the results of these tests were normal with the exception of several stool studies positive for *C difficile*. The diarrhea persisted despite multiple enteral nutrition formulas, trials of Imodium and Lactinex granules, three treatments with oral vancomycin (for the positive *C difficile* studies), and a course of intravenously administered antibiotics.

After a 75-pound weight loss, a Hickman catheter was placed and parenteral nutrition was initiated. The diarrhea persisted, and after two bouts of central line sepsis, 3 months of parenteral nutrition, and an additional hospitalization, it was discovered that the valproic acid elixir contained sorbitol. Valproic acid sprinkles were substituted, and within 36 hours, the diarrhea resolved.

Discussion

Sorbitol is present in a wide range of prescription and over-the-counter products. Historically, it has been used to induce catharsis, but currently it is also being used as a sweetener and for its humidifying and antihardening properties. The presence of sorbitol is commonly overlooked by physicians, however, despite multiple studies and case reports that have shown it to be a cause of abdominal symptoms.¹⁻⁸ The *Physicians' Desk Reference*,⁹ which is widely used as a source of drug information, does not always list sorbitol as an active or inactive ingredient when present, and when sorbitol is listed, the concentration is not always specified.

Sorbitol is found naturally in a variety of fruits and plants, and is used commercially in a wide range of products. It is a popular sugar substitute in dietetic foods, especially sugar-free chewing gum and mints. Sorbitol is present in over-the-counter medications such as liquid acetaminophen, vitamins, and cough preparations. Prescription elixirs also frequently contain sorbitol. Examples include theophylline, cimetidine, codeine, isoniazid, lithium, and valproic acid.

Sorbitol is a polyalcohol sugar that is poorly absorbed by the small intestine. The incompletely absorbed carbohydrate passes into the colon where it has an osmotic effect that can lead to diarrhea. It also serves as a substrate for

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bacterial fermentation and hydrogen production, which can result in abdominal bloating and gas. A portion of the hydrogen produced is absorbed and subsequently excreted through the lungs. The measurement of breath hydrogen by gas chromatography has been found to be a sensitive technique for detecting carbohydrate malabsorption.¹

Despite marked intersubject variability, there is a dose-related intolerance to sorbitol.¹ Biochemical intolerance has been defined as an increase in breath hydrogen without clinical symptoms, whereas clinical intolerance implies the presence of abdominal symptoms.² Hyams¹ has shown that in most individuals, ingestion of 5 g of sorbitol is associated with a significant increase in breath hydrogen, 10 g causes mild gastrointestinal distress such as gas and bloating, and 20 g causes severe symptoms such as cramps and diarrhea.

Jain et al² studied 23 whites and 19 nonwhites (Asian Indians and US blacks) aged 25 to 55 years. They excluded volunteers with a history of gastrointestinal disease or use of antibiotics in the past 6 months. After an overnight fast, the subjects were given 10 g of sorbitol, after which breath hydrogen was measured for 4 hours and abdominal symptoms were recorded for 6 hours. Severe clinical intolerance, defined as bloating, abdominal pain, and diarrhea, was present in 32% of nonwhites and 4% of whites. The 10 g of sorbitol ingested would be equivalent to chewing 4 or 5 pieces of sugar-free gum in a short period of time. The significantly higher prevalence in nonwhites has not been explained.

The above studies indicate that sorbitol intolerance is not uncommon. Patients who consume products containing sorbitol are at risk for experiencing sorbitol-induced abdominal symptoms. Diabetics frequently consume large amounts of sugar-free products. A study done by Badiga et al³ showed that diarrhea is significantly more prevalent in diabetics who consume sorbitol-containing foods compared with diabetics who do not consume these products. Patients for whom medications in elixir form are prescribed, including pediatric, geriatric, and patients with severe chronic disabilities, are also at increased risk.

This case is a dramatic example of the adverse outcomes that can result from the therapy we prescribe. Not only does it highlight the problems of a specific component of many medications, it also serves to remind us to review all medications as a potential cause for an unexpected clinical course.

