The risk of type 2 diabetes in survivors of critical illness with stress induced hyperglycaemia

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INTRODUCTION

Hyperglycaemia occurs frequently in the critically ill and may be secondary to either diabetes or stress induced hyperglycaemia. Stress induced hyperglycaemia occurs in patients who have normal glucose tolerance following resolution of their acute illness. Whether stress induced hyperglycaemia unmasks latent insulin resistance and/or impaired β-cell function has not been adequately explored.

OBJECTIVE

To evaluate the association between stress induced hyperglycaemia, the development of diabetes and long-term mortality in survivors of critical illness.

METHODS

This is a retrospective, multi-centre observational study. All adult patients surviving admission to a tertiary intensive care unit (ICU) in South Australia between 2004 and 2011 were included. Stress induced hyperglycaemia was defined as a blood glucose ≥ 11.1 mmol/l within the first 24 hours of ICU admission. Prevalent diabetes was identified through ICD-10 coding or prior registration with the Australian National Diabetes Service Scheme (NDSS). Incident diabetes was identified as NDSS registration > 30 days after hospital discharge until July 2015. The predicted risk of developing diabetes was described as sub-hazard ratios using competing risk regression. Survival was assessed using Cox proportional hazards regression.

RESULTS

Stress induced hyperglycaemia was identified in 2,883 (17%) of 17,074 patients without diabetes. The overall incidence of subsequent type 2 diabetes following critical illness was 4.8% (821 of 17,074). The risk of diabetes in patients with stress induced hyperglycaemia

was approximately double that of those without (HR 1.91 (95% CI 1.62, 2.26), $p<0.001$) and was sustained regardless of age or severity of illness. Subdividing age into approximate deciles the greatest risk was seen in the 50-59 year age group with over a seven-fold risk (HR 7.90 (5.38, 11.60), $p < 0.001$). Stress induced hyperglycaemia was not associated with increased long-term mortality in patients who survived their hospital admission.

CONCLUSIONS

Stress induced hyperglycaemia within 24 hours of admission to the ICU identifies patients at greater risk of subsequent diabetes.

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