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## **Toe Tourniquet Syndrome in Association With Maternal Hair Loss**

R. Scott Strahlman

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after steroid treatment. The 2 cases presented demonstrate a plausible causative association between ILH and recurrent intussusception. Being a common intestinal finding on imaging studies in infants and children, ILH might indeed have been an incidental finding, that had resolved spontaneously. However, in both cases, radiologic evidence of ILH was documented during 2 separate episodes of intussusception, and in both cases a clinical and radiologic response to steroid treatment was undoubtedly evident. In the first case an almost normal intestinal mucosa was demonstrated after a short course of steroid treatment (Fig 2), and there was no recurrence of the intussusception during a 2-year follow-up. In the second case, as an additional episode of intussusception had not occurred, we did not find the performance of the follow-up barium enema justified. The uneventful clinical course suggested that clinically significant lymphoid hyperplasia was no longer present. We thus propose that the immediate initiation of steroid treatment had contributed to the rapid resolution of symptoms.

### CONCLUSION

In both our patients no other possible reason for ILH, such as intestinal infections or hypogammaglobulinemia, could be found. Therefore, other than steroids, no other medical treatment could be offered to these children. Surgical intervention may be performed at any stage of treatment. Successful management with a short course of steroids thus enabled us to avoid unnecessary surgical interventions. We therefore conclude that when recurrent intussusception occurs in association with ILH, and no other leading point can be identified, it is important to consider a trial of steroid therapy before committing the child either repeated attempts of pneumatic or hydrostatic reduction or a more radical surgical resection approach.

EYAL SHTEYER, MD\*

BENJAMIN Z. KOPLEWITZ, MD‡

EITAN GROSS, MDS

ESTHER GRANOT, MD\*

Departments of \*Pediatrics, ‡Radiology, and

§Pediatric Surgery

Hadassah Medical Center and the Faculty of Medicine

The Hebrew University

Jerusalem 91120 Israel

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## Toe Tourniquet Syndrome in Association With Maternal Hair Loss

**ABSTRACT.** Increased hair loss a few months after delivering an infant is a common postpartum condition known as telogen effluvium. A much less common condition involving young infants is the hair-thread tourniquet syndrome, or toe tourniquet syndrome, which involves hair or thread becoming so tightly wrapped around an appendage that pain, injury, and sometimes loss of the appendage result. This case report is the first known description of the hair-thread tourniquet syndrome in association with maternal telogen effluvium. A literature review shows that accidental cases involving human hair almost always involve the toes, and usually occur at the age when mothers are experiencing excessive hair loss. This association is significant in that anticipatory guidance of new parents experiencing rapid hair loss may prevent cases of the toe tourniquet syndrome and its associated morbidity. *Pediatrics* 2003;111:685-687; *hair-thread tourniquet syndrome, toe tourniquet syndrome, telogen effluvium, hair, appendage.*

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Reprint requests to (R.S.S.) Department of Pediatrics, Patuxent Medical Group, Two Knoll North Dr, Columbia, MD 21045. E-mail: rsstrahlman@hotmail.com

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## CASE REPORT

A healthy 3-month-old male infant was taken to his pediatrician because of excessive fussiness. There was no fever, vomiting, or diarrhea, and the infant's physical examination was completely normal. The fussiness was attributed to gas and possible constipation, and was treated with simethicone drops and glycerine suppositories. Two days after the office visit it was noted during the infant's bath that the second, third, and fourth toes of the left foot were entrapped by a hair. The second toe distal to the hair was edematous, violaceous, and tender to the touch. The hair was carefully removed and the wounds were treated with topical antibiotic ointment. The infant's fussiness resolved immediately, and within 1 week the toes were healing. Of note and of significance is that the infant's mother was experiencing massive postpartum hair loss during this period.

## DISCUSSION

### Telogen Effluvium

A normal human hair goes through 3 stages of growth. The growing, or anagen, stage is the predominant phase, usually involving 80% to 90% of a person's hair. The anagen stage is followed by a transitional catagen stage and then a resting, or telogen, stage. When new hair growth is initiated, the new anagen hair pushes the old telogen hair out, and shedding occurs. Typically a person sheds no more than 50 to 100 hairs per day. However, a severe stress such as childbirth can "shock" an excessive number of hairs into the telogen stage. Approximately 3 months after this stress, the postpartum mother experiences excessive hair loss on the order of >100 hairs per day.<sup>1</sup> This excessive hair loss is termed telogen effluvium. Up to 90% of postpartum women experience this condition.<sup>1</sup> The condition can occur immediately after delivery.<sup>1</sup> More typically, however, the increased hair loss occurs between 2 and 6 months' postpartum.<sup>2</sup> The shedding rate returns to normal in 4 to 6 months, and mothers should be reassured that the condition is self-limited.<sup>3</sup>

