

Change in HbA1C predicts future abnormal Oral Glucose Tolerance tests in children and adolescents with Cystic Fibrosis.

P1-070

Sommayya Aftab^{1*}, Rooha Ghauri¹, Samantha Drew¹, Hannah Meek¹, Catherine Peters¹, Rakesh Amin¹

¹ Department of Paediatric Endocrinology, Great Ormond Street Hospital, London, UK.

*Current affiliation Department of Paediatric Endocrinology, The Children's Hospital & The Institute of Child Health, Lahore



INTRODUCTION

- ❑ The diagnosis of Cystic Fibrosis Related Diabetes (CFRD) is made from the start of insulin therapy.
- ❑ The oral glucose tolerance test (OGTT) is the 'Gold standard' screening choice for CFRD.
- ❑ HbA1C is considered unreliable in diagnosing CFRD because of increased red cell turn over in children and adolescents with Cystic Fibrosis (CF).

AIM

- ❑ To determine the validity of HbA1C as a predictive tool for future abnormal OGTT in CF.

METHOD

- ❑ Results for OGTT, HbA1C (within 3 month of OGTT) and need for insulin treatment were obtained from records of CF patients over a 15 years period (January 2004 to December 2018).
- ❑ The sensitivity and specificity of HbA1C to detect CFRD on OGTT or CFRD based on need for insulin treatment were calculated.
- ❑ The sensitivity for HbA1C and OGTT in detecting CF patients needing insulin therapy was compared.

RESULTS

Table-1. Demographic data

Total cases reviewed	180
Total cases included	150
Gender	Male=69 Female = 81
Mean age at testing	11.9(6-17) yr

