ACUTE CLINICAL EMERGENCIES ON THE PAEDIATRIC NEUROSCIENCES WARD: CAN WE IMPROVE PREDICTION AND REDUCE RISK?

1MR Eyre, 2L Andre, 3R Robinson. 1Paediatric Neurology Department, Great Ormond Street Hospital for Children NHS Foundation Trust, London, UK; 2Resuscitation Department, Great Ormond Street Hospital for Children NHS Foundation Trust, London, UK

Background Paediatric inpatients with complex neurological problems can rapidly deteriorate and arrest on the ward. Various early warning risk-scoring systems are used, but none apply specifically to this patient cohort. The aim of this study was to identify modifiable risk factors and optimise patient safety.

Methods Our tertiary neurosciences unit comprises 24 acute beds (8 HDU) serving children with complex neurological, neurosurgical and craniofacial disorders. All calls to the clinical emergency team (CET) were prospectively audited.

Results Over 10.2 years the CET responded to 128 calls in 98 children (median age 2.8 y, range 2 d-19 y, 52% female). Diagnoses included epilepsy (37%), hydrocephalus (31%), CNS tumour (14%), craniofacial disorders (8%) and epilepsy surgery (4%). 19% of events followed recent surgery or general anaesthetic. Most recent Children’s Early Warning Score (CEWS) was median 1 (IQR 0–3) at median 56 min pre-event (IQR 29–110).

Events included respiratory arrest (88%) and cardiac arrest (4.7%). Ustein-type categorization was used to classify the primary cause: 72% neurological, including seizure-related apnoea in 41% and raised intracranial pressure in 25% (hydrocephalus 16%, acute haemorrhage 5.5%); 22% respiratory, including central or obstructive apnoea in 9.4%, benzodiazepine-related apnoea in 6.3%, and blocked tracheostomy in 4.7%; 3.1% circulatory (septic shock, hypovolaemia). 33% of events were regarded as potentially preventable by the attending CET.

In addition to basic supportive care, interventions on the ward included endotracheal intubation in 16%, mannitol/hypertonic saline in 9.4% and adrenaline in 2.3%. No shockable rhythms were identified. One death occurred during resuscitation and 33% of survivors were transferred to ICU; all were alive at 24 hours. In 11 consecutive patients prospectively followed up, all survived to discharge at median 11 days (range 3–93) post-event; 86% were alive at 1 year.

Conclusions Respiratory arrests secondary to epileptic seizure, raised intracranial pressure, central or obstructive apnoea and benzodiazepine administration are potentially predictable. CEWS had poor sensitivity for predicting imminent deterioration in paediatric neurosciences patients. Analysis of pre-event clinical observations in cases and controls will enable development of a deterioration-prediction model specific to this patient cohort.