

J. Perinat. Med.  
24 (1996) 513–520

## Effects of Leboyer childbirth on left- and right systolic time intervals in healthy term neonates

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### 1 Introduction

In the normal human neonate, postnatal transfer of blood from the placenta to the neonate occurs if the newly born infant is kept at or below the level of the placenta and the umbilical cord is clamped at some time after 5 seconds of birth [10, 11, 18, 21]. Before birth, the full-term fetus has a blood volume of about 70 ml/kg and the placenta contains about 45 ml of blood per kg of fetal weight [10]. If the umbilical cord is clamped three minutes after birth or later, 35 ml/kg may flow into the neonate [11, 21]. The rapid increase in blood volume by 50% may result in marked volume overload of the neonate. The blood volume expansion is counteracted by extravasation of plasma so that the hematocrit rises. The resulting rise in blood viscosity by 40% [11] may impair blood flow to various organs [5]. For this reason, late cord clamping of infants, held at the level of the placenta or below, has become uncommon. However, the Leboyer method is widely used.

The Leboyer birth method requires that the newborn infant is placed on the mother's abdomen and the cord is clamped when it stops pulsating [9]. Thus, the cords of these infants are clamped late, but the pressure gradient between placenta and infant is decreased by lifting the infant above the placenta [21]. Consequently, the volume of placental transfusion and the postnatal rise of hematocrit in Leboyer deliveries are in between those infants with early and late cord-clamping [10, 16, 17].

### Curriculum vitae

Dr. MATHIAS NELLE, M.D., was graduated from University Göttingen, Fed. Rep. of Germany, in 1986 and took the Boards in General Pediatrics in 1995. Since 1988, he has worked at the Department of Neonatology (Prof. Dr. med. Otwin Linderkamp), University of Heidelberg.

Now he is mainly concerned with problems of systemic, cerebral and intestinal circulation in relation to rheologic parameters in premature infants and fullterm neonates. Specific projects concerned the role of placental blood transfer in circulation and postnatal adaptation, as well as effects of blood transfusion and volume expansion in anemic and hypovolemic neonates.



Neonatal polycythemia may be associated with elevated systemic and pulmonary resistance and decreased left and right ventricular output [2, 6, 13]. Moreover, congestive heart failure may be present in polycythemic neonates [10].

Doppler echocardiographically determined right and left systolic time intervals have been used for assessment of ventricular performance and pulmonary vascular resistance in neonates and showed a close correlation to invasive cardiac catheterization measurements [1, 3, 4, 8, 20]. The ratio of pulmonary artery time to peak velocity (RTPV) and right ventricular ejection time (RVET), as measured from Doppler waveform