

Study on the Enhancement of Malaysian ICU Centre and Introduction of STAR Performance

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ABSTRACT

Stress-induced hyperglycaemia commonly occurred in the ICU. It is known that the majority of the ICU centre in Malaysia is using intensive insulin therapy (IIT) protocol in order to control glucose level in critically ill patient blood within the targeted level to achieve required safety goals. However, alterations to the current practice needed to be considered to minimize the risk of hypoglycaemia and mortality while reducing the case of hyperglycaemia event. Therefore, the objective of this research paper is to weigh and evaluate the performance of a modern practice known as Stochastic Targeted (STAR) Protocol in managing blood glucose (BG) levels in Malaysia ICU cohort and to compare its performance between the three participating hospitals (HTAA, HUSM and PPUM) via MATLAB simulations. STAR is a tablet-computer based protocols that provide patient-specific glucose control framework accounting for patient variability with a stochastically derived maximum 5% risk of hypoglycaemia events. The in-silico trials were simulated with controlled goal feed (GF) and without GF. Only one type of nutrition is considered in this study, which is Glucerna. The results show that all three ICU centre with STAR simulation have a tight glycemic control with HTAA (83.6%), HUSM (76.8%) and PPUM (80.6%) in terms of BG within the targeted band of 4.0–10.0 mmol/L. Also, the median BG measurement level and insulin secretion shows decrease in percentage for all ICU cohort, HTAA (12.3%; 30.2%), HUSM (21.6%; 9.9%) and PPUM (17.9%; 13.3%). The insulin sensitivity (SI) of STAR simulations have a significant increase when compared with IIT protocol, HTAA (26.1%), HUSM (33.3%) and PPUM (50%). The Kruskal-Wallis test was utilized to test the BG, SI and insulin secretion median. There are significant differences between IIT protocol and STAR simulations among the three cohorts ICU centre with p-value < 0.05.

KEYWORDS

Hypoglycaemia; STAR; Stochastic targeted; Stress induced hyperglycemia

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