

Contact Burn with Blister Formation in Children Treated with Sennosides

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Abstract: Eight children treated for severe constipation with sennosides unexpectedly developed contact burns with blisters secondary to the use of these laxatives. All patients wore diapers, and the injuries occurred overnight. To avoid this side effect, we recommend that patients treated with sennosides, especially those in diapers, receive the medication at a time that allows for bowel movements to occur during the day and not overnight.

We treat patients with idiopathic constipation and constipation due to anorectal malformations and Hirschsprung's disease. The choice between osmotic and stimulant laxatives is made according to the condition of the patient (1). We prefer to use sennosides, a stimulant laxative with particular effect on colonic motility. An adequate and individual dose of these laxatives produces one effective bowel movement that cleans out the rectum completely once a day (2).

Patients with chronic use of sennosides may develop melanosis coli, a condition characterized by dark pigmentation of the colonic mucosa (3). Sennosides may also produce various skin reactions in adults (4,5). In children, sennosides can produce contact burns with blister formation (6–8).

We report eight patients treated with sennosides who developed contact burns on the buttocks, alerting the medical community to this unusual side effect, and discuss how to avoid or treat this condition.

METHODS

Between November 2013 and June 2016 we treated 232 patients with sennosides at the Colorectal Center for Children at Children's Hospital of Pittsburgh, University of Pittsburgh Medical Center. We reviewed the medical records of eight patients identified with contact burns while using sennosides. We analyzed patient age and sex, diagnosis, duration of treatment with sennosides before developing the skin reaction, dose of sennosides, and management of burns. We obtained approval for this study from our Institutional Review Board (PRO 15030254).

RESULTS

The age of the patients was 1 to 10 years. There were seven girls and one boy. Six patients had idiopathic constipation, one had an anorectal malformation, and one had spina bifida with neurogenic bowel. In our

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center, patients with spina bifida do not usually receive sennosides because of the lack of fecal control of their neurogenic bowel. The patient with spina bifida in our series received the sennosides because the family refused to administer enemas.

The duration of using sennosides before developing the contact burn was 6 days to 18 months. The dose range of sennosides was 35.2 to 150 mg/day in a single dose. Seven patients received local management of the contact burn with topical zinc oxide, magnesium sulfate, or silver sulfadiazine, and one patient received topical antibiotics. One patient stopped the laxatives and received daily enemas. Another patient stopped the use of laxative until the lesion healed and then returned to using sennosides. All patients wore diapers and had the bowel movement in response to the sennosides overnight, thus the feces remained in contact with the skin for several hours, causing the injury. When the diaper was changed, the parents observed the burned skin of the buttocks with various degrees of blister formation, which the parents documented in some instances with photographs (Fig. 1). None of the patients required hospital admission. We encouraged the parents to modify the time of day at which they administered the laxative to avoid a bowel movement overnight and to change the diaper

promptly after a bowel movement. Seven patients continued taking sennosides, none of whom had a second burn.

DISCUSSION

Senna is obtained from *Cassia angustifolia* or *Senna alexandrina*, which contain glycosides of rhein dianthrone known as sennosides. Glycosides of rhein dianthrone are inactive and have molecular properties that make them hydrosoluble, which prevents passage through the lipophilic membranes of the small bowel (9). Thus sennosides are not absorbed in the upper gastrointestinal tract. The β -glucosidase of enteric bacteria hydrolyze sennosides into rhein mono-anthrone, which become active when they reach the large bowel (1,9). This active drug then induces a rapid increase in the motility of the colon (9), causing 3 to 10 high-amplitude contractions that occur 6 to 10 hours after ingestion. These high-amplitude contractions propagate distally to the left colon and result in the elimination of feces (10).

Skin burns associated with laxative use have been reported with dianthrone- and senna-based laxatives (6,7,11). Some were related to accidental ingestion of senna-based laxatives in children, which may be



Figure 1. Clinical pictures of four patients with blistering dermatitis after the use of sennosides. (A) Diamond-shaped lesion on the buttock after blisters ruptured. Note sparing of perianal area. (B) Ruptured blisters with some small intact blisters affecting the diaper area. The perianal area was intact (not shown). (C) Diamond-shaped erythema with a ruptured blister on the right buttock. (D) Partially healed blistering dermatitis affecting the diaper area. The perianal area was not affected.

because the most common brand of this laxative comes in a chocolate presentation (7).

Accidental ingestion of a senna-based laxative in four patients 23 to 42 months of age resulted in second-degree burns of the buttocks (7). An overnight bowel movement caused the lesions. The authors described a diamond-shaped wound on the buttocks with borders that lined up with the diaper edge, sparing the perianal tissue and the gluteal cleft.

In our series, the burn occurred with the prescribed dose of senna as part of a bowel management program. Our patients presented with the same distribution of dermal injury. Diapers contribute to the perianal burn and blistering because feces stays in contact with the skin for a longer time overnight. We now advise parents to give senna-based laxatives in the early morning and to plan for defecation during the day. In our 25 years of experience using sennosides in children, we have never seen a toilet-trained child with burns.

Laxative-associated contact dermatitis can present along a spectrum. In 2003, Spiller et al (6) evaluated the database of six poison control centers for children younger than 5 years old exposed accidentally to senna laxatives; 88 exposures were analyzed. Twenty-nine (33%) of the children experienced severe diaper rash and 10 (11%) had blisters and skin sloughing. Severe diaper rash was reported more frequently in children who wore diapers (6).

A variety of plants and substances can cause contact burns. This type of burn was first described more than 3,000 years ago, and it presents with a spectrum of clinical features ranging from dryness or redness to an acute caustic burn. An irritant applied for sufficient time and concentration produces cellular damage, penetrates the skin, and produces an inflammatory response that can cause epidermal necrosis, acantholysis, and pustules (12). Occlusion increases the water content of the stratum corneum, which is the principal defensive barrier of the skin, and enhances percutaneous absorption of skin irritants. Thus the likely cause of contact burns in our eight cases was prolonged exposure of the buttocks to sennosides in fecal material, and the occlusion of the diaper enhanced this effect.

There are other reports of drug-induced eruption (4) and exanthematous pustulosis (5) in adults treated with sennosides. The difference between burn injury and contact dermatitis (e.g., from rhein monoanthrones) is that burns induce lysis of the tissue, whereas contact dermatitis entails spongiosis. Smith et al (8) reported two cases of patients with burns and

blisters related to therapeutic and accidental ingestion of senna-containing laxatives. These children were treated with fluticasone ointment, barrier cream, fluconazole, polymyxin B, and bacitracin ointment. In our series, most of the patients showed resolution with topical zinc oxide, and only one required topical antibiotics because of severe skin sloughing. Our patients had skin lesions ranging from erythema with small blisters to large fluid-filled blisters, suggesting second-degree burns.

CONCLUSIONS

Sennosides may produce contact burns ranging from erythema with small blisters to large fluid-filled blisters equivalent to second-degree burns with skin sloughing. To prevent this adverse effect, in patients who are not toilet trained we recommend that sennosides be administered at a time that allows for bowel movements to occur during the day and not overnight, considering that they take effect 6 to 10 hours after ingestion. To treat contact burns and blister formation related to sennosides, we recommend using a soap substitute to cleanse the skin, then applying a lubricant to the skin and zinc oxide to serve as a barrier.

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