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Performance of Stochastic Targeted Blood Glucose Control Protocol by virtual trials in the Malaysian intensive care unit

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Abstract

Background and objective: Blood glucose variability is common in healthcare and it is not related or influenced by diabetes mellitus. To minimise the risk of high blood glucose in critically ill patients, Stochastic Targeted Blood Glucose Control Protocol is used in intensive care unit at hospitals worldwide. Thus, this study focuses on the performance of stochastic modelling protocol in comparison to the current blood glucose management protocols in the Malaysian intensive care unit. Also, this study is to assess the effectiveness of Stochastic Targeted Blood Glucose Control Protocol when it is applied to a cohort of diabetic patients.

Methods: Retrospective data from 210 patients were obtained from a general hospital in Malaysia from May 2014 until June 2015, where 123 patients were having comorbid diabetes mellitus. The comparison of blood glucose control protocol performance between both protocol simulations was conducted through blood glucose fitted with physiological modelling on top of virtual trial simulations, mean calculation of simulation error and several graphical comparisons using stochastic modelling.

Results: Stochastic Targeted Blood Glucose Control Protocol reduces hyperglycaemia by 16% in diabetic and 9% in nondiabetic cohorts. The protocol helps to control blood glucose level in the targeted range of 4.0-10.0 mmol/L for 71.8% in diabetic and 82.7% in nondiabetic cohorts, besides minimising the treatment hour up to 71 h for 123 diabetic patients and 39 h for 87 nondiabetic patients.

Conclusion: It is concluded that Stochastic Targeted Blood Glucose Control Protocol is good in reducing hyperglycaemia as compared to the current blood glucose management protocol in the Malaysian intensive care unit. Hence, the current Malaysian intensive care unit protocols need to be modified to enhance their performance, especially in the integration of insulin and nutrition intervention in decreasing the hyperglycaemia incidences. Improvement in Stochastic Targeted Blood Glucose Control Protocol in terms of u(en) model is also a must to adapt with the diabetic cohort. (C) 2018 Elsevier B.V. All rights reserved.

Keywords

Author Keywords: Blood glucose control protocol; Stochastic modelling; Sliding scale method; Hyperglycaemia; Insulin sensitivity

KeyWords Plus: CRITICALLY-ILL PATIENTS; TIGHT GLYCEMIC CONTROL; INSULIN THERAPY; HYPOGLYCEMIA; MODEL; HYPERGLYCEMIA; MANAGEMENT; MORTALITY

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