

Abstract

Introduction: Hyperglycemia and insulin resistance are a common occurrence in critically ill patients and are associated with adverse outcome. Thus, intensive insulin therapy is advocated increasingly for hyperglycemic intensive care unit (ICU) patients to reduce morbidity and mortality. Nevertheless convincing evidence of benefit comes mainly from trials carried out on surgical ICU patients while studies of the effects of intensive insulin therapy in mixed medical & surgical ICU patients have yielded conflicting results.

Methods: This study aimed at determining the efficacy of tight glycemic control and impact on morbidity and mortality measures in mixed medical/surgical ICU patients. On admission, sixty patients were randomly assigned to receive intensive insulin therapy (IIT) (30 patients) using insulin infusion (target blood glucose= 90-149 mg/dl) or conventional glycemic control (30 patients) (target blood glucose \leq 199 mg/dL).

Results: There was no statistically significant difference between both groups in the mean age (41.6 ± 19 vs 50 ± 23.9 years, $P = 0.13$), sex ($P = 0.6$), or the presence of history of diabetes mellitus ($P = 0.25$) but there was statistically significant higher mean APACHE II in (IIT) group (15.5 vs 13.2 , $P = 0.043$). the tight glycemic control group showed a statistically higher mean daily insulin dose (53.1 vs 12.7 units, $P < 0.001$), higher mean duration of stabilization within target blood glucose range (21.8 vs 12.2 hour ($P < 0.001$) & lower mean blood glucose level (136 vs 166.6 , $P = 0.004$) compared to conventional group. There was no statistically significant difference between the two groups as regards need for vasopressor use ($P = 0.79$) or the need for renal replacement therapy ($P = 0.71$), however, the incidence of acute kidney injury was lower in the tight control group (33.3% vs 53.3%) but lacks statistical significance ($P = 0.09$). Beneficial effect significantly was found in the tight glycemic control group regarding incidence of bacteremia ($P = 0.037$), mean duration of ICU stay (6.6 vs 14.1 days, $P = 0.03$) & accelerated weaning from mechanical ventilation (MV) (2.5 vs 8.2 days, $P = 0.028$). The tight glycemic control medical subgroup showed statistically significant less duration of ICU stay (7.9 ± 3 vs 16 ± 4.9 , $P = 0.05$). As regards the study surgical subgroup, tight glycemic control was associated with statistically significant lower bacteremia rate (6.7% vs 46.7 , $P = 0.013$), accelerated weaning from MV (0.5 vs 6.6 days, $P = 0.009$) & lower mean duration of ICU stay (5.3 vs 12 days, $P = 0.023$). There was no statistical significant difference between the two group regarding frequency of hypoglycemia [tight (16.7%) vs conventional (30%), $P = 0.063$]. We found lower mortality rate in the tight glycemic control group (26.7%) compared to conventional group (40%), yet with no statistical significance ($P = 0.412$). Meanwhile on subgroup analysis, there was statistically significant lower mortality in surgical ICU patients who assigned to receive IIT compared to those who receive conventional glycemic regimen (6.7% vs 26.7% , $P = 0.045$). Also, there was significant reduction in mortality with IIT among long stayers (> 5 days) compared to conventional group (16.7 vs 33.3% , $P = 0.05$).

Conclusion: Tight glycemic control significantly reduce morbidity in mixed medical and surgical ICU patients by the prevention of newly acquired bacteremia during ICU course, acceleration of weaning from mechanical ventilation and early discharge from intensive care unit with insignificant reduction in mortality rate among the whole mixed medical / surgical ICU patients yet with significant survival beneficial in surgical ICU patients & in mixed group of patients who stayed more than 5 days in the intensive care unit.

Keywords: Tight glycemic – mixed medical/surgical –intensive insulin.

