Regulation (NICE-SUGAR) study: analysis of the first 100 hypoglycaemic events

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Introduction

Intensive insulin therapy (IIT) is a new treatment strategy that increases the risk of hypoglycaemia. Little is known about the epidemiology of hypoglycaemia in this setting.

Subjects and settings

A total of 1838 patients were recruited during the first 14 months of the NICE-SUGAR (Normoglycaemia in Intensive. Care Evaluation — Survival Using Glucose Algorithm Regulation) study. This is a randomised controlled trial comparing two target ranges for blood glucose concentration,4.5–6.0 mmol/L and < 10 mmol/L.

Methods

In the NICE-SUGAR study, all episodes of hypoglycaemia(blood glucose concentration_2.2 mmol/L) are reported as serious adverse events (SAEs). The incidence and timing of the first 100 SAEs were extracted from the study database. Two assessors independently reviewed the SAEs to determine cause; differences were resolved by consensus. Patients' baseline characteristics were extracted from the study database to investigate risk factors for hypoglycaemia. Clinical sequelae were recorded.

Results

The rate of hypoglycaemia (events per 100 patients enrolled) was 4.1 (8.0 in the lower target group, and 0.3 in the higher target group). Initial multivariate analysis of baseline characteristics did not yield a useful model for predicting hypoglycaemia, although patients with hypoglycaemia were older (mean age, 63.9 v 59.7 years,*P*= 0.03),and had higher APACHE II and SOFA renal scores(mean,23.0 v 20.2,*P*=0.07; and 1.2 v 0.7,*P*= 0.001, respectively).

Adjudicated causes were: clinician error (ie, failure to follow the computerised treatment algorithm and infrequent blood glucose monitoring), 37%; decreased nutritional intake, 24%; pre-terminal, 8%; likely spurious(measurement error), 16%; and miscellaneous, 15%. Hypoglycaemia occurred up to 55 days after randomisation: 56% of episodes occurred within 5 days of randomisation, and 26% within 48 hours of randomisation. No adverse clinical sequelae were detected.

Conclusions

During the first 14 months of the NICE-SUGAR study, 8.0% of the patients treated with IIT suffered hypoglycaemia. The major causes of hypoglycaemia were clinical error and cessation of nutritional intake. Multivariate analysis of baseline characteristics did not yield a useful model for predicting hypoglycaemia