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Lactation Induction in a Transgender Woman: Macronutrient Analysis and Patient Perspectives

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INDUCED LACTATION AND MILK ANALYSIS IN A TRANSGENDER WOMAN

Abstract

Introduction

Induction of lactation in a non-gestational parent has numerous potential benefits including parent-child bonding, optimal nutrition, and health benefits to the child and breast- or chest-feeding parent. For transgender and gender-diverse (TGD) parents, the ability to nourish their infants through production of their own milk may also be a profoundly gender-affirming experience. Two prior case studies have been published describing induced lactation in transgender women, but analysis of the nutritional quality of the milk produced has not been previously described.

Main issue

Here we describe the experience of a transgender woman who underwent successful induction of lactation in order to breastfeed her infant, who was gestated by her partner.

Management

Through modification of exogenous hormone therapy, use of domperidone as a galactogogue, breast pumping, and ultimately direct breastfeeding, the participant was able to co-feed her infant for the first four months of life. We provide a detailed description and timeline of the medications used, laboratory and electrocardiographic (EKG) measurements, results of the participant's milk analysis showing robust macronutrient content, and description of the participant's experience in her own words.

Conclusion

These findings provide reassurance about the adequacy of nutrition from human milk produced by non-gestational TGD parents on estrogen-based gender-affirming hormone therapy and support the importance of this experience on a personal level.

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Introduction

Many TGD individuals desire to be parents (Auer et al., 2018; Morong et al., 2022). There are numerous paths to parenting, including adoption, fostering, personal gestation or surrogacy, which may be supported by assisted reproductive techniques. Commonly reported barriers to parenting include cost, disruption or delay of gender-affirming treatments, fear of worsening dysphoria with assisted reproductive procedures or pregnancy, and legal barriers (Tornello & Bos, 2017). As technology for assisted reproduction expands, and insurance coverage for reproductive services improves, there is growing opportunity for parenting in the TGD community. For those who are able, breast- or chest-feeding their infant may enhance the parent-child bond, optimize nutrition, and promote better health in both the infant and nursing parent (Office on Women's Health in the U.S. Department of Health and Human Services, 2021).

Induction of lactation strives to mimic the hormonal milieu of pregnancy and the postpartum state to establish and maintain milk production. During pregnancy, estrogen, progesterone and prolactin levels rise to prepare the breast for lactation (Schock et al., 2016). Following delivery, estrogen and progesterone levels drop abruptly (Said et al., 1973), while prolactin levels are maintained during the lactation period (Battin et al., 1985). A commonly referred-to protocol for lactation induction is the Newman-Goldfarb protocol, which uses synthetic estrogen-progestin oral contraceptive formulations and galactagogues, with a specific recommendation for domperidone (Newman, 2002-2019). Domperidone, and its relative metoclopramide, act as antagonists of dopamine in several tissues; these effects on the pituitary gland lead to an increase in prolactin levels, thus stimulating alveolar development in breast tissue and increasing milk production (Hale et al, 2018). Though domperidone is available in

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many countries, in the United States, the Food and Drug Administration (FDA) has not approved domperidone and has assigned a medication safety warning due to the increased risk of prolonged QT interval, an abnormality in the electrical conduction of the heart that may increase risk for severe heart arrythmias or sudden death (U.S. Food & Drug Administration, 2004). To date, there have been two published case reports of successful lactation induction in transgender women (Reisman & Goldstein, 2018; Wamboldt et al., 2021), though internet discussion forums indicate many others have pursued this privately (Guest KiraMT, 2013; Miyuki, 2015). In both published cases, estradiol and progesterone were used along with domperidone.

Induced milk from a transgender woman has not been analyzed for macronutrients to our knowledge. Others have suggested that the human breast, regardless of previous hormonal exposure, is capable of making true milk (Perrin et al., 2015). However, parents who have induced lactation non-gestationally and health care providers who support them may worry that the milk lacks sufficient nutrients or bioactive components to nourish a young child (Coleman et al., 2022).

Here we report a case of successful lactation in a transgender woman using estradiol, progesterone, and domperidone; a detailed description of timeline and dosing is included, along with achieved serum levels of relevant hormones and EKG measurement of the corrected QT (QTc) interval. In addition, we report findings of milk macronutrient analysis showing excellent nutritional quality of the milk. Finally, the participant describes her experience with the process.

