Severe hypoglycaemia requiring emergency medical assistance by ambulance services in the East Midlands, UK

K Khunti*, H Fisher, S Paul, M Iqbal, MJ Davies & AN Siriwardena

Aims: To report the characteristics and treatment of individuals experiencing severe hypoglycaemia that required emergency ambulance services, using routinely collected data. An additional objective was to provide associated ambulance related health service costs of hypoglycaemia.

Methods: Retrospective analysis of routinely collected data collected by the East Midlands Ambulance Service NHS Trust (EMAS), UK, of episodes of severe hypoglycaemia attended by emergency ambulance services during a four-month period. Standard clinical measures, response time, on-site treatment and transportation were recorded and ambulance services costs calculated.

Table 1: Association of risk factors with the likelihood of hospitalization based on multivariate regression analyses

Predictors	Adjusted OR (95% CI)	p
Age (years)	1.01 (0.99-1.02)	0.61
Male *	1.00 (0.57-1.76)	0.99
Pre Treatment Blood Glucose	1.09 (0.76-1.56)	0.65
Post Treatment Blood Glucose	0.90 (0.81-1.00)	0.05
Heart Rate (beats/min)	1.00 (0.98-1.02)	0.91
Respiratory Rate (breaths/min)	1.11 (1.01-1.23)	0.03
Systolic Blood Pressure (mmHg)	1.00 (0.99-1.01)	0.87
Diastolic Blood Pressure (mmHg)	1.00 (0.97-1.02)	0.73
Glasgow Coma Scale score	0.98 (0.92-1.05)	0.63
Insulin Treated *	0.31 (0.15-0.64)	<0.01
Nocturnal event (00:00-07:59)	0.55 (0.28-1.08)	0.08

* Yes/No   Model adjusted for all predictors listed

Results: During 01/11/10-28/02/2011, a total of 90,435 emergency calls were received, of which 523 (0.6%) were recorded as severe hypoglycaemia. The highest frequency of episodes of hypoglycaemia occurred in individuals treated with insulin (n=387, 74.0%). Calls were most frequently recorded as diabetic problems (n=448, 85.8%). Most frequent treatment initially administered was glucagon (n=203, 38.8%).

After adjusting for confounders in a multivariable logistic regression model, higher post treatment blood glucose and a higher respiratory rate remained statistically significant independent positive predictors for transportation to hospital. Individuals receiving insulin treatment were 69% less likely to be hospitalized compared to those receiving non insulin treatment (Table 1).

Median time from allocation of call to departure of scene by ambulance services was 39 minutes translating to an average cost of £92. The median time from allocation to handing over patients to emergency staff was 75 minutes, equating to a cost of £176 per episode. Annually, costs of call outs for hypoglycaemia to the EMAS approximate £235,407.

Conclusions: Most cases of severe hypoglycaemia are successfully treated at the scene by the emergency ambulance services. Insulin-treated and non insulin-treated individuals were similar with respect to clinical characteristics; non insulin-treated individuals and a lower post treatment blood glucose measurement were independent predictors of transportation to hospital. Further studies are needed into the effect of prehospital ambulance care by treatment type and diabetes type on individuals' subsequent outcomes.