Therapy of low cardiac output syndrome after cardiac surgery in infants and children: a double blind randomized study comparing Dobutamine and Milrinone

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Background: Low cardiac output syndrome (LCOS) after cardiopulmonary bypass is usually treated with intravenous inotropic and afterload-reducing agents. Dobutamine (D) is well established for prevention and therapy of postoperative LCOS, similar effects can be achieved with milrinone (M). The aim of this study was to compare safety and efficacy of D versus M, which to our knowledge has not been done in a similar population yet.

Methods: Fifty non-selected children, median age: 1.2 years (range 0.2-14.2), median weight 8.6 kg (range 3.4-35.5) with non-obstructive congenital heart lesions including single ventricles undergoing open-heart surgery were randomized to continuous infusion of D or M for 36h after cardiopulmonary bypass. Maximum dosis: D 6 µg/kg/min, M 0.75 µg/kg/min.

Results: Need for additional inotropic support did not differ between the two groups (D 39% vs. M 33%, p=0.71). Sodium nitroprusside was used significantly more often in the D group (42% vs. 13%, p=0.019). Systolic blood pressure at 1 and 36h after ICU arrival was higher in the D group (106+/-18 vs. 94+/-23 mmHg, p=0.042 and 99+/-13 vs. 92+/-17 mmHg, p=0.024). Similarly, early (8h) postoperative heart rate was higher in the D group (143+/-16 vs. 131+/-26 bpm, p=0.039). No significant differences were found in central venous oxygen saturation, serum lactate levels, urine output, duration of chest drains, and length of mechanical ventilation, ICU stay and hospital stay. The cardiac function evaluated by echocardiography was consistently good in both groups. Both drugs were well tolerated, no serious adverse events occurred.

Conclusions: Milrinone has at least an equal efficacy and safety as Dobutamine for the treatment of LCOS in paediatric patients undergoing heart surgery for congenital heart disease. Milrinone demonstrated a trend to be more efficient in afterload reduction and might have less chronotropic effects. An individual selection of the appropriate inotropic agent may be justified.