Figure-1. Proportion of OGTT results

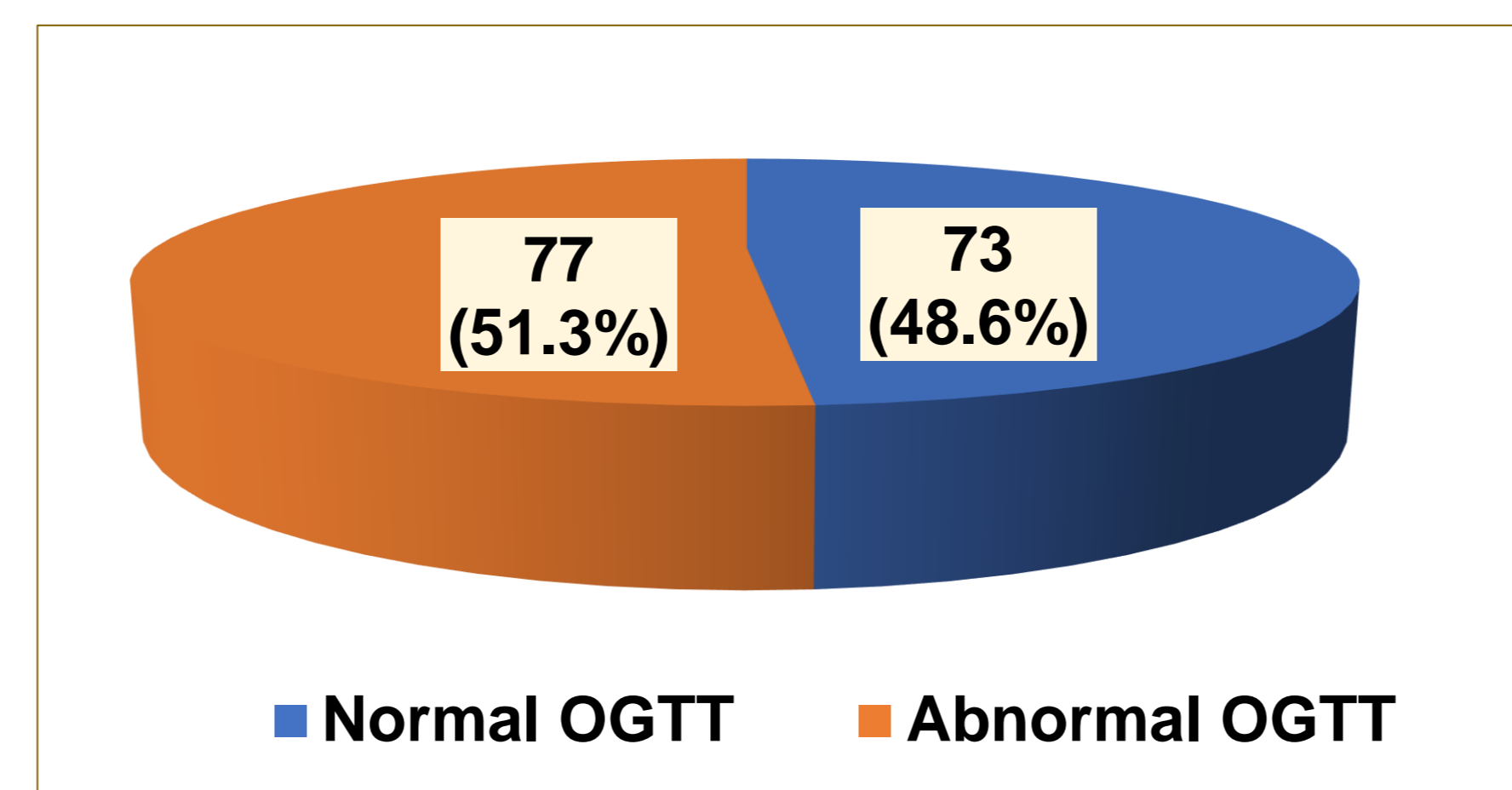


Figure-2. Breakdown of abnormal OGTTs

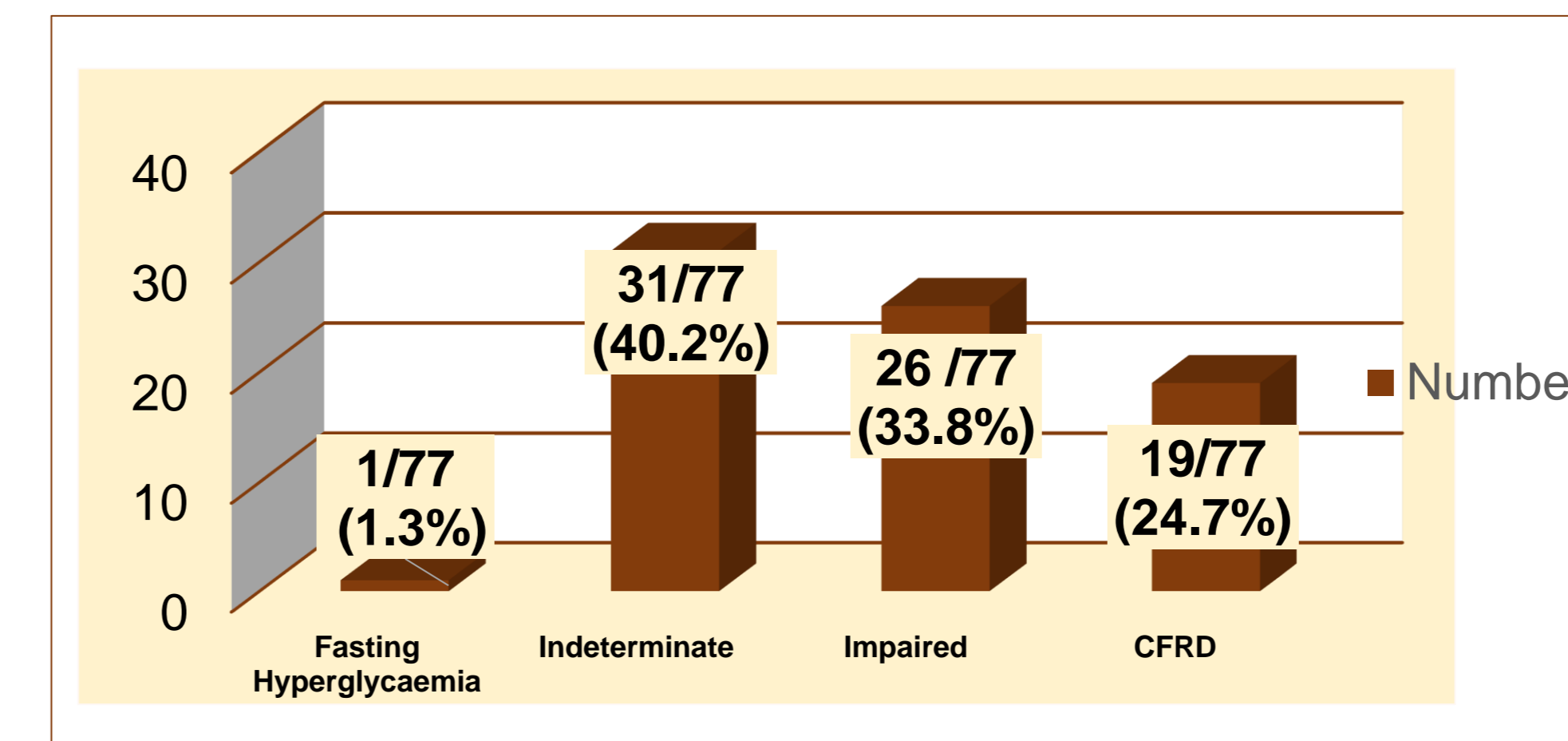


Table-2. Sensitivity and specificity of HbA1C (> 42 mmol/mol) to detect CFRD on OGTT and CFRD based on need for insulin.

Groups	Sensitivity	Specificity
CFRD (on OGTT)	68.4 %	84.3%
CFRD (on need for insulin)	64.5%	89.1%

Table-3. Sensitivity and specificity of HbA1C (> 40 mmol/mol) to detect CFRD on OGTT and CFRD based on need for insulin.

Groups	Sensitivity	Specificity
CFRD (on OGTT)	78.9 %	67.9%
CFRD (on need for insulin)	74.2%	71.4%

Table-4. Comparison of sensitivity of HbA1C and OGTT in detecting CFRD needing Insulin

Groups	Sensitivity	Specificity
OGTT	48.9%	98.3%
HBA1C (>42 mmol/mol)	64.5%	89.1%
HBA1C (>40 mmol/mol)	74.2%	71.4%

INFERENCE

- ❑ HbA1C (>42 mmol/mol) is more sensitive than OGTT in detecting CFRD patients who need insulin therapy.
- ❑ Reducing HbA1C cut off to >40 mmol/mol further increases its sensitivity to detect CFRD on OGTT and CF needing insulin therapy. Specificity is reduced.
- ❑ Increase in HbA1C by 3mmol/mol in a year correlates with indeterminate and impaired OGTT.