### Hair-Thread Tourniquet Syndrome

The hair-thread tourniquet syndrome occurs when hair, and occasionally thread or fiber, wraps tightly around a young child's appendage and obstructs the circulation. Although most cases are felt to be accidental, child abuse must be considered in selected cases.<sup>4</sup> This syndrome has been described to involve the fingers, the toes, and even the genitals.<sup>5</sup> The offending fiber can cut through the skin making the fiber difficult to see. The only presenting symptom may be irritability, so the index of suspicion needs to be high.<sup>6</sup> Treatment is prompt removal of the constricting fiber. The fiber can usually be removed by direct inspection. In cases where hair is the offending agent and cannot be completely removed, entrapped hairs have been removed using commercial hair removal agents such as Nair (Church and Dwight Co, Inc, Princeton, NJ).<sup>7</sup> If the fiber cannot be completely removed, then surgical exploration is mandatory.

This disorder can be quite serious if not promptly recognized and treated; permanent tissue damage or loss of the appendage can occur.<sup>4</sup>

Hair-thread tourniquet syndrome can be grouped into 3 broad categories, reflecting the type of appendage involved. In a review of 66 cases there were 3 distinct subsets of the hair-thread tourniquet syndrome: cases involving the toes; cases involving the fingers; and cases involving the genitals.<sup>5</sup>

The largest group of patients was the group with toe involvement. This group contained 28 (43%) of the 66 patients. A total of 22 (79%) of these patients had hair as the offending agent. The median age of these patients was 4 months, exactly when maternal telogen effluvium peaks, with a range of 3 weeks to 15 months. Infants with toe involvement have been said to have the toe tourniquet syndrome.<sup>8</sup>

In the case review there were 16 (24%) patients with finger involvement. Fourteen of these patients (88%) had thread or fiber as the cause. Only 2 (12%) of the fingers were affected by hair. The median age was only 3 weeks, with a range of 4 days to 19 months. The finger injuries therefore do not appear to be as closely associated with maternal telogen effluvium. It is possible that the finger injuries are related to the prolonged use of gloves or mittens in young infants, either for warmth or to prevent infants from scratching.

The third subset, those with genital strangulation, included 22 (33%) patients. These patients had a median age of 2 years with a range of 4 months to 6 years. Child abuse was suspected in most of these cases. These cases therefore did not tend to be accidental and were probably not related to maternal telogen effluvium.

## CONCLUSION

Hair-tourniquet syndrome involving the toes occurs during the time period when postpartum mothers are experiencing increased hair loss. This condition is also known as toe tourniquet syndrome. It occurs at ~4 months of age, when up to 90% of all mothers are experiencing excessive postpartum hair loss. The condition, although very serious, is treatable with prompt diagnosis and is potentially preventable.

A hallmark of pediatrics is anticipatory guidance and the prevention of injury. Postpartum mothers should be counseled about the possibility of excessive hair loss in the first few months after delivery. Mothers with long hair need to be especially vigilant. New parents should be warned that if excessive hair loss should occur, then their infant should be carefully checked on a regular basis to make sure that no hairs are becoming entangled in the fingers or toes. If an infant is not bathed every day, or is wearing extra clothing, checking the fingers and toes regularly becomes even more important. Any clothing that covers the fingers or toes should be turned inside out and examined for loose hairs. At the first sign of entrapment or loss of circulation, medical attention should be sought immediately. Toe tourniquet syndrome is a dangerous but a preventable condition of young infants.

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R. SCOTT STRAHLMAN, MD  
Department of Pediatrics  
Patuxent Medical Group  
Columbia, MD 21045  
Department of Pediatrics  
Johns Hopkins Hospital  
Baltimore, MD 21205

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## Aspiration of Fruit Gel Snacks

**ABSTRACT.** Aspiration of a foreign body is common in children and can cause upper airway obstruction, leading to significant morbidity or mortality. We report 3 cases of aspiration of a popular fruit-flavored gel snack that led to cardiopulmonary arrest and death in 1 case and respiratory failure in 2 other cases. There is increasing concern about the safety of this gel snack and its risk of aspiration, even in older children. Pediatricians should advise parents and children about the dangers of eating this candy during their health maintenance visits. *Pediatrics* 2003;111:687-689; *foreign body, aspiration pneumonia, bronchoscopy, resuscitation, pulmonary edema.*

ABBREVIATIONS. FB, foreign body; ED, emergency department.

