Extubation has acute positive hemodynamic effects in the unstable patients after total cavopulmonary connection

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Introduction: After 2009 we aimed early extubation in all patients following Total cavopulmonary connection (TCPC), including the unstable ones. We investigated the acute hemodynamic effects of timely postoperative extubation in the unstable patients following TCPC.

Methods: Between 2009-2013 145 patients have received TCPC in our institution; 50 exceeded the 75th percentiles for volume requirement or inotrope score (135ml/kg and 19 respectively) in the first 24 postoperative hours and were defined as unstable. The unstable patients, who were successfully extubated in the first 12 postoperative hours, were included in the study (n=43). The volume requirements, inotrope score, arterial pressure, cavopulmonary pressure, arterial oxygen saturation and partial CO2 pressure were recorded in the first 24 postoperative hours at fixed time points related to extubation. Their changes were analyzed with Pearson (r-coefficient) correlation and with paired T-test comparison of the values. Presented is the comparison between the values 1 hour before and 1 hour after extubation.

Results: Median ventilation time of the included 43 patients was 5 (range 2-12) hours. Mean arterial pressure increased during the first 24h postoperative hours (r=0.50, p<0.001) with the most significant change occurring between 1 hour before and 1 hour after extubation – 52+/−7 vs. 58+/−9 mm Hg, p<0.001. Cavopulmonary pressure decreased with time (r=−0.34, p<0.001), but no acute drop was observed with extubation – 18+/−5 vs. 17+/−4 mm Hg, p=0.22. Volume requirements decreased with time (r=−0.651, p<0.001) with strongest differences between 1 hour before and 1 hour after extubation – 17.3+/−15 vs. 3.4+/−5.5 ml/kg, p<0.001. Similar changes were observed with the inotrope score (r=−0.47, p<0.001) with strongest reduction around extubation – 12.0+/−6.6 vs. 9.7+/−5.4, p=0.008. Arterial oxygen saturation decreased slightly (r=−0.12, p=0.03) and dropped significantly with extubation (93+/−6 vs. 89+/−8%, p=0.005). Partial CO2 pressure remained stable (r=0.06, p=0.27) with a temporary increase in the first hour after extubation - 45+/−7 vs. 50+/−8.4 mm Hg, p=0.002.

Conclusion: Extubation of the hemodynamically unstable patients in the first hours following TCPC has beneficial hemodynamic effects and enables an immediate reduction of the volume and inotrope treatment. Thus, extubation can be a powerful management tool in the stabilization of these patients.