

Posters

ENDOCRINE/BONE

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Change in dual energy X-ray absorptiometry scan values in children with cystic fibrosis, after starting elexacaftor/tezacaftor/ivacaftor and optimizing physical activity and calcium intake

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Background: Cystic fibrosis (CF)-related bone disease, a common complication of cystic fibrosis, is characterized by low bone mineral density and risk of fracture. CF-related bone disease is common in individuals with CF for reasons including malabsorption of fat-soluble vitamins, poor nutritional status, lack of physical activity, delayed puberty, and chronic lung inflammation. In October 2019, the Food and Drug Administration approved the triple combination CF transmembrane conductance regulator modulator elexacaftor/tezacaftor/ivacaftor (ELX/TEZ/IVA). With partially restored function of the chloride channels, patients on ELX/TEZ/IVA have showed improvements in lung function, Cystic Fibrosis Questionnaire-Revised score, sweat chloride, and body mass index (BMI). With these results, it is expected that people with CFs' BMI and ability to absorb vitamins including vitamin D, vitamin K, and calcium will improve. Over the last 2 years, our CF clinic has worked to improve patient dual energy X-ray absorptiometry (DEXA) scan Z-scores. This included ensuring that all qualified patients received ELX/TEZ/IVA, exercise counseling, and optimized calcium intake. The purpose of this study is to determine whether there is a correlation between treatment with ELX/TEZ/IVA and improvement in bone density and evaluate other factors that may influence bone health by comparing change in Z-scores in people with CF before and after starting ELX/TEZ/IVA and analyzing other variables that could affect Z-scores, including time on ELX/TEZ/IVA, amount of daily physical activity, and optimized calcium intake.

Methods: This was a single-center, retrospective chart review of people with CF with low baseline Z-scores taking ELX/TEZ/IVA and managed by Valley Children's Hospital Pulmonology Clinic between January 2018 and March 2022.

Results: Eighteen patients were included in this study. All were on ELX/TEZ/IVA before having their second DEXA scan. Median change from first to second DEXA scan was 0.15, with 67% of patients seeing an improvement in Z-score on their second scan. Patients whose Z-scores increased were on ELX/TEZ/IVA for a mean of 13.4 months, compared with 12 months for those whose Z-scores decreased. Median activity level for patients whose Z-scores increased was 2.8 (meeting 70% of physical activity), compared with 2.17 (meeting 54.5% of physical activity) for those whose Z-scores decreased. Fifty-eight percent of patients whose Z-scores increased were taking supplemental calcium (enteral shakes or prescribed calcium), whereas 83% of patients whose Z-scores decreased. Of patients maximized on all three (ELX/TEZ/IVA, calcium, meeting activity recommendations), average improvement in DEXA scan scores was 0.07. Eight percent of patients fully meeting their activity score showed improvements in DEXA scores.

Conclusions: There was a positive correlation between improvement in Z-score and treatment with ELX/TEZ/IVA and between improvement in Z-score meeting the recommended physical activity, although the improved group had a less optimized calcium intake than the group that did not

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Contraception and pregnancy in a cohort of women with cystic fibrosis in the era of elexacaftor/tezacaftor/ivacaftor

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Background: Women with cystic fibrosis (CF) report sexual activity comparable with that of women without CF [1]. Prior research in cohorts of reproductive-aged women with CF suggests that only about half use contraception [2]. A study evaluating a cohort of women at three CF centers suggested that oral contraceptive pills was the most popular birth control method, followed by condoms [3]. The goal of the current study is to explore contraceptive use and pregnancy history in reproductive-aged women with CF at a single CF center in the Pacific Northwest since November 2019, when the Food and Drug Administration approved elexacaftor/tezacaftor/ivacaftor (ELX/TEZ/IVA).

Methods: Women with CF aged 18 to 45 recruited from the University of Washington CF Center between April and December 2021 completed a self-administered online questionnaire regarding pregnancy history, life-time contraception, and CF transmembrane conductance regulator (CFTR) modulator use. We summarized results using descriptive statistics.

Results: Seventy-two women with CF (average age 30.5 ± 5.5) completed the survey. Forty-nine percent were married or living with their partner, and 76% had menstrual cycles. Of 96% currently using a CFTR modulator, 97% were using ELX/TEZ/IVA. Thirty-one percent (n = 22) reported having ever been pregnant. 45% (n = 10) that at least one pregnancy ended in live birth, and 50% (n = 11) at least one pregnancy ended in miscarriage or abortion. Fifteen (21%) reported at least one unplanned pregnancy, which is about 4 times as high as the national percentage (5%) of women who report an unplanned pregnancy annually [4]. Fewer than 5% reported using medical assistance to achieve pregnancy. All respondents reported using one or more types of contraceptive during their lifetime, including those who reported having a same-sex partner. Participants in the current study reported using condoms the most (n = 59, 82%), followed by oral contraceptive pills (n = 44, 61%), penile withdrawal (n = 41, 57%), emergency contraception (n = 25, 35%), and abstinence (n = 23, 32%).

