

Fluid Balance and Tight Glycaemic Control Trade-offs for Extremely Low Birth Weight Infants

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Objective:

Tight glycaemic control (TGC) has shown benefits for extremely pre-term infants in intensive care. Some glycaemic control protocols for these infants are constrained by strict fluid balance goals, possibly at the expense of control and safety.

Method:

Data from critically-ill neonates undergoing insulin therapy are analyzed retrospectively. 53 patients from Christchurch Women's Hospital in New Zealand were on the STAR protocol, with TGC prioritized over fluid intake and saline used to meet volume targets. 10 patients from Semmelweis Hospital in Miskolc, Hungary were treated with insulin in a fluid volume-based protocol for glycaemic control. Quality of fluid balance and glycaemic control are examined.

Result:

The median difference between target fluid guidelines and actual fluid intake during insulin was 15 mL/kg/day in Christchurch, or 10% of median actual fluid intake. In the Miskolc data this difference was 25 mL/kg/day. These deviations appear to be proactive, patient-specific changes in target due to complications, particularly in the case of the Miskolc patients. The Christchurch cohort maintained blood glucose (BG) within its 72–144 mg/dL target band for 71% of measurements, and for Miskolc, 37.1%. Miskolc patients were targeted at BG within 54–180 mg/dL, which was met for 65% of measurements, and which Christchurch met for 90%. The Miskolc cohort also displayed a higher incidence of hypoglycemia, with all 10 patients experiencing BG < 47 mg/dL during insulin therapy, as opposed to 5 patients (9%) in the Christchurch cohort.

Conclusion:

Both hospitals showed similar ability to meet fluid volume targets. However, the Christchurch cohort exhibited improved glycaemic control under the STAR protocol compared to the Miskolc cohort. Hence, TGC can be achieved without detriment to fluid volume targets.