With the knowledge of products that may contain sorbitol and the types of patients who might use such products, the family physician can efficiently screen patients who present with abdominal complaints. Questioning about sorbitol intake before initiating a laboratory workup could greatly reduce costs. Although the *Physicians' Desk Reference* may not be a definitive reference in this area, most

Table 1. Sorbitol Content in Liquid Medications and in Their Suggested Daily Dosages

Generic	Trade	Grams/ 5 mL	Grams/ day
Trimethoprim-sulfamethoxazole	Bactrim	.35	1.4-2.8
Sucralfate	Carafate	1.16	14
Valproic acid	Depakene	.75	1.5-3.0
Hydrocodone	Hycodan	.3	.6-1.2
Theophylline	Slo-Phyllin	2.86	42-108
Amantadine	Symmetrel	3.2	6.4-12.8
Cimetidine	Tagamet	2.5	5-10
Carbamazepine	Tegretol	.85	4.2-8.5
Perphenazine	Trilafon	1.0	1.0-2.0
Ranitidine	Zantac	1.0	2-4
Lithium carbonate (Roxane)	—	3.86	11.6-15.4
Isoniazid (Carolina)	—	3.5	24-49
Acetaminophen w/codeine (Barr)	—	1.75	7-21
Iodinated glycerol w/codeine	Iophen-C	1.5	6-9
Iodinated glycerol w/dextromethorphan	Iophen-DM	1.5	6-9

Note: The amount of sorbitol in each medication was determined by reading the product label or by contacting the manufacturer directly.

pharmacists should be able to assist in determining if a product contains sorbitol, as well as suggesting alternative forms of the medication available (eg, sprinkles). The amounts of sorbitol in some commonly used medications are listed in Table 1. Perhaps, as more controlled studies demonstrate the prevalence of sorbitol intolerance, the use of sorbitol as an "inactive" ingredient, or its concentration, will be decreased and drug manufacturers will consistently list sorbitol in their product labels.

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Pseudocyesis in an Adolescent Incest Survivor

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This case is an example of pseudocyesis in an incest survivor. Symptoms of pregnancy were unconsciously created by the patient to shield her from the memory of her incest and at the same time confront the reality of her abuse. Her symptoms allowed her entrance into the medical system. Once in the system, it was just a

matter of time before she was referred for psychological evaluation. The authors recommend that family physicians consider incest when evaluating patients who present with pseudocyesis.

Key words. Pseudopregnancy; incest; conversion disorder. *J Fam Pract* 1993; 36:97-103.

Pseudocyesis is a "clinical syndrome, in which a nonpsychotic woman firmly believes herself to be pregnant and develops objective signs and symptoms of pregnancy in the absence of true gestation."¹ An expanded definition would include those women who insist that they are pregnant without showing physical signs of pregnancy. As Small² notes, incidence rates of pseudocyesis range from 1 to 6 per 22,000 births.

Signs and symptoms of pseudocyesis can be as subtle as the patient insisting she is pregnant (100%) and feeling fetal movement or quickening (75%), or as dramatic as abdominal enlargement (97%) and breast changes (59%), including enlargement, tenderness, and pigment changes. Other signs and symptoms include menstrual irregularities (98%), rarely amenorrhea, history of infertility (59%), galactorrhea (56%), weight gain (44%), cervical softening (40%), uterine enlargement (25%), diagnosis of pregnancy by a healthcare professional (18%), fetal heart tones (7%), and false labor (1%).¹

Pseudocyesis has components of conversion and psychophysiological disorders.³ The essential feature of a conversion disorder is an "alteration or loss of physical functioning that suggests physical disorder, but that instead is apparently an expression of a psychological conflict or need."⁴ One of the psychological issues for women with pseudocyesis is that their wish for pregnancy is essential to their identity and self-esteem.^{3,5}

Pseudocyesis dramatically illustrates the interaction between mind and body. The literature frequently de-

scribes these women as having various personality disorders,⁶ and maternal deprivation or oral conflicts or both.⁷ We would like to suggest another explanation: that for some women incest survivorship may place them at risk for this disorder.

Incest is the most common form of childhood sexual abuse and has multitudinous physical, emotional, cognitive, and interpersonal sequelae.⁸ It is "the sexual exploitation of a child by another person in the family, who stands toward them in a parental role, or in a relationship invested with significant intimacy and authority."⁹ Researchers estimate that more than one in five women are adult survivors of incest,¹⁰ with even higher prevalence rates among clinical populations.¹¹

For some incest survivors, pseudocyesis may be a metaphor for their trauma and may serve as a defense mechanism to keep knowledge of the incest out of their conscious awareness.

While the literature has described the association between incest and somatization,¹² we believe that incest may also be associated with pseudocyesis. The following case report describes the manifestation of pseudocyesis in a 16-year-old incest survivor.

Case Report

Medical Evaluation

A 16-year-old white single female patient presented to the family practice center on August 30, 1991, with a chief complaint of being pregnant. She indicated that her last menstrual period was on May 3, 1991, and that she had a positive pregnancy test on June 15, 1991, at a local health clinic. The patient said her abdomen had been

continued on page 101

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continued from page 97

increasing in size since her last menses and that she had felt the fetus moving for "several weeks" after her last menstrual period. The patient was not distressed about being pregnant and had made plans to continue in school as long as possible. After delivery she planned to return to school and have her mother provide childcare.

