primary studies - published RCT

Insulin for early glycaemic abnormality in children with cystic fibrosis without cystic fibrosis-related diabetes (CF-IDEA): a randomised controlled trial.

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Study design (if review, criteria of inclusion for studies)

Multicentre, randomised controlled trial

Participants

Five children's hospitals in Australia and one in the USA. Eligible participants were children with cystic fibrosis aged 5-18 years without cystic fibrosis-related diabetes and with peak glucose concentration on a five-point OGTT of 8Â·2-11Â·0 mmol/L (cystic fibrosis insulin deficiency stage 1) or â‰¥11Â·1 mmol/L (cystic fibrosis insulin deficiency stage 2). Between Dec 6, 2010, and Feb 25, 2022, 109 participants

Interventions

Participants were randomly assigned (1:1) to insulin or observation. Randomisation was done using the biased coin method, followed by minimisation when the study groups became imbalanced by chance. Randomisation was stratified by glycaemic category (cystic fibrosis insulin deficiency stage 1 or 2), weight Z score (more than or equal to -0·61 or less than -0·61), and study centre. Participants in the insulin group received once-daily, long-acting insulin detemir by subcutaneous injection before breakfast, commencing at 0·1 units per kg per day, adjusted in 0·5-unit increments to achieve all fingerstick blood glucose concentrations between 4 mmol/L and 8 mmol/L.

Outcome measures

The primary outcomes were absolute changes in weight Z score, percentage predicted forced expiratory volume in 1 s (ppFEV(1)), and percentage predicted forced vital capacity (ppFVC), derived with generalised estimating equations and presented with two-sided 95% CIs. Severe hypoglycaemic events (defined as requiring outside assistance or causing reduced level of consciousness or seizure), insulin-related adverse events, and continuous glucose monitoring (CGM) percentage time with blood glucose below 3·9 mmol/L were recorded as safety outcomes.

Main results

Between Dec 6, 2010, and Feb 25, 2022, 109 participants were randomly assigned to observation (n=54) or insulin (n=55). Five participants withdrew after the baseline visit, and the analysis therefore included 104 participants (53 observation and 51 insulin); 95 participants completed the 12-month protocol and nine completed only 6 months. Baseline characteristics were similar between the groups; however, the observation group included 30 (57%) boys and 23 (43%) girls, whereas the insulin group included 23 (45%) boys and 28 (55%) girls. The median daily insulin dose at 12 months was 0·12 units per kg per day (range 0·05-0·41). There were no statistically or clinically significant differences between the observation and insulin groups in change in weight Z score (difference insulin minus observation 0·07 [95% CI -0·04 to 0·18]; p=0·20), change in ppFEV(1) (1·2 [-2·2 to 4·7]; p=0·48), or change in ppFVC (0·6 [-2·6 to 3·8]; p=0·72). Similarly, there were no significant differences in subgroup analyses by cystic fibrosis insulin deficiency stages 1 and 2. There were no episodes of severe hypoglycaemia or insulin-related adverse events, and we found no evidence of difference between the observation and insulin groups in CGM percentage time less than 3·9 mmol/L.

Authors' conclusions

Insulin treatment did not improve weight or lung function when given to children and adolescents with cystic fibrosis and early glycaemic abnormalities. Insulin treatment should not be given to those who do not meet OGTT criteria for cystic fibrosis-related diabetes.

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See also

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Keywords

Glargine; Insulin; Hypoglycemic Agents; pharmacological_intervention; Glucose Intolerance; Pancreatic Diseases; Gastrointestinal Diseases;