

Management of Extremely Low Birth Weight Infants in Delivery Room



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KEYWORDS

• Infants • Newborn • Neonatal resuscitation • Very low birth weight infants

KEY POINTS

- Establishing breathing and improving oxygenation after birth are vital for survival and long-term health of preterm infants.
- Approximately 50% of extremely low birth weight (ELBW) infants are hypothermic after admission to neonatal intensive care units (NICUs).
- Active measures to avoid hypothermia during stabilization in the delivery room (DR) should include the use of plastic wrapping; warming equipment, such as radiant warmers; warmed humidified resuscitation gases; and adequate temperature.
- Respiratory support at birth should aim to facilitate the early establishment of an effective functional residual capacity (FRC), initiate spontaneous breathing, facilitate gas exchange, and deliver an adequate tidal volume, without damaging the lung.
- Current neonatal resuscitation guidelines recommend the use of 21% to 30% oxygen during neonatal resuscitation at birth.

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INTRODUCTION

Establishing breathing and improving oxygenation after birth are vital for survival and long-term health of preterm infants. Very preterm infants often have difficulty in establishing effective breathing after birth because their lungs are structurally immature, surfactant deficient, and not supported by a stiff chest wall,¹ which render the lungs of very preterm infants uniquely susceptible to injury.^{2,3} A majority of ELBW infants receive respiratory support in the DR. The DR is a stressful environment where decisions are made quickly and resuscitators need to be skilled in clinical assessment, decision making, and mask ventilation.⁴ These tasks, however, are often more difficult than is widely appreciated, and it is possible that these infants are not optimally supported because of difficulties in ventilation and perfusion during initial resuscitation.^{1,5,6}

CORD CLAMPING

For centuries a physiologic approach to clamping the cord was routinely used. In the middle of the twentieth century, this physiologic approach to cord clamping was changed to immediate cord clamping (ICC). One reason for this practice change was the thought that keeping the cord intact could contaminate the obstetric sterile field. The practice of ICC has recently been questioned as unphysiologic,⁷ which is also reflected in the current neonatal resuscitation guidelines, which recommend delayed cord clamping (DCC) for at least 30 seconds.⁴ Using DCC (defined by various definitions of time delays [eg, >30 seconds or until pulsation is no longer detected]) allows transfusion of