Conclusions: This cohort of reproductive-aged women with CF all reported contraceptive use at some point in their lifetime. Despite reported birth control use, unplanned pregnancy was common. This cohort of women with CF commonly reported using less effective methods such as condoms, penile withdrawal, and emergency contraception. These findings suggest a need for better contraceptive counseling and management for reproductive-aged women with CF.

Acknowledgements: Funding source: CFF GODFRE19A0, PI: Godfrey/Aitken.

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Cystic fibrosis–related diabetes–adherence to screening at a large clinical center

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Background: Cystic fibrosis (CF)-related diabetes (CFRD) is increasing in incidence in people with CF (PwCF) as life expectancy increases with the advent of CF transmembrane conductance regulator (CFTR) modulator treatments. Current Cystic Fibrosis Foundation screening guidelines, last updated in 2010, recommend screening for CFRD with a 2-hour oral glucose tolerance test (OGTT) annually starting at 10 years of age [1]. Prior studies have demonstrated that centers with higher rates of screening with OGTTs diagnose CFRD earlier and have slower rates of pulmonary decline [2]. Questions remain as to the best way to screen for diabetes in PwCF given their complexity. The aim of our study was to describe adherence rates of ordering OGTTs and completion rates of OGTTs at Michigan Medicine in CF populations.

Methods: The cohort was defined as PwCF who were eligible for screening with an OGTT between 2010 and 2021. We excluded patients with a diagnosis code of CFRD. We defined screen-eligible years as number of

years between 2010 and 2021 in which the CF patient should have been screened with an OGTT. We defined number of OGTT tests ordered per patient by summing number of OGTT orders performed per year over the period. We defined number of OGTT tests completed per patient by summing number of completed OGTT tests for the period. We defined order adherent as having a percentage ordered per patient of 75% or greater. We defined test adherent as having a percentage performed per patient of 75% or greater. We analyzed the differences in these measures based on race, gender, and age and examined the outcomes of screening (pre-diabetes or diabetes) based on OGTT results and glycosylated hemoglobin (HbA1c).

Results: At Michigan Medicine, in all patients eligible for screening with an OGTT, there was a 16.5% center-level rate of ordering OGTTs and a 13.8% rate of screening with completed OGTTs. Patients completed 83% of OGTTs and 100% of HbA1c tests ordered. Of OGTTs completed, 24% screened positive for pre-diabetes and 3.4% for diabetes. Of HbA1c performed, 31% screened positive for pre-diabetes, and 1.2% screened positive for diabetes. There were significant differences according to age in screening ($p < 0.01$) and completion ($p < 0.01$) rates, with higher rates of screening in younger than older patients, but not according to gender or race (Table 1).

Conclusions: Overall, adherence rates to OGTT ordering and completion were suboptimal. Patients had a higher adherence rate to diabetes screening with HbA1c than to OGTTs, and ordering adherence was higher for pediatric than adult patients. Although current CFF guidelines recommend the OGTT as the standard of screening for CFRD, oral glucose tolerance testing is more burdensome and takes more time to complete than HbA1c testing in a patient population that already has high health care use. Continued analysis of our data is needed to determine outcomes of screening, specifically trends in body mass index, pulmonary function tests (forced expiratory volume in 1 second, forced expiratory flow at 25% and 75% of pulmonary volume), number of hospitalizations, and variations in insulin use.

References

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Table 1 (abstract 3): Order and test adherence rates according to gender, race, age range, and age group

	Order Adherent (>= 75%)	Order Non-Adherent (< 75%)	p-value	Test Adherent (>= 75%)	Test Non-Adherent (< 75%)	p-value
Overall Adherence	12.9 (60)	87.1 (405)		71.8 (135)	28.2 (53)	
Gender			p = 0.636			
Female	51.7 (31)	48.4 (196)		45.2 (61)	47.2 (25)	p = 0.535
Male	48.3 (29)	51.6 (209)		54.8 (74)	52.8 (28)	
Race			p = 0.511			p = 0.152
Caucasian	100 (60)	91.9 (372)		97 (131)	94 (50)	
African American	0 (0)	2.7 (11)		0.7 (1)	6 (3)	
Asian	0 (0)	1.0 (4)		0 (0)	0 (0)	
American Indian or Alaska Native	0 (0)	0.5 (2)		0 (0)	0 (0)	
Other or Unknown	0 (0)	3.9 (16)		0 (0)	0 (0)	
American Indian or Alaska Native	0 (0)	0.5 (2)		0 (0)	0 (0)	
Other or Unknown	0 (0)	3.9 (16)		0 (0)	0 (0)	
Age Group (yrs)			p < 0.01			p < 0.01
10-19	80 (48)	24 (97)		52.6 (71)	64.2 (34)	
20-29	20 (12)	27.4 (111)		45.2 (61)	35.9 (19)	
30-39	0 (0)	14.8 (60)		2.2 (3)	0 (0)	
40-49	0 (0)	14.3 (58)		0 (0)	0 (0)	
50+	0 (0)	19.5 (79)		0 (0)	0 (0)	
Adult vs. Pediatrics			p < 0.01			p < 0.01
Adult (>= 18 yrs)	31.7 (19)	80.5 (326)		59.3 (80)	39.6 (21)	
Pediatrics (< 18 yrs)	68.3 (41)	19.5 (79)		40.7 (55)	60.4 (32)	