On physical examination her abdomen appeared gravid, including a mild linea nigra, but with the umbilicus inverted. The abdomen was soft, diffusely tympanitic, with normal active bowel sounds. No fetal heart tones were audible. On pelvic examination, the uterus felt enlarged but not to the extent of the abdominal size. The rest of the physical examination was unremarkable. At that time, the patient was given prenatal instructions.

The patient was seen shortly after this visit with the complaint of abdominal pain and vaginal bleeding. On physical examination, a small amount of blood was found in the vagina, the cervix was closed, and no products of conception were visualized. The patient was sent for an abdominal ultrasound. The results of the ultrasound were normal; the ovaries and uterus appeared normal and no fetus was visualized. When the patient was informed that she was not pregnant, she became enraged, insisting that she knew she was pregnant because she could feel the fetus moving.

Further review of the patient's medical records revealed that the patient had been seen on April 18, 1989, for a court-ordered molestation examination. At that time, the patient had admitted to an 8-month history of progressive molestation by her father, which included vaginal intercourse. The patient had complained of increasing abdominal pain over the preceding 7 to 8 months as well as feeling somewhat bloated. On physical examination at that time, no abdominal distention was noted. Since that visit, the patient had been seen multiple times for abdominal pain (usually epigastric). Abdominal and pelvic ultrasonograms and results of an upper gastrointestinal series had been normal. She had experienced no relief from medications, including numerous over-the-counter drugs. The patient had also been seen on March 8, 1991, for vaginal bleeding and stated she had not had a menstrual period since November 1990, adding that she had had a positive pregnancy test in January 1991. The patient had minimal blood-tinged mucus in the vaginal vault and serum beta human chorionic gonadotropin of less than 2 mIU/mL.

Psychological Evaluation

The patient was referred for a psychological evaluation after it was ascertained that she was not pregnant. She was quite angry about what she called the "runaround" that she had received from physicians regarding the diag-

nosis of pregnancy. By the time the first author (M.H.-M.) interviewed her, she no longer believed she was pregnant, but was convinced that some organic disease was causing her symptoms and that the lack of a definitive diagnosis was because of physician ineptness. She was also somewhat hostile toward the interviewing psychologist, saying that she did not need a "headshrinker."

Initially, the patient denied any significant problems, stating that things were fine with her family relationships and that all was well in her life. When the psychologist proceeded to construct a genogram of her family, the first sign that things were not "fine" was when she was asked about her maternal grandfather. She refused to state his first name and said that she did not consider him one of her relatives and did not want him included on her family tree. When pressed about this, she revealed that he was severely addicted to alcohol and had physically abused her mother and her maternal grandmother and had had numerous extramarital affairs.

In talking about her relationship with her mother, the patient initially described the relationship as "close" and spoke of how supportive her mother was about her pregnancy. After further discussion, she admitted that the reality of the relationship was quite different. This young woman described a mother who at her best moments was neglectful of this patient and at her worst, physically abusive. The patient also mentioned that in the past, she and her sister had been removed from the home by the courts because of maternal abuse and neglect.

The patient did not admit her incest history until the discussion turned to the death by drowning of one of her uncles. The patient had been present as he was pulled from the water. When the psychologist suggested that it must have been quite traumatic for a girl of 12 to see her uncle drown, the patient responded that it was not as traumatic as the actions of her father, who had begun molesting her intermittently when she was 3 or 4 years old, culminating in vaginal intercourse when she was 14 years old. She then admitted that her father had been in prison after being convicted of committing incest. She added that he had been released from prison in January 1991, but she had not seen him, as the courts forbade this.

Her father currently was living with his mother, his brother, and the patient's 17-year-old brother, while the patient and her 13-year-old sister resided with their mother. When asked about her physical health history, the patient admitted to years of stomachaches, nausea, vertigo, and headaches. She stated that she had undergone numerous diagnostic tests and procedures, but the source of her pain had never been found.

After several sessions, the patient became unwilling to continue psychotherapy. She was later seen in an

emergency department: on one occasion for a suicide attempt and on two additional occasions for abdominal pain.

Discussion

Although it is well known that pseudocyesis has a psychological basis, there has been no identification of a single psychological process representative of all patients with this disorder.¹ Pseudocyesis has been consistently described as a complicated syndrome that presents in the form of a conversion disorder with accompanying depression.¹ Some of the psychological characteristics that have been reported as being related to the development of pseudocyesis include histrionic or borderline personality disorder,⁶ penis envy,² and conflicting feelings about becoming pregnant.²

The history of incest should be added to the list of factors that place patients at risk for developing pseudocyesis because the presence of that history, especially if unresolved, may potentiate this unique form of conversion disorder. That this dramatic symptom may result from incest is better understood in the context of incest being a profound violation of a child's physical, emotional, psychological, and spiritual self.⁸ While incest undeniably results in a physical violation of the individual, it is the psychological violation of self, with its accompanying surrender of autonomy and control, that produces damage of a magnitude such that conversion disorders may serve as useful defense mechanisms.

