

Systemic steroid therapy modifies postoperative lung injury after congenital cardiac surgery in neonates

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Introduction:

Reperfusion after cardiopulmonary bypass (CPB) liberates inflammatory mediators and may cause lung injury with accumulation of excessive extravascular lung water. Systemic corticosteroid administration decreases inflammatory reaction. However, the data on whether systemic steroids attenuate postoperative inflammation and ischemia-reperfusion of the lungs after neonatal congenital cardiac surgery are scarce.

Methods:

We aimed to evaluate whether parenteral stress-dose corticosteroid (SDC) treatment reduces lung inflammation and ischemia-reperfusion injury after cardiac surgery and CPB. SDC and placebo were initiated perioperatively in 40 neonates in a double-blinded fashion. The SDC group received perioperative methylprednisolone at 2 mg/kg followed by hydrocortisone 0.2 mg/kg/h for 6-48 hours postoperatively, 0.1 mg/kg/h for the next 48 hours, and 0.05 mg/kg/h for the following 24 hours. The placebo group received saline in similar fashion. Postoperatively, lung edema in chest X-ray images, dynamic respiratory system compliance (Crs), oxygenation index, and PaO₂/FiO₂ -ratio were compared between the study groups.

Results:

The CXR lung edema score was lower in the SDC group than in the placebo group on first postoperative day (POD1), but not preoperatively or 4 hours postoperatively (Figure 1). Furthermore, postoperative dynamic Crs was better in SDC group than in placebo group 4 – 6 hours postoperatively [7.3 (interquartile range (IQR) 6.2 – 8.9) vs 5.9 (IQR 5.0 – 6.7) ml/kPa/kg, p=0.006], on POD1 [7.3 (6.6 – 8.6) vs 5.3 (4.6 – 6.3), p=0.001], on POD2 [7.3 (6.5 – 8.4) vs 5.8 (5.0 – 6.5), p=0.001], and on POD3 [7.2 (6.6 – 8.8) vs 6.4 (5.4 – 6.6), p=0.005]. Postoperative oxygenation, however, showed no difference between SDC and placebo groups early postoperatively, or during POD1-POD3.

Conclusions:

Intravenously administered corticosteroid reduced accumulation of radiographic lung edema and improved postoperative dynamic Crs. Thus, corticosteroids may attenuate postoperative lung injury after congenital cardiac surgery and CPB.