It is important to note that this care was delivered in the United States, in a state that legally prohibits health care discrimination against TGD people and mandates insurance coverage for gender-affirming medical care. Though the participant did not openly disclose her transgender identity, she was living publicly in a lesbian relationship. Access to medical care and

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social acceptance of sexual and gender minority (SGM) identities vary widely across the world, and many SGM individuals who may desire lactation support face insurmountable barriers as a result.

The participant discussed in this case has provided written consent for publication of this case study and has read and approved the case as submitted. The participant's written contributions are clearly delineated by quotation marks below. The participant declined authorship credit in favor of anonymity.

History and Observational Assessment

The participant was a 46-year-old transgender woman who presented to discuss establishment of breastfeeding. Her partner was pregnant, with a due date four months in the future. The pregnancy was conceived via in vitro fertilization after one unsuccessful intrauterine insemination attempt, using the participant's sperm which had been previously cryopreserved. The participant's stated goals were to support her partner during the early postpartum months. She felt it "would be a wonderful, personal experience, and it would be a great help for my partner."

She had been on gender-affirming hormone therapy since the age of 27. She was treated with oral estradiol throughout the entirety of this period, on a stable dose of 2mg twice daily for the past 14 years, though administration had been switched to sublingual approximately four years ago. She did pause hormone therapy for 4 months prior to preserving sperm. She was treated with spironolactone until undergoing orchiectomy at age 41. She had never been treated with progesterone.

Her past medical history was otherwise notable for prediabetes, which responded to dietary changes, with a hemoglobin A1c value of 5.4% four months prior to consultation; and

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migraine headaches without aura which were infrequent and responsive to sumatriptan. She was a nonsmoker and had no family history of venous thromboembolism. She took no other medications, including specifically over-the-counter medications which may prolong the QT interval. Her physical examination at the initial consultation for lactation induction showed mature A-cup breasts with full rounded contour and excellent nipple maturation and protrusion.

Management

The medical management of the participant's lactation was delivered by her primary care provider in the context of her overall health care with clinical visits occurring in person or via telemedicine approximately at the points of data collection indicated in Table 1.

At the first clinical visit, the participant was counseled regarding galactogogues, including the risk of prolonged QT interval and lack of FDA approval with domperidone, and the risk of akathisia, restlessness and/or drowsiness with metoclopramide. The participant opted to pursue domperidone, which she obtained through a licensed Canadian pharmacy. Baseline EKG was normal. Once she received the domperidone, 107 days prior to the infant's due date (DD), she increased her estradiol dose and started progesterone and domperidone. Estradiol dosing of 4mg twice daily was selected to be relatively pharmacologically equivalent to the recommended ethinyl estradiol dose of 35mcg daily in the Newman-Goldfarb protocol (Newman, 2002-2019). She noted increased breast fullness promptly. After 13 days, doses of progesterone and domperidone were increased to maximize effect. She reported no adverse effects to any medication adjustments. QTc interval was reassessed and found to be unchanged. Test results and medication doses at baseline and throughout treatment are listed in Table 1.

She underwent diagnostic mammogram with ultrasound three weeks after initiation of the lactation induction protocol, both for routine breast cancer screening, as well as new

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development of right axillary discomfort. Images were notable for extremely dense breast tissue and were otherwise normal. Axillary discomfort spontaneously improved.

At six weeks prior to the DD, to simulate the effects of delivery and the postpartum state, she was instructed to stop progesterone, switch to low-dose (25 mcg/day) transdermal estradiol, continue domperidone, and start pumping with a goal of six 15-minute sessions per day. She made these changes and established care with a lactation support provider 34 days prior to the DD.

Outcomes

The infant was delivered four days past the DD via induced vaginal delivery secondary to low amniotic fluid index. There were no significant complications during delivery or the early neonatal period. Initially, in order to establish her own successful milk supply, the gestational parent exclusively breastfed the infant, while the participant continued to pump and store milk. While pumping exclusively, she produced approximately five ounces per day over five pumping sessions. At approximately 14 days after delivery, once the gestational parent's breastfeeding was well established, the participant started directly breastfeeding the infant once to twice daily with good success, and a bottle of her pumped milk was periodically offered. She continued to store five ounces daily over two pump sessions, in addition to direct breastfeeding one or two times daily. The gestational parent was able to maintain her own milk supply without need for additional pumping. The participant decreased the domperidone to 20mg three times daily but found that further dose reductions resulted in diminished milk supply, so continued this dose for the remainder of her breastfeeding (Table 1).

