

Levosimendan after cardiac surgery: a single-center case series

Introduction Low cardiac output syndrome (LCOS) is a severe complication after cardiac surgery and is associated with increased mortality (1). Routine inotropic support consists of catecholamine analogues and levosimendan, a newer calcium sensitizer and inodilator, which exerts a positive inotropic effect without increasing myocardial oxygen consumption.

Objectives The purpose of this study is to describe the short-term effect of levosimendan on hemodynamics and inotropic/vasopressor requirements after different types of cardiac surgery.

Methods This retrospective review of medical records was conducted in a tertiary mixed-ICU teaching hospital between April 2012 and November 2019 on patients receiving levosimendan after cardiac surgery. Exclusion criteria for analysis were heart transplantation, ECMO, assist devices and multiple levosimendan doses. Levosimendan was administered postoperatively as a continuous infusion, without a loading dose. Age, sex, mortality, dose and duration of levosimendan infusion, preoperative Euroscore II and need for renal replacement therapy (RRT) were collected from medical files. Mean arterial pressure (MAP), heart rate, arterial lactate, dobutamine and noradrenaline requirements were collected before, at conclusion of, and 24 hours after levosimendan infusion. Data were numbers (percentages), mean \pm SD and/or median (ranges) where appropriate.

Results Data of 78 patients were retrieved: 49 (63%) of the patients were male and 29 (37%) were female. Age was 74 (\pm 10) years. Euroscore II was 9.75 (\pm 12.5). A total dose of 12.5 mg levosimendan was administered at 0.05-0.2 μ g/kg/min. Duration of infusion was 34.4 (\pm 15.4) hours. Heart rate, MAP, arterial lactate and dobutamine/noradrenaline requirements are shown in Table 1. Fourteen patients (18%) had an intra-aortic balloon pump at the start of levosimendan infusion. Renal replacement therapy was needed in 26 patients (33.3%). ICU and 28-day mortality were 7.6% (n=6) and 2.5% (n=2), respectively.

Table 1. Hemodynamic data and support

	Preinfusion (T0)	Postinfusion (T1)	24h postinfusion (T2)	P-value
HR	90 (50-138)	90 (59-170)	89 (54-129)	0.81
MAP (mmHg)	73 (49-109)	69 (49-115)	75 (47-112)	0.29
Arterial lactate (mmol/L)	1.63 (0.8-9.6)	1.36 (0.4-6.6)	1.24 (0.4-5.6)	< 0.0001*
Dobutamine (μ g/kg/min)	5 (0-10)	0.5 (0-10)	0 (0-10)	< 0.0001*
Noradrenaline (μ g/kg/min)	0.10 (0.0-0.6)	0.05 (0.0-0.4)	0.00 (0.0-0.4)	< 0.0001*

HR: Heart Rate, MAP: Mean Arterial Pressure. Data are expressed as median (ranges).

*T2 vs. T0, T1 vs. T0.

Conclusion

In patients with LCOS after cardiac surgery levosimendan infusion, without a loading dose, reduced the need for dobutamine and noradrenaline up to 24 hours postinfusion, without inducing systemic hypotension.

References

- (1) Effect of Levosimendan on Low Cardiac Output Syndrome in Patients With Low Ejection Fraction Undergoing Coronary Artery Bypass Grafting With Cardiopulmonary Bypass: The LICORN Randomized Clinical Trial. Cholley B et al. JAMA. 2017 Aug 8;318(6):548-556.