Foreign body (FB) aspiration is a common occurrence in infants and young children and can be a life-threatening event. Almost 2.5 million children are affected each year in the United States and FB aspiration leads to ~300 deaths annually.<sup>1</sup> The most frequently aspirated objects are organic food items such as peanuts, popcorn, hot dogs, or vegetable matter. Nonfood objects include balloons, coins, pen tops, and pins.<sup>1-3</sup> One food item, called fruit gel snack, is widely available in Asia and is increasingly becoming popular in the Western hemisphere.

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Reprint requests to (S.Q.) Harbor-UCLA Medical Center, Division of Pediatric Critical Care, Department of Pediatrics, 1000 W Carson St, Box 491, Torrance, CA 90509. E-mail: soneaq@worldnet.att.net  
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It is sold in the United States under different trade names, including Gel-ly Drop and Fruit Poppers. This candy consists of a small flavored gel with a central fruit core. We present 3 cases of aspiration of this food in children that caused cardiopulmonary arrest and death in 1 case and respiratory failure in 2 other cases.

## CASE REPORTS

### Case 1

A 5-year-old boy was brought to the emergency department (ED) in cardiopulmonary arrest after choking on a fruit gel snack. He was eating the candy and few minutes later started coughing, gagging and then collapsed. The emergency medical technicians arrived and found that he had no pulse. After examining his airway, they removed a 1.5-cm piece of gel from his oropharynx. Bag-valve mask ventilation and chest compressions were initiated and he was brought to the ED.

On initial examination, he had no spontaneous respirations or pulse. Resuscitation included intubation, chest compressions and administration of epinephrine, atropine, and sodium bicarbonate. After 3 doses of epinephrine, a normal sinus rhythm was obtained. His pulse was 144 beats/minute; blood pressure, 102/58 mm Hg; and temperature, 34.2°C. His skin was cold with peripheral cyanosis. Bilateral equal air entry and normal heart sounds were heard on auscultation. Neurologic examination revealed an unresponsive child with a Glasgow coma scale of 3 and his pupils were 5 mm and nonreactive. An arterial blood gas showed a pH of 6.95, PaCO<sub>2</sub> of 48 mm Hg, PaO<sub>2</sub> of 519 mm Hg and base deficit of -22 mEq/dL. Initial laboratory results revealed a white blood cell count of 8800/mm<sup>3</sup>, hemoglobin of 12 g/dL, and platelets 214 000/mm<sup>3</sup>. A chest radiograph demonstrated bilateral pulmonary edema. He was felt to be unstable to go to the operating room for direct laryngoscopy and rigid bronchoscopy. A few hours later he had focal seizure and was given phenytoin and phenobarbital. Computed tomography of the head was normal. Two days later he became febrile to 38.5°C, a repeat chest radiograph was consistent with pneumonia, so therapy was initiated with ceftriaxone, gentamicin, and clindamycin.

Three days after admission he developed diabetes insipidus and received desmopressin acetate. He also required inotropic support for hypotension. His physical examination was consistent with brain death. An apnea test revealed no respiratory effort and after a radionuclide cerebral blood flow study demonstrated no flow, he was pronounced brain-dead.

### Case 2

An 8-month-old previously healthy infant boy presented to the ED after experiencing a respiratory arrest. His mother gave him a piece of fruit gel candy, and while eating it, he immediately started choking and became cyanotic. Cardiopulmonary resuscitation was started by bystanders and when the paramedics arrived, they found the infant unresponsive, cyanotic, and bradycardic with a heart rate of 40 beats/minute. The paramedics were unable to visualize a FB in the oral cavity. Bag-mask ventilation was successfully instituted and the infant was brought to the ED.

In the ED, he was immediately intubated and a 2.5- to 3-cm piece of pink, gelatinous mass with a central fruit core was removed from his oropharynx. A copious amount of pink, frothy fluid was suctioned from his endotracheal tube. His vital signs included a temperature of 37°C, heart rate of 186 beats/minute, and blood pressure of 53/33 mm Hg. On physical examination, he was pale and unresponsive. Breath sounds were heard bilaterally with end expiratory rales and occasional wheezing. Cardiac examination was significant for regular rate and rhythm, but decreased peripheral perfusion. A venous blood gas showed a pH of 6.88 with a PaCO<sub>2</sub> of 80 mm Hg. Chest radiograph revealed bilateral haziness. A normal saline bolus was given with improvement in his hemodynamics.

The infant was immediately taken to the operating room for direct laryngoscopy and rigid bronchoscopy under general anesthesia. No FB was seen in the oropharynx, hypopharynx, subglottic area, or bronchi. He was transferred to the pediatric intensive care unit where he was hypotensive with poor peripheral perfusion.

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