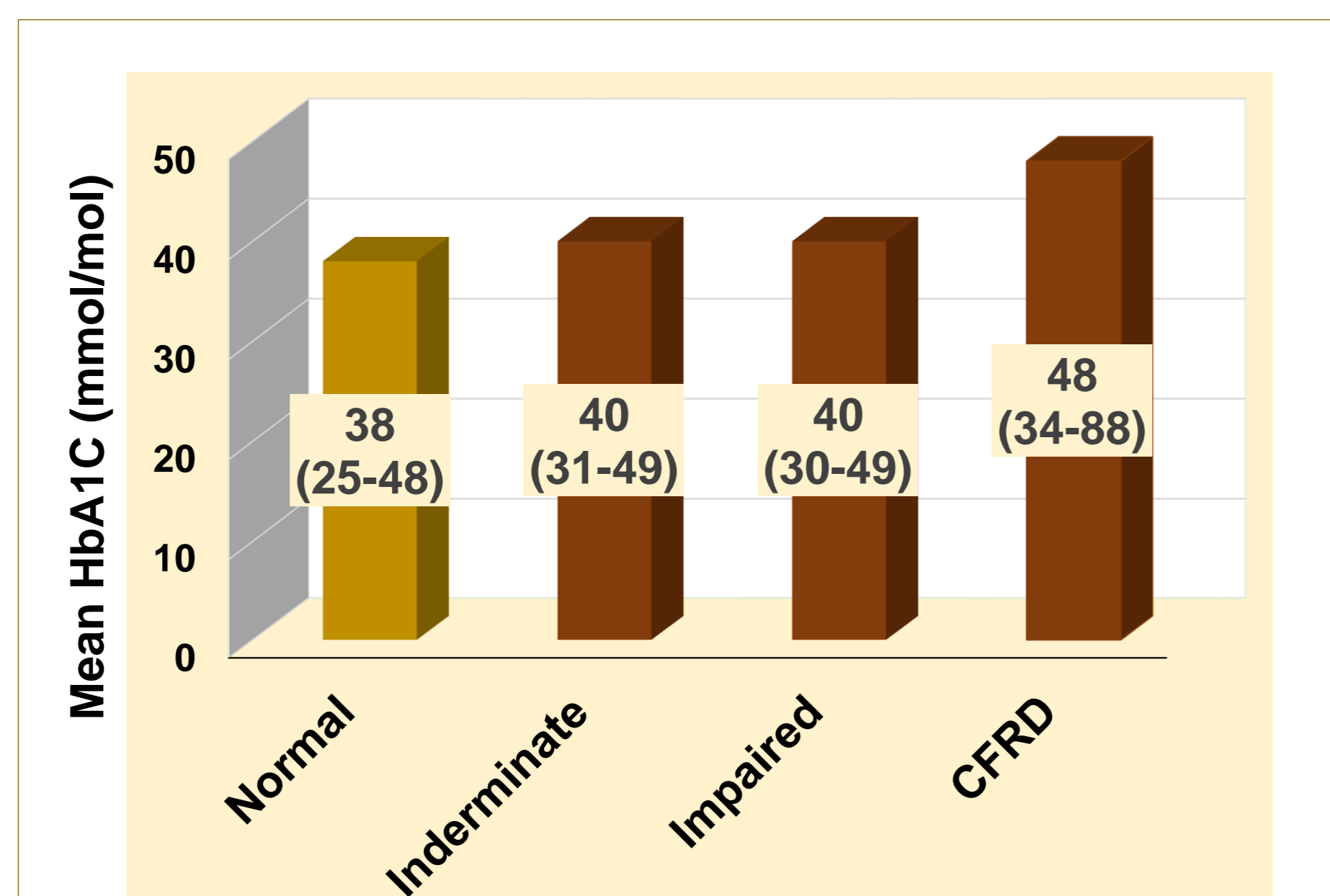
CONCLUSION

- ❑ HbA1C is a useful additional tool in screening for CFRD.

