EVALUATION OF CONTINUOUS GLUCOSE MONITORING IN CYSTIC FIBROSIS PATIENTS

54th Annual Meeting 1-3 October ESPE 2015 BARCELONA European Society for Paediatric Endocrinology

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INTRODUCTION

The oral glucose tolerance test (OGTT) is the accepted method of screening for cystic fibrosis-related diabetes (CFRD). However, the results are not always sufficiently sensitive and specific. Use of continuous glucose monitoring (CGM) as a diagnostic tool for CFRD is receiving increasing attention.

AIMS

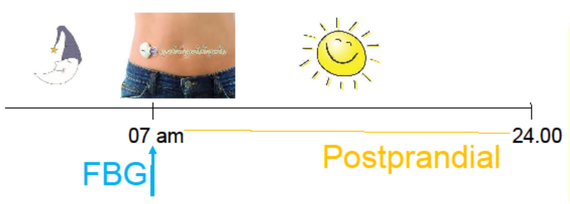
1. Describe the glucose profile in cystic fibrosis (CF) in patients over 10 years of age by CGM
2. Compare CGM and OGTT results
3. Evaluate lung function and nutritional status changes during the year prior to evaluation

PATIENTS AND METHODS

Prospective study of CF patients aged ≥ 10 years
OGTT and CGM (Ipro2TM) were performed
(November 2012 – May 2014)

Patients with exacerbations treated with steroids, GH,immunosuppressed, insulinised or transplanted were excluded.

Changes in BMI standard deviation score (SDS) and percent forced expiratory volume in 1s (%FEV1) in the year preceding both tests were evaluated: Δ SDS BMI and Δ % FEV1 respectively (current-1year ago)



ROC curve (compared to the gold standard OGTT) was used to determine optimal glycaemic cutoffs for detecting changes in BMI and FEV.
Analysis using STATA statistical software

RESULTS

PATIENTS

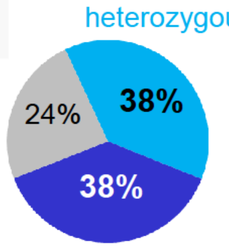
n=21

Mean age 15.4 (±1.88 SDS)

Tanner mean 4 [2-5]

(TV 20ml)

