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Raynaud's Phenomenon of the Nipple: A Treatable Cause of Painful Breastfeeding

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ABSTRACT. Maurice Raynaud first described the vasospasm of arterioles in 1862, and Raynaud's phenomenon is now felt to be common, affecting up to 20% of women of childbearing age. Raynaud's phenomenon has been reported to affect the nipples of breastfeeding mothers and is recognized by many lactation experts as a treatable cause of painful breastfeeding. In 1997, Lawlor-Smith and Lawlor-Smith reported 5 women with Raynaud's phenomenon associated with breastfeeding, but there are few other case reports, and none report the possible relationship between Raynaud's phenomenon of the nipple and previous breast surgery.

We report 12 women who breastfed 14 infants, all of whom were seen in 1 pediatric practice and 1 lactation consultation center in San Francisco, California, within the past 3 years. Of the 12 women, 11 were seen between June 2002 and May 2003. All women suffered from extremely painful breastfeeding, with symptoms precipitated by cold temperatures and associated with blanching of the nipple followed by cyanosis and/or erythema. Poor positioning and poor attachment or latch may cause blanching of the nipple and pain during breastfeeding, but 10 of the 12 mothers were evaluated by experienced lactation consultations, who were sure that inappropriate breastfeeding techniques were not contributing factors.

Because the breast pain associated with Raynaud's phenomenon is so severe and throbbing, it is often mistaken for *Candida albicans* infection. It is not unusual for mothers who have Raynaud's phenomenon of the nipple to be treated inappropriately and often repeatedly for *C albicans* infections with topical or systemic antifungal agents. Eight of our 12 mothers and their infants received multiple courses of antifungal therapy without relief before the diagnosis was made.

To diagnose Raynaud's phenomenon accurately, additional symptoms such as precipitation by cold stimulus, occurrence of symptoms during pregnancy or when not breastfeeding, and biphasic or triphasic color changes must be present. All our mothers experienced precipitation of symptoms by cold stimuli and demonstrated biphasic or triphasic color changes, and 6 of the 12 experienced symptoms during pregnancy.

Interestingly 3 of 12 mothers also reported a history of breast surgery, including 1 mother who had a fibroadenoma removed and 2 who had breast-reduction surgery. The association between breast surgery/implants and au-

toimmune disease, including Raynaud's phenomenon, has been discussed extensively, but the association of Raynaud's phenomenon of the nipple during breastfeeding has not been reported previously. Given the small numbers in the study, it is uncertain as to whether this may be a precipitating factor in developing Raynaud's phenomenon.

Treatment options include methods to prevent or decrease cold exposure, avoidance of vasoconstrictive drugs/nicotine that could precipitate symptoms, and pharmacologic measures. There are reports in the lay press of the use of herbal medicines, aerobic exercise, and dietary supplements, but because most women with painful breastfeeding require immediate relief of the pain to continue breastfeeding successfully, it is important to offer a treatment plan that will alleviate the pain quickly. Nifedipine, a calcium channel blocker, has been used to treat Raynaud's phenomenon because of its vasodilatory effects. Very little of the medication can be demonstrated in breast milk and thus is safe to use in breastfeeding mothers. Of the 12 mothers in our series, 6 chose to use nifedipine, and all had prompt relief of pain. Only 1 mother developed side effects from nifedipine.

Pediatricians and lactation consultants should be aware of this treatable cause of painful breastfeeding and should specifically question their patients, because most mothers will not provide this information to the breastfeeding consultant. Prompt treatment will allow mothers to continue to breastfeed pain free while avoiding unnecessary antifungal therapy. *Pediatrics* 2004;113:e360–e364. URL: <http://www.pediatrics.org/cgi/content/full/113/4/e360>; *Raynaud's phenomenon, nipple, breastfeeding.*

Maurice Raynaud¹ first described the vasospasm of arterioles in 1862 and reported in 1888 on "local asphyxia of the extremities." Raynaud's phenomenon is now felt to be common, occurring more frequently in women than men, and affecting up to 20% of women of childbearing age.² Although it was described originally as affecting acral parts of the body (eg, fingers and toes), it has now been described as occurring in many other vessels including coronary, gastrointestinal, penile, and placental.

Vasospasm of the arterioles causes intermittent ischemia, which is manifested clinically as pallor, followed by cyanosis as the venous blood is deoxygenated. When reflex vasodilatation occurs, there is subsequent erythema of the affected body part. This triphasic color change is usually associated with pain, burning, and paresthesias. The vasospasm is often precipitated by cold temperatures, but other

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precipitating events have been reported, including emotional stress.