REFERENCES

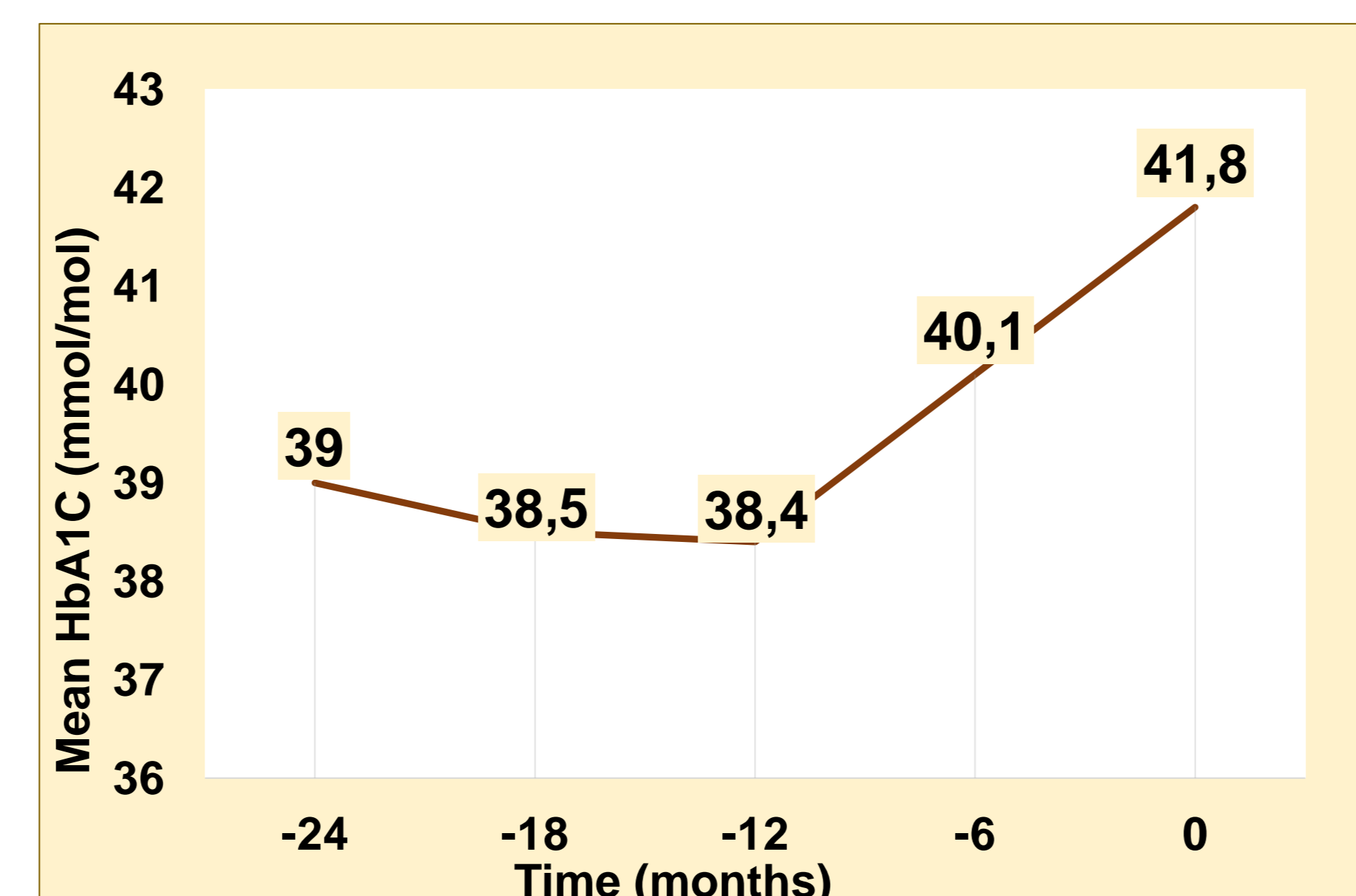
- Moran A, Brunzell C, Cohen RC, et al. Clinical care guidelines for CFRD: recommendations from the Cystic Fibrosis Foundation, the American Diabetes Association and the Pediatric Endocrine Society. *Diabetes Care*. 2010;33:2697-2708.
- Lanng S, Hansen A, Thorsteinsson B, Nerup J, Koch C. Glucose tolerance in cystic fibrosis: a five-year prospective study. *BMJ*. 1995;311: 655-659.
- Dobson L, Sheldon CD, Hattersley AT. Conventional measures underestimate glycaemia in CF patients. *Diabet Med*. 2004;21:691-696. 6. Frohnert BI, Ode KL, Moran A, et al. Impaired fasting glucose in cystic fibrosis. *Diabetes Care*. 2010;33:2660-2664.
- Finkelstein SM, Wielinski CL, Elliott GR, et al. Diabetes mellitus associated with cystic fibrosis. *J Pediatr*. 1988;112:373-37

