

ALGORITHMIC ADJUSTMENT OF INSULIN REGIMEN REDUCES GLUCOSE VARIABILITY IN PATIENTS WITH TYPE 1 DIABETES IN HOSPITAL SETTINGS

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Motivation and aim: High glucose variability (GV) has been identified recently as a risk factor for cardiovascular disease in diabetic subjects [1, 2]. Besides, increased GV is associated with hypoglycemic events [3]. The aim of the study was to evaluate the possibility of reduction of GV in hospitalized patients with type 1 diabetes using stepwise adjustment of insulin regimen.

Materials and methods: We observed 93 patients with type 1 diabetes (38 M/55F) aged 19-76 years, on multiple daily injections (MDI) or continuous subcutaneous insulin infusion (CSII), in hospital settings. The average hospital stay was 12-14 days. Using the 7-point glucose monitoring data, the mean blood glucose, Mean Amplitude of Glycemic Excursions (MAGE), Mean Absolute Glucose (MAG) and Lability Index (LI) was calculated for every 3 days. Regular adjustment of insulin regimen was based on these data and included (among other options) switching from MDI to CSII for patients with high GV.

Results: At the moment of hospital admission 8 patients were on CSII, while others were on MDI insulin dose varied in the range of 0.3-1.2 U/kg. Diabetes duration was 1-50 years. At the discharge, 34 patients were on CSII and 59 patients remained on MDI. Baseline LI, MAGE and MAG correlated with diabetes duration ($r=0.31$, $r=0.36$, $r=0.3$, resp.) and with HbA1c level ($r=0.46$, $r=0.41$, $r=0.37$, resp.), all $p<0.001$. At days 9-12 the mean glucose dropped by 1.16 mmol/L, MAGE by 1.21 mmol/L, LI by 1.19 (mmol/L)²/hour and MAG by 0.23 mmol/L/hour as compared to days 1-3 (all $p<0.0001$). In patients with baseline MAGE >5 mmol/L decrease in mean glucose and GV parameters was much more (7-8-fold) pronounced than in others (all $p<0.0001$). However, GV at day 9-12 did not depend from insulin regimen, diabetes duration or HbA1c level.

Conclusion: In most patients with type 1 diabetes a significant reduction of GV can be achieved by stepwise adjustment of insulin regimen in hospital settings, with the greatest effect observed in those with initially high GV.

References:

1. Klimontov VV, Myakina NE (2014) Glycaemic variability in diabetes: a tool for assessing the quality of glycaemic control and risk of complications. *Diabetes Mellitus* **17** (2):76-82. doi:10.14341/DM2014276-82
2. Hirsch IB (2015) Glycemic variability and diabetes complications: does it matter? Of Course It Does! *Diabetes Care* **38** (8): 1610-1614. doi: 10.2337/dc14-2898.
3. Klimontov VV, et al. (2014) Hypoglycemia in type 2 diabetes patients treated with insulin: the advantages of continuous glucose monitoring. *Diabetes Mellitus* **17** (1): 75-80. doi: 10.14341/DM2014175-80.