Raynaud's phenomenon has been reported to affect the nipples of breastfeeding mothers and is recognized by many lactation experts as a treatable cause of painful breastfeeding. Gunther³ described nipple vasospasm in 1970 but ascribed it to psychosomatic concerns and used the term "psychosomatic sore nipples" for women who have "some fear or unhappy association connected with breasts or breastfeeding." Coates⁴ suggested in 1992 that nipple vasospasm may be related to Raynaud's phenomenon. In 1997, Lawlor-Smith and Lawlor-Smith⁵ reported 5 women with Raynaud's phenomenon associated with breastfeeding, but there are few other case reports, and none report the possible relationship between Raynaud's phenomenon of the nipple and previous breast surgery.

We report 12 women who breastfed 14 infants, all of whom were seen in 1 pediatric practice and 1 lactation consultation center in San Francisco within the past 3 years. Of the 12 women, 11 were seen in the 12 months between June 2002 and May 2003. We hope to alert pediatricians and lactation consultants to this treatable cause of nipple pain. Because nipple pain is the second most common cause of weaning,⁶ it is hoped that, by treating patients with Raynaud's syndrome appropriately, affected mothers may breastfeed their infants successfully. Recognition of Raynaud's phenomenon early in the course may also decrease the amount of inappropriate antifungal therapy prescribed.

CASE REPORTS

Case 1

A 28-year-old gravida 1, para 1 mother gave birth to her 3450-g, term infant by cesarean section. Breastfeeding was initiated within 2 hours of delivery, and the mother reported no pain initially. However, by the time the infant was 3 weeks of age, the mother had sought lactation consultation for severe breast pain associated with nipple vasospasm and subsequent erythema. The infant was treated for possible thrush, but there was no relief of the pain or vasospasm. By the time the infant was 6 weeks of age, the mother had resorted to pumping, which lessened the symptoms. She declined the use of nifedipine and continued to pump for 1 year, successfully feeding her infant only breast milk for the first 6 months of life. The mother had a previous minor surgical procedure to remove a fibroadenoma from 1 breast at 19 years of age. There was no other history of smoking, thyroid disease, connective tissue disease, or Raynaud's phenomenon, nor was there any family history of any of these diseases.

The sibling of this patient's first child weighed 2780 g via cesarean section and was breastfed while in the hospital. However, the mother began to experience the nipple pain, with blanching, followed by bluish coloration, which she quickly recognized as Raynaud's phenomenon. She elected again to express breast milk via electric pump, which reduced her symptoms. The infant was fed breast milk for the first year of life with good growth and development.

Case 2

A 31-year-old, gravida 1, para 1 mother gave birth to a 2680-g, term infant via normal spontaneous vaginal delivery and had no complications of pregnancy, labor, or delivery. The infant was breastfed in the hospital, but the mother soon sought lactation consultation for painful nursing. The infant's latch was good, and there was no evidence of ankyloglossia or micrognathia. The pain was exacerbated at 2 weeks of age, and repeat lactation consultation was sought. The mother was treated with multiple courses of

topical antifungal therapy (including Gentian violet) and 3 courses of fluconazole for presumed yeast infections without experiencing any change in her symptoms. The infant continued to be breastfed and grew well.

When the infant was 2 months old, the mother presented to her pediatrician for repeat evaluation of breast pain. This time, she noted that symptoms had improved during a vacation to a warmer climate. Further questioning revealed that the mother experienced the classic features of Raynaud's syndrome with blanching of her nipples followed by throbbing pain and redness of the nipple after nursing was finished.

The mother chose to prevent symptoms by warming measures during and after breastfeeding but elected not to use nifedipine. Her symptoms decreased as the climate warmed, but she stopped breastfeeding when her infant was 6 months old, after having pumped for 2 months.

Case 3

A 35-year-old, gravida 1, para 1 mother gave birth to a 3880-g infant via normal spontaneous vaginal delivery after having experienced no complication of pregnancy, labor, or delivery. The mother had previously undergone bilateral breast-reduction surgery and had noted nipple pain during pregnancy, although without blanching. After initiation of breastfeeding, she immediately experienced breast pain and noted blanching of her nipples followed by a purple color. Symptoms were definitely increased by cold temperatures. The mother was seen by a lactation consultant, who confirmed correct technique, and she was not treated for thrush. The diagnosis of Raynaud's phenomenon was made by her pediatrician, and the mother elected to use nifedipine, which quickly eliminated her pain. She used nifedipine for 1 month and then successfully eliminated the use of the medication while still able to breastfeed without pain. She continues to breastfeed her 8-month-old infant and has used a subsequent course of nifedipine twice during the following 6 months.

These patients, along with 9 others, are presented in Table 1. Six mothers elected to use nifedipine at low dose (one 30-mg slow-release tablet once a day), and all continued to solely breastfeed their infants for the first 6 months of life. Of the 12 women, 3 had previous breast surgery (2 of whom had breast-reduction procedures).

