Hemodynamic assessment of Levosimendan use in a newborn with vein of Galen aneurismatic malformation

Flaminia **Pugnaloni** [1,*], Francesca **Landolfo** [1], Paola **Giliberti** [1], Domenico Umberto **De Rose** [1], Alessandra **Santisi** [2], Claudia **Columbo** [1], Luca **Di Chiara** [3], Alessandra **Toscano** [4], Carlo **Gandolfo** [5], Andrea **Dotta** [1], Irma **Capolupo** [1]

[1] Neonatal Intensive Care Unit, Medical and Surgical Department of Fetus, Newborn and Infant, "Bambino Gesù" Children's Hospital IRCCS, Rome, Italy.

[2] Neonatal Semi Intensive and Follow up Medical Unit, Medical and Surgical Department of Fetus, Newborn and Infant, "Bambino Gesù" Children's Hospital IRCCS, Rome, Italy.

[3] Pediatric Cardiac Intensive Care Unit, Departments of Pediatric Cardiology and Cardiac Surgery, "Bambino Gesù" Children's Hospital IRCCS, Rome, Italy.

[4] Perinatal Cardiology Unit, Department of Medical and Surgical of Fetus, Newborn and Infant, "Bambino Gesù" Children's Hospital IRCCS, Rome, Italy.

[5] Neuroradiology Unit, Department of Imaging, "Bambino Gesù" Children's Hospital IRCCS, Rome, Italy.

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Objective. Vein of Galen aneurismatic malformation (VGAM) is a rare congenital anomaly which can be present during the neonatal period with high output heart failure. Medical management of VGAM-related hemodynamical status is complex and challenging.

The aim of this study was to gain reliable data about hemodynamic changes after Levosimendan use in one patient with VGAM.

Materials and Methods. Hemodynamic parameters indicative of cardiac preload, afterload, contractility and tissue oxygen delivery were systematically collected and analyzed offline before and after 48 hours from Levosimendan infusion. MostCare-Up® relies on pressure recording analytical method (PRAM) and analyses beat-by-beat arterial waveform.

Near-Infrared Spectroscopy (NIRS) measures regional cerebral and splanchnic tissue oxygen saturation (rSO_2c and rSO_2s).

Results. The female baby had a prenatal diagnosis of VGAM and was born preterm (33+2 GA) due to fetal heart failure. Postnatal heart failure was treated with continuous infusion of diuretics (etacrynic acid, up to 0.2 mg/kg/h), milrinon (0.75 mcg/kg/min) and Levosimendan at 8 hours of life after discontinuation of milrinon.

Use of Levosimendan determined significant changes in the hemodynamic status; we recorded significantly higher systolic, diastolic and dicrotic arterial pressure, higher Cardiac Index (CI) and a significant increase in DO_2I (total amount of oxygen delivered to the tissues per minute).

NIRS and rSO_2c/rSO_2s values were not significantly different before and after treatment protocol (**Table 1**).

Conclusions. This is the first case report exploring hemodynamic changes after Levosimendan treatment in a patient with VGAM. We observed a significant improvement of arterial pressure values, CI and global oxygen delivery within 48 hours after treatment.

Table 1.

	Before levosimendan	*After 48hours since levosimendan infusion*	*p-value*
Systolic pressure	52.0 (49.0 - 54.0)	64 (60.0 – 66.0)	<0.0001
Diastolic pressure	25.0 (24.0 – 27.0)	38.0 (34.0 – 44.0)	<0.0001
Dicrotic pressure	24.0 (23.0 – 26.0)	30.0 (28.0 – 31.0)	<0.0001
Pulse rate	155 (148 – 159)	154 (135 – 158)	0.0004
dP/dt	0.82 (0.77 – 0.87)	0.68 (0.64 – 0.98)	<0.0001
CI	2.05 (1.94 – 2.29)	2.90 (2.53 – 3.04)	<0.0001
PPV/SVV	0.96 (0.67 – 1.20)	0.69 (0.36 – 1.19)	<0.0001
DO2I	354 (334 – 403)	495 (431 – 518)	<0.0001
Cerebral rSO2	0.48 (0.41 – 0.53)	0.51 (0.45 – 0.56)	0.6857
Renal rSO2	0.31 (0.22 – 0.46)	0.62 (0.49 – 0.72)	0.1143