GENOTYPE



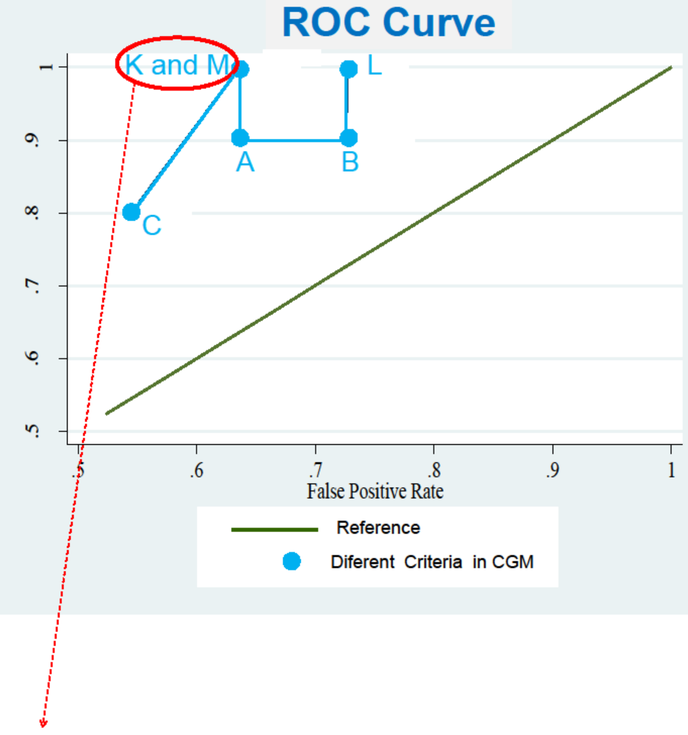
SEX

43% ♂ 57% ♀

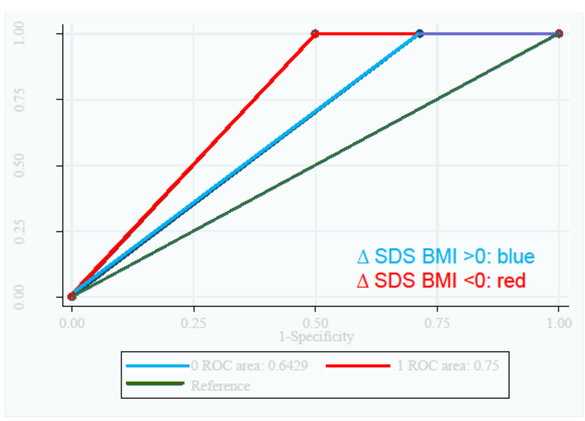
GLUCOSE PROFILE IN CGM

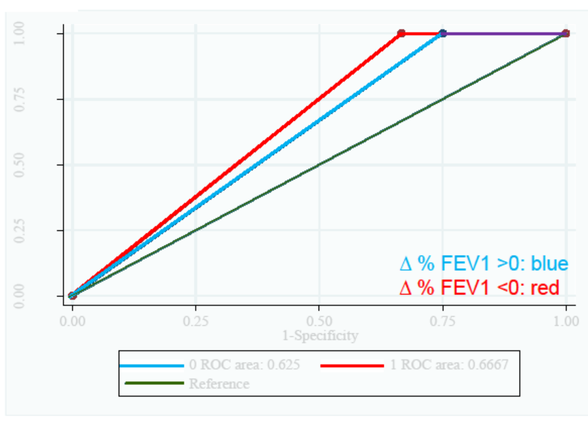
	Episodes	N	%	Median	IQR
Max glucose				191	(178-201)
Min glucose				59	(47.5-66.5)
%>140mg/dl				5	(3-8.5)
%<60mg/dl	0	12	57.1		
	≥1	9	42.9		
%>200mg/dl postpran	0	15	71.4		
	≥1	6	28.6		
%100-126mg/dl FBG				26	(4-50)
%>126mg/dl FBG	0	19	90.4		
	≥1	2	9.6		
%AUC>140 mg/dl				1	(0.5-1.4)
Peaks >200 mg/dl	0	15	71.6		
	1	3	14.2		
	≥2	3	14.2		