Conversion symptoms serve as defense mechanisms to keep internal conflicts, drives, or past trauma out of one's conscious awareness.⁴ Stated differently, by focusing on the physical symptom, the patient does not have sufficient remaining energy to have his or her memories or inner secrets disclosed.¹³ In the case reported here, the patient, by being preoccupied with her "pregnant" state, was unlikely to spend time thinking about her incest history. It is important to note that this patient's pseudocyesis symptoms first appeared during the month in which her father was released from prison. Our interpretation was that it was too overwhelming to her psyche to deal with the myriad issues surrounding her father's release, so her symptoms represented an extraordinarily creative way to distract herself from these issues.

An additional purpose that her symptoms could have served was to temporarily curtail her promiscuous sexual activity. Incest survivorship has been associated with promiscuity.¹⁴ For this patient, being "pregnant" allowed her greater control and ease with which to decline invitations for recreational sexual activity, which she frequently received from men. Her symptoms were of

further significance as her "pregnancy" might also serve to protect her from her father's sexual advances.

A paradoxical role that conversion symptoms play, especially with regard to incest survivors, is that of compelling the survivor to deal with the past trauma if the wounds to the psyche are to heal.¹³ While this patient's "pregnancy" demanded a great deal of her time and attention, her symptoms also ensured that her prior abuse history would be disclosed and dealt with once her "pregnancy" was recognized for what it was. In other words, this dramatic conversion symptom was a nonverbal way of demanding that her feelings about the incest be addressed.

While this young woman's pseudocyesis clearly had some aspects that were anxiety relieving, she also achieved at least one area of secondary gain from her condition. As previously noted, the patient's relationship with her mother was marked by neglect and, on occasion, physical abuse. With her "pregnancy" she received a great deal of positive attention from her mother in particular and from her environment in general.

Summary

This case illustrates the role of pseudocyesis in an incest survivor. Symptoms of pregnancy were unconsciously created by the patient to shield herself from the conscious awareness of her incest and at the same time confront the reality of her abuse. Her symptoms also allowed her entrance to the medical system. Once in the system, it was just a matter of time before her symptoms would be questioned and she would be referred for psychological evaluation. Thus, this young woman would find herself in a position to begin dealing with the immense pain stemming from her past trauma.

Although the patient was referred for counseling, as is the standard recommendation for patients with this disorder,^{1,2,7} it was not surprising that she did not follow through. By definition of her symptoms, she dealt with immensely painful issues by avoidance, minimization, and somatization.

The literature has described the difficulties in getting somatizing patients to follow through with psychiatric treatment.¹⁵ Part of the difficulty stems from the patient's belief that she or he is being written off as "a head case." This young woman was no exception, as indicated by her comments to the psychologist that she did not need a "headshrinker." It is very important for physicians referring somatizing patients for psychological evaluation or treatment to stress to the patients that their physical symptoms are very real and deserving of attention, but that the treatment is not what it would be if the symp-

toms had a biological basis. It is also important that the physician express willingness to continue seeing the patient in tandem with the mental health practitioner.

As there appears to be a relationship between pseudocyesis and incest, it behooves family physicians to inquire about such history in patients presenting with this disorder. Although gathering a sexual abuse history is initially uncomfortable for most physicians, it can be the key factor in diagnostic certainty. Stenchever¹⁶ recommends beginning such questioning with "Were you physically or sexually abused or raped as a child or adolescent?" If the patient indicates this occurred, questioning should continue in a nonjudgmental, clear, and gentle manner. The physician should also ascertain how much, if any, counseling the woman has received regarding her abuse. If an incest history is revealed, it is very important that the family physician refer the patient for psychotherapy if she has not received previous counseling for this. Even though many patients will not follow through, the physician owes it to the patient to underscore the serious adverse psychological impact that incest has and to encourage the patient to obtain counseling.

Although it is unlikely that a history of incest is present in every case of pseudocyesis, it should be included in the differential diagnosis. The real challenge to family physicians in evaluating pseudocyesis is not the physical diagnosis, but rather the counseling that is necessary to reduce the symptoms when incest is involved.

As a final note, while this case report addresses the presentation of pseudocyesis in an incest survivor, physicians will see far more incest victims who present with only pelvic or abdominal pain.^{14,17} When a physical cause cannot be identified, physicians should consider the possibility of incest or another form of child sexual abuse early in the investigative process.

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