

Early extubation following cardiac surgery in adult congenital heart disease improves post-operative haemodynamics and reduces costs

G. Costola¹, A. Constantine², P. Bianchi¹, S. Mele¹, D. Shore², T.C. Aw¹, K. Dimopoulos²

¹Royal Brompton Hospital, London, United Kingdom; ²Royal Brompton Hospital Imperial College London, London, United Kingdom

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Background: In paediatric cardiac surgery, there has been a paradigm shift in perioperative management from a slow wean of mechanical ventilation in the intensive care unit (ICU), to “ultra fast-track” anaesthesia with early extubation (EE) in theatre to promote a faster recovery. Adults with congenital heart disease (ACHD) have multiple risk factors for prolonged intubation, including a greater proportion of re-do interventions, more comorbidities and metabolic differences leading to slower emergence from anaesthesia. As a result, EE remains unproven and has not been widely adopted and in this patient group.

Aim: To assess the effects of EE on post-operative haemodynamics, hospital stay and associated healthcare costs.

Methods: Data were collected on ACHD patients, who underwent cardiac surgery in a high-volume tertiary centre between 2012 and 2018. Propensity score matching (1:1 or 2:1 where possible) was performed using the following variables: age, sex, body mass index, CHD complexity, functional class, length of surgery, systemic ventricular function, procedure-specific risk (adult congenital heart score; ACHS), urgent versus elective procedure, active endocarditis, pulmonary hypertension and renal dysfunction.

Results: 614 procedures were performed during the study period. After matching, 87 (14.2%) patients receiving EE were compared to 164 patients who received conventional care (CC). The overall complication rate was low, with no difference between the EE and CC groups (8.0% vs. 9.1%, $p=0.77$), and a very low reintubation rate (<1%). EE patients had a significantly shorter post-operative hospital length of stay in ICU and the high dependency unit (HDU; 48 [43–51] vs. 50 [47–69] hours, $p<0.0001$). EE patients required less inotropic & vasopressor support, as demonstrated by a lower Vasoactive-Inotropic Score (VIS) compared to patients following NEE (median VIS 0.5 [0.0–1.8] vs. 2.0 [0.0–3.5], $p<0.0001$). The total fluid balance by the third post-operative day was more positive after CC than EE (1177±737mL vs. 927±780mL, $p=0.004$). Finally, lower combined ICU and HDU costs were incurred by EE compared with CC (£3.9K[2.8–4.2K] vs. £4.2K[3.9–6.3K], $p<0.0001$).

Conclusion: In ACHD patients undergoing cardiac surgery, including complex and redo procedures, EE was safe, associated with a shorter ITU and HDU stay and lower hospital costs.