ROC Curve



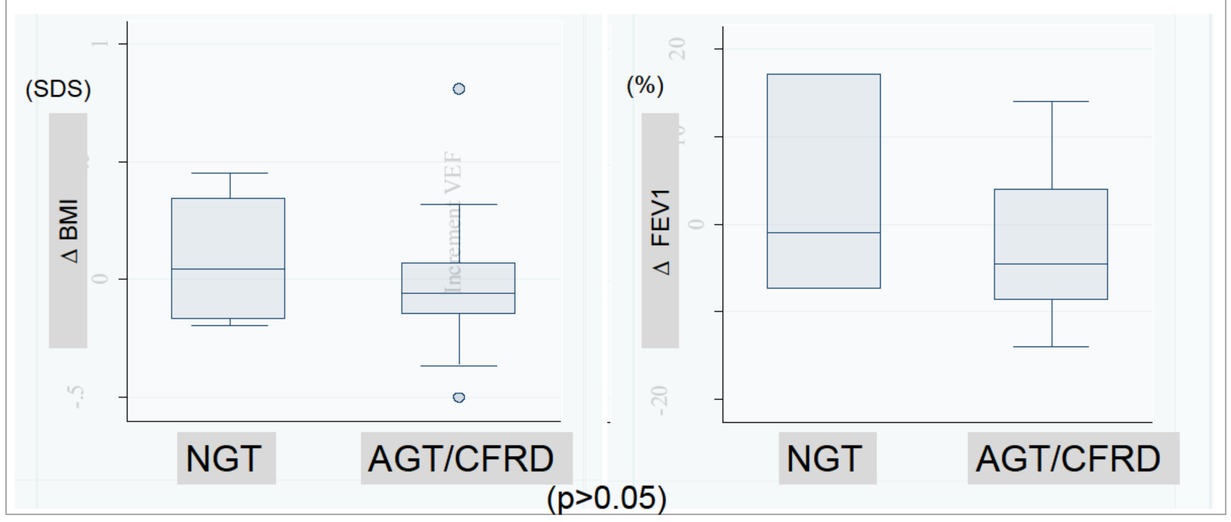
CGM SENSITIVITY AND SPECIFICITY FOR CHANGES IN BMI AND FEV1





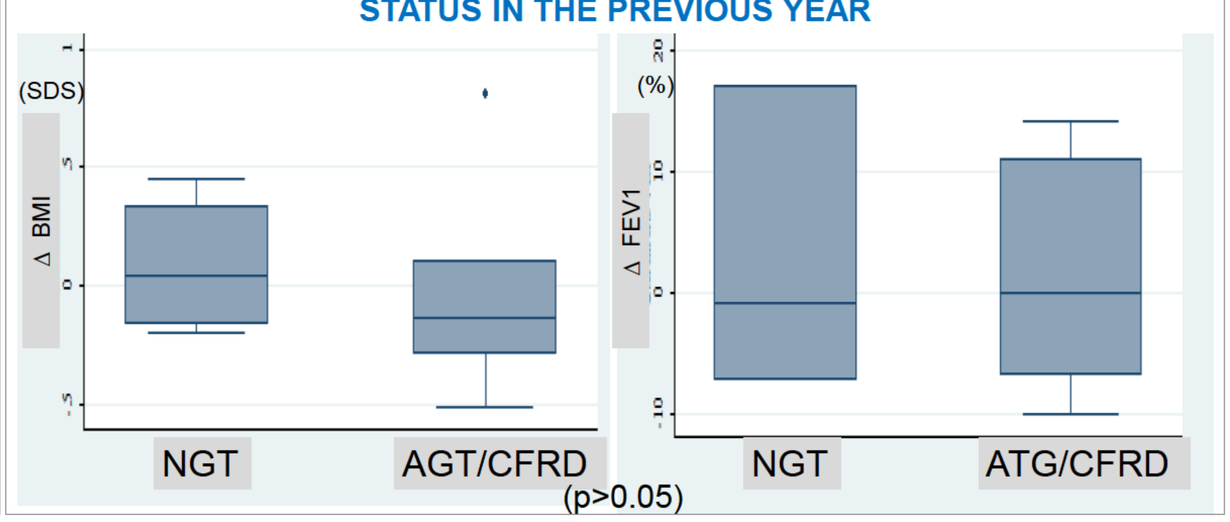
MORE SENSITIVE AND SPECIFIC CRITERIA IN CGM BY ROC CURVE	Fasting blood glucose (FBG)	Postprandial
Normal Glucose Tolerance (NGT)	< 100 mg/dl 100-126 mg/dl (CGM time <30%)	< 140 mg/dl or 140-199mg/dl (CGM time < 4.5%)
Abnormal GlucoseTolerance (AGT)	CGM time **≥ 30% between 100-126** mg/dl	**140-199mg/dl (CGM time ≥ 4.5%)** or ≥ 200 mg/dl (one peak only)
CFRD	≥ 126 mg/dl	**≥ 200mg/dl (>1peak)**

GLUCOSE ABNORMALITIES DURING CGM AND CHANGES IN LUNG FUNCTION AND NUTRITIONAL STATUS IN THE PREVIOUS YEAR



(p>0.05)

GLUCOSE ABNORMALITIES DURING CGM IN PATIENTS WITH NORMAL OGTT (n=11) AND CHANGES IN LUNG FUNCTION AND NUTRITIONAL STATUS IN THE PREVIOUS YEAR



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CONCLUSIONS

1. CGM is a useful tool for diagnosing and managing carbohydrate metabolism in patients with CF.
2. CGM is more specific and sensitive for CFRD diagnosis when deterioration in lung function or nutritional status was greater during the previous year.
3. CGM seems to reveal early glucose tolerance abnormalities that remain undiagnosed by OGTT screening and are correlated with clinical abnormalities.

ESPE 2015 301--P2
Diabetes and Insulin
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DOI: 10.3252/pso.eu.54espe.2015
Poster presented at: ESPE 2015 BARCELONA European Society for Paediatric Endocrinology
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