Figure-3. Mean HbA1C of different OGTTs



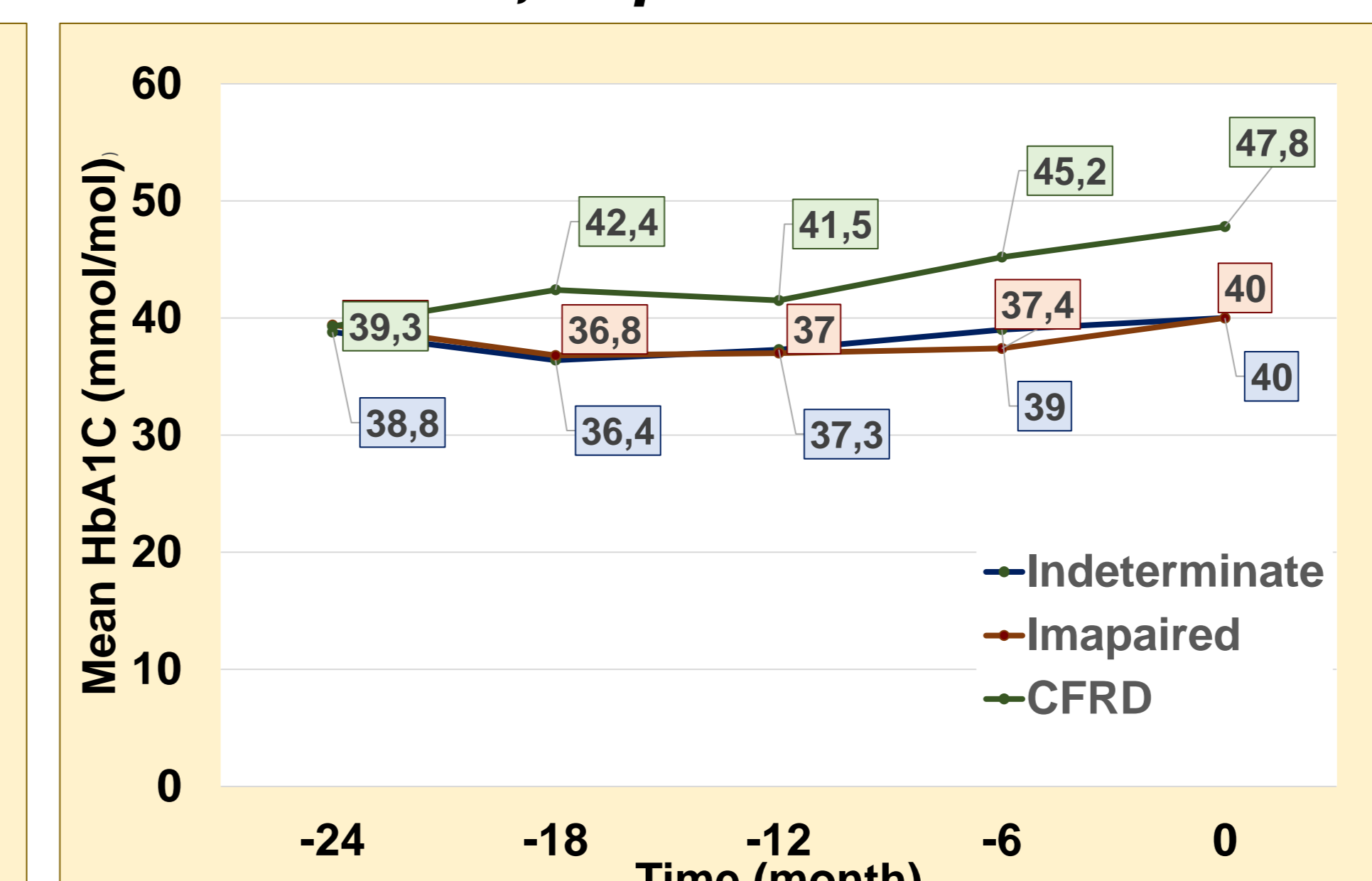
Increasing trend of mean HbA1C through progressive phases of insulin dysregulation

Figure-4. Mean HbA1C trend for all abnormal OGTTs



HbA1C starts rising a year before an abnormal OGTT with rate of 1.7 mmol/mol every 6 month

Figure-5. Mean HbA1C trend for indeterminate, impaired and CFRD OGTTs



HbA1C was already in diabetic range 18 months before CFRD on OGTT. HbA1C rose by 3mmol/mol over year before indeterminate and impaired OGTT