At approximately four months following delivery, the participant desired to stop breastfeeding, as the infant's sleep pattern and routine no longer necessitated her additional

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support. She weaned off the domperidone over one week without adverse effects and resumed her previous dose of sublingual estradiol 2mg twice daily. The participant's stored milk supply was adequate to continue these supplemental feedings through six months of the infant's life.

Four samples of expressed human milk were frozen and supplied for analysis. Each 40-mL sample was obtained from full breast emptyings pooled over a 24-hour period, collected approximately once each month, starting 129 days after initiation of domperidone and 56 days after initiation of pumping. The samples were warmed to 45 degrees Celsius and agitated by hand prior to analysis. Milk samples were analyzed on a FOSS FT1 milk analyzer (Hilleroed, Denmark), a Fourier transform infrared technology (FTIR) instrument with high levels of accuracy. Samples were run twice, and a mean result provided. Total calories were calculated using the Atwater General equation (4 kilocalories per gram [kcal/g] for protein, 4 kcal/g for carbohydrates and 9 kcal/g for fat). Measurements are listed in Table 2.

Participant Perspective

The participant describes her experience with this process as follows: "I found it both an emotionally fulfilling experience as well as a pragmatic one. I continue to feel heartened that I was able to do this for baby and have such a connection with her during her earliest days. It's something that so many women do and definitely felt special to me. I was moved to learn that my breast milk had good nutritional qualities, that I actually had fed her, even in a supplemental role. And it was also really convenient to be able to feed baby during the early weeks and months, especially at night, to make our routine smoother and make sure my partner could sleep better between the scheduled feedings."

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Notable barriers that were encountered by the participant included obtaining domperidone from a reliable international pharmacy, navigating insurance coverage for the breast pump, and finding time to pump with adequate frequency.

Discussion

As family structures continue to diversify, there is growing urgency to understand the experiences and needs of non-gestational parents, including TGD people who desire to breast- or chest-feed their infants. TGD people have been largely absent from research on lactation. Though the experiences and needs of breast- or chest-feeding TGD parents have much in common with those of cisgender people, there are also unique considerations, including the need for appropriate and affirming language, and the management of gender-affirming hormone therapy during the process (MacDonald, 2019; Ferri et al., 2020). The ability of this participant to access support was likely facilitated by her pre-existing relationship with her primary care provider, who was experienced in affirming care for TGD people and in lactation induction.

Lactation induction in TGD people on estrogen-based gender-affirming hormone therapy can be pursued relatively simply, utilizing common formulations already in use for hormone therapy, with the addition of a galactagogue. In the choice of galactagogue, domperidone may carry a lower risk of neuropsychiatric adverse effects but is linked to an increased risk of QTc prolongation and may be challenging to obtain in certain countries. Metoclopramide is widely available, but may more commonly cause akathisia, restlessness and/or drowsiness, though data are conflicting to support this concern (Hale et al., 2018; Foong et al, 2020; Shen et al., 2021). Shared decision-making and an individualized approach is prudent.

Because the participant was expected to have minimal endogenous production of estradiol as a result of orchiectomy, the rationale for continuing low-dose estradiol treatment

during the period of milk production was to minimize adverse effects, in particular mental health effects, from discontinuation of estrogen treatment altogether, while also avoiding any impact on milk production (Shea, 2017). In prior case reports of transgender women inducing lactation, spironolactone was noted to be continued during lactation; however, because of this participant's history of orchiectomy, antiandrogen therapy was not indicated (Reisman & Goldstein, 2018; Wamboldt et al., 2021).

For this participant, the quantity of expressed milk was low in comparison to what would be needed to sustain infant growth independently; this was at least in part due to less frequent breast emptying in this individual, consistently below commonly recommended frequencies of at least six to eight times daily to establish and maintain robust milk supply. As she was sharing breastfeeding duties with her spouse, the gestational parent, lower milk production aligned appropriately with her goals. However, relatively low volume of milk production was also noted in the two prior published case reports of lactation induction in transgender women, though other contributing factors must be considered (Reisman & Goldstein, 2018; Wamboldt et al., 2021). Common causes of low milk production in cisgender women must also be considered for TGD people including but not limited to infection, illness, prior breast surgery, nipple pain, medications, and stress.