DISCUSSION

Raynaud's phenomenon of the nipple was described first in 1970 and Lawlor-Smith and Lawlor-Smith reported 5 cases. There are numerous references to Raynaud's phenomenon while breastfeeding in the lactation literature and on the Internet, but this is the first report in the pediatric literature. Symptoms common to all 12 cases include extreme nipple pain, blanching of the nipple with breastfeeding followed by redness or bluish coloration accompanied by intense throbbing pain, and precipitation of symptoms with environmental cold temperature. The nipple pain is so severe that it causes most women to stop breastfeeding. One of our mothers described her pain as a "vice clamped on my nipples."

Poor positioning and poor attachment or latch may cause blanching of the nipple and pain during breastfeeding; thus, it is important to seek additional symptoms (such as precipitation by cold stimulus, occurrence of symptoms during pregnancy or when not breastfeeding, and biphasic or triphasic color changes) before diagnosing Raynaud's phenomenon. All the mothers reported here noted that symptoms were precipitated by cold temperatures and occurred at times when they were not breastfeeding, and they reported biphasic or triphasic color changes of their nipples. One mother even noted that symptoms were precipitated by opening the refrigerator door. Of the

TABLE 1. Demographics and Clinical Information

Case	1	2	3	4	5	6	7	8	9	10	11	12
Age	28	31	35	32	32	33	33	33	31	34	34	32
Gravida/para	1/1 2/2	1/1	1/1	1/1	1/2	2/1	1/1	1/1	1/1	4/1	2/1	1/1
Birth weight, g	3450 2780	2680	3880	3620	3151 2860	3800	3560	2590	3250	3390	4040	2540
Nipple pain	X	X	X	X	X	X	X	X	X	X	X	X
Symptoms with cold	X	X	X	X	X	X	X	X	X	X	X	X
Blanching	X	X	X	X	X	X	X	X	X	X	X	X
Color change	X	X	X	X	X	X	X	X	X	X	X	X
Symptoms with pregnancy	...	X	X	X	X	X	...	...	...	...	X	...
History of thyroid disease	...	X	...	...	...	...	...	...	...	X	...	...
History of Raynaud's phenomenon	...	X	...	...	...	...	...	Possible multiple sclerosis	...	...	...	...
History of smoking	...	...	...	...	...	...	...	...	...	...	...	...
Family history of any disease	...	...	Maternal thyroid disease	Aunt with Raynaud's phenomenon	...	Sister with thyroid disease	...	...	...	...	Brother with thyroid disease	Family history thyroid disease
Seen by lactation specialist	...	X	X	...	X	X	X	X	X	X	X	X
Treated for thrush	X	X	...	X	X	X	...	X	X	...	...	X
Treated with nifedipine	...	...	X	X	...	...	X	X	...	X	...	X
Previous breast surgery	X	...	X	...	...	...	...	...	...	...	X	...
Breastfeeding duration	1 y	6 mo	1 y*	6 mo*	8 mo*	4 mo*	8 mo*	6 mo*	8 mo*	?	4 mo*	4*

X indicates present; ..., not present; *, currently breastfeeding.

12 mothers, 10 were evaluated by experienced lactation consultants, who confirmed that inappropriate breastfeeding techniques were not contributing factors. In addition, 6 of 12 women chose to try and responded well to nifedipine treatment. Thus, we are confident that these cases truly represent Raynaud's phenomenon of the nipple rather than other diagnostic possibilities.

Because the breast pain associated with Raynaud's phenomenon is so severe and throbbing, it is often mistaken for *Candida albicans* infection. It is not unusual for mothers who have Raynaud's phenomenon of the nipple to be treated inappropriately and often repeatedly for *C albicans* infections of the breast with topical or systemic antifungals, as well as having their infants treated with oral antifungals. Of our 12 mothers, 8 received antifungal therapy without relief before the diagnosis was made, and all 8 received multiple courses of therapy with no effect on symptoms.

Raynaud's phenomenon has been associated with other medical conditions including rheumatologic diseases (eg, systemic lupus erythematosus or rheumatoid arthritis) and endocrine diseases (eg, hypothyroidism or carcinoid) and medications. Only 1 of our patients had thyroiditis, and 1 patient is being evaluated for multiple sclerosis. Of the 12 women, 5 did have a close relative who had a history of thyroid disease. Hardwick et al⁷ recommended evaluating all patients with symptoms of Raynaud's phenomenon for autoimmune disease, but this may not be necessary, given the high incidence of Raynaud's phenomenon in women of childbearing age.

The association between breast surgery/implants and autoimmune disease, including Raynaud's phenomenon, has been discussed extensively. Peters et al⁸ reported that 75 of 100 women requesting implant removal noted marked decreased sensitivity of the nipple after implantation. The association of prior breast surgery with Raynaud's phenomenon of the nipple during breastfeeding has not been reported previously. Of our 12 mothers, 3 reported previous surgery: 2 had undergone bilateral breast reductions, and 1 had a unilateral fibroadenoma removal. Unfortunately, we were not able to obtain history of possible breast surgery for 3 of the other 9 patients. Because of the small number of patients, it is impossible to know whether the previous surgery was in any way causative. However, we would encourage additional research in this area.

Treatment options include methods to prevent or decrease cold exposure, avoidance of drugs/nicotine that could precipitate symptoms, and pharmacologic measures. Women with Raynaud's phenomenon should be encouraged to wear warm clothing and breastfeed in warm environments. Most of our mothers reported improved symptoms as the weather warmed and when visiting warmer climates during vacations. Often the patient's entire body needs to remain heated to avoid the vasospasm, so several of our patients breastfed their infants while underneath blankets.

Women with Raynaud's phenomenon of the nipple while breastfeeding should avoid vasoconstricting drugs including caffeine because of its rebound

vasoconstriction and should definitely avoid smoking. Nicotine can decrease blood flow by up to 40% when only 2 cigarettes are smoked as well as increase vascular resistance,⁹ and thus smoking may precipitate symptoms in susceptible breastfeeding women. None of our mothers had smoked during or after pregnancy, so this was not a precipitating factor in any of our cases.

Other treatment options for Raynaud's phenomenon have been reported, including aerobic exercise, biofeedback, calcium and magnesium supplementation, vitamin B₆ supplementation, and use of evening primrose oil and fish oil. In *Breastfeeding—A Guide for the Medical Profession*, Lawrence and Lawrence¹⁰ state that addition of fish oil to the mother's diet has reduced symptoms, as has evening primrose oil. There are no reports in the pediatric literature, however, of mothers using these treatments for Raynaud's phenomenon of the nipple. Anecdotally, it is recognized that these herbal and dietary supplemental therapies often require days of therapy before an effect is noticed. Because most women with painful breastfeeding require immediate relief of the pain to continue breastfeeding successfully, it is important to offer a treatment plan that will alleviate the discomfort quickly.

Nifedipine, a calcium channel blocker, inhibits the uptake of calcium by vascular smooth muscle cells and therefore is used mainly to treat hypertension, angina, and some arrhythmias. Because of its vasodilatory effects, nifedipine has been used to treat Raynaud's phenomenon, including Raynaud's phenomenon of the nipple. Ehrenkranz et al¹¹ demonstrated that "a very insignificant fraction" (<5%) of the nifedipine dose given to a mother who expressed breast milk for her premature infant was actually measured in the breast milk. Because nifedipine has been used safely in children, and 90% of a dose is unavailable for transfer through breast milk because of binding to plasma proteins, nifedipine is considered to be safe for use by breastfeeding mothers. The American Academy of Pediatrics has approved the use of nifedipine in breastfeeding mothers, and in his book *Medications and Mothers' Milk*, Hale¹² documents the low levels of nifedipine (<1–10.3 µg/L) found in breast milk 1 to 3 hours after maternal dosing. Several cases in the literature report good results with nifedipine therapy, and 6 mothers in our series used it successfully. Nifedipine can be prescribed at 5 mg (3 times daily) or as a daily, 30-mg slow-release tablet. The medication is given for 2 weeks and then stopped. Often a 2-week course is sufficient to eliminate the symptoms, but sometimes patients require a second or third course of therapy. Although side effects of nifedipine include dizziness, flushing, headache, and tachycardia, only 1 of the mothers in our series experienced any side effects of the nifedipine. That mother developed headaches during her second course of treatment and discontinued the medication.

Other medications have been used to treat Raynaud's phenomenon, including angiotensin-converting enzyme inhibitors and serotonin receptor an-

tagonists, but would not be indicated in the breastfeeding mother.

CONCLUSIONS

With this report of Raynaud's phenomenon of the nipple in the pediatric literature, we hope pediatricians and lactation consultants will consider this possibility in breastfeeding women who present with severe breast and nipple pain. Mothers must be questioned specifically about the symptoms of Raynaud's phenomenon, because they will rarely provide this information to the breastfeeding consultant. By recognizing Raynaud's phenomenon early in the course of breastfeeding, pediatricians will be able to treat breastfeeding mothers appropriately, will avoid unnecessarily treating mothers for candidal mastitis, and will allow mothers to continue breastfeeding successfully and pain free for a much longer duration. Because the 1 mother who had a second child experienced repeated similar symptoms, it is important also to inform mothers that Raynaud's phenomenon may occur with subsequent pregnancies/breastfeeding and to advise them to seek treatment quickly when breastfeeding a subsequent child.

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