Why protocolised care works in my unit: A case study in glycemic control

Geoffrey M. Shaw¹, J. Geoffrey Chase², Leesa Pfeiffer³, Jean-Charles Preiser⁴, Thomas Desaive⁵, Christopher Pretty⁶ and Fatana Suhaimi⁷

¹ Dept of Intensive Care, Christchurch Hospital, New Zealand
² University of Canterbury, Centre for Bio-Engineering, Christchurch, New Zealand
³ University of Otago Christchurch, Christchurch, New Zealand
⁴ Universite de Liege, Liege, Belgium

Objective: Examine the impact of protocolised glycemic control on patient outcome and resource costs, and their interaction.

Background: Tight glycemic control (TGC) can reduce mortality and costs, but has been difficult to repeat. Protocolised care with a patient-specific, adaptive approach (SPRINT) has resulted in significant reductions in mortality.

Methods: This retrospective analysis examines the impact on patient outcome, cost, and the inter-relation of these two metrics. Data included 381 patients treated with SPRINT (2005-7) and 413 treated prior to SPRINT (2003-5) who were matched on intention to treat, age, sex and primary diagnosis. Sequential Organ Failure Assessment (SOFA) score was calculated each day for each patient for their entire ICU stay. Cost data for laboratory, x-ray, ventilation, dialysis, transfusion, inotropes, and other major drug therapies and cost items was also collected for each patient and day. SOFA score was analysed in terms of the percentage of patients with SOFA ≤ 5 each day. Cost data was analysed by total per-patient costs, as well as stratified per-patient by maximum SOFA score.

Results and Outcomes: Initial and maximum SOFA scores were similar in both groups (p=0.56 and p=0.90). Maximum SOFA score was reached in a similar time, as well (median= 1 day, p=0.95). Percentage of patients with SOFA ≤ 5 increased far more rapidly, deviating at 2 days and reached a higher steady state level for SPRINT (p ≤ 0.001, Figure). SPRINT had 41.6% of days free of organ failure versus 36.6% for Pre-SPRINT (p<0.0001). Number of organ failures, as a percentage of the total possible, was 16.0% for SPRINT and 19.0% for pre-SPRINT (p<0.0001).

In all cost components either cost per patient per day was reduced, or a lower percentage of SPRINT patients required each intervention (p<0.05). In total an average cost saving of $345,775.46 for SPRINT (~$1152.58 per patient treated) was achieved per annum (Figure). Cost savings was highest in diabetic patients and those with a maximum SOFA ≤ 4. A what-if analysis of the clinical data shows that this cost savings could be doubled if a high dependency unit (HDU) were available.

Conclusions: An effective protocolised TGC algorithm (SPRINT) has reduced mortality by mitigating organ failure faster and for more patients. This reduction has led to reduced interventions and cost for expensive treatment, resulting in a savings of over $1000 per patient. Overall a protocolised therapy has improved clinical outcomes, which led directly to cost savings.