Table 2 includes average nutritional values for mature milk from 10-12 weeks (70-84 days) after delivery compiled from a large systematic review of milk analysis (Gidrewicz & Fenton, 2014). Standard mature milk contains approximately 20 kcals per ounce. Our participant's milk was quite robust with higher values for all macronutrients and average calories over 20 kcals per ounce. Other important characteristics of human milk, including micronutrients and bioactive factors, were not assessed. Future research is encouraged in more

TGD parents to confirm robust macronutrient content and analyze content of micronutrients and bioactive factors.

Limitations

Sample preparation for human milk analysis is very important if accurate macronutrient measurement is desired. Though samples were full breast emptyings pooled over 24-hour periods, it is likely that these samples do not reflect the exact 24-hour nutrient content of her milk and may thus over- or underrepresent exact nutrients provided over time.

Conclusion

Contributing to breastfeeding was a meaningful and affirming experience for this non-gestational parent, suggesting that supporting TGD parents in their goals to breast- or chest-feed their infants should be acknowledged and addressed as part of gender-affirming care. Furthering education of providers in primary care, endocrinology and other relevant specialties may reduce barriers for TGD people. TGD people should be included in research relating to lactation including lactation induction, breast- or chest-feeding as a primary or secondary provider of milk, and milk provision through pumping.

Measurements presented here are reassuring that human milk produced by a TGD person with breast development from exogenous hormone therapy should provide adequate caloric content for infant growth and development, though supplementation may be necessary depending on the volume of milk produced. Optimally, future analysis would include precisely pooled 24-hour milk samples for more detailed assessment of macronutrients, as well as analysis of micronutrients and bioactive factors. This information would inform parents, medical providers and lactation support providers making decisions about infant feeding in similar circumstances. Meanwhile, non-gestational TGD parents on estrogen-based gender-affirming hormone therapy

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who have induced lactation can feel reassured that the caloric content of the milk is likely similar to standard term milk.

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Table 1

Medication Management, Study Results and Lactation Outcomes

	Days relative to due date (DD)							
	DD-121	**DD-107**	**DD-94**	**DD-79**	**DD-34**	**DD-18**	**DD+27**	**DD+128**
Medications								
Estradiol	2mg PO BID	4mg PO BID	4mg PO BID	4mg PO BID	25 mcg/d TD	25 mcg/d TD	25 mcg/d TD	25 mcg/d TD
Progesterone		100mg QD	200mg QD	200mg QD	Stopped			
Domperidone		10mg QID	20mg QID	20mg QID	20mg QID	20mg QID	20mg TID	Stopped
Study Results								
QTc on EKG (ms)	440			440				
Prolactin (ng/mL)	12.4			209		143		12.7
Estradiol (pg/mL)	197			285		46		32
Estrone (pg/mL)	1350.0			1150.0		28.4		21.2
Estriol (ng/mL)	< 0.10			< 0.10				
Progesterone (ng/mL)	0.1			10.7		0.2		0.2
Testosterone (ng/dL)	9							

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Lactation Outcomes			
Breast pump frequency	5 times per day	5 times per day	2 times per day
Expressed milk volume	5 oz per day	5 oz per day	5 oz per day
Breastfeeding frequency			1-2 times per day

Note. Summary of medication dosing throughout treatment period, corresponding laboratory results and relevant electrocardiogram (EKG) measurements, and lactation outcomes. Included days are those at which medication changes were implemented, study results were collected, or changes in pumping or feeding occurred. Milk collection for analysis occurred from DD+22 to DD+117.

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Table 2

Milk Macronutrients and Calories, Compared to Standard

	Days relative to due date (DD)				Standard term milk*
	DD+22	DD+70	DD+93	DD+117	70-94 days after delivery
Protein (g/dL)	1.2	1.1	1.0	1.0	0.9
Fat (g/dL)	4.1	5.6	5.9	6.2	3.4
Lactose (g/dL)	6.9	7.6	7.3	7.4	6.7
Calories (kcal/oz)	21	25	25	26	20.4

*Gidrewicz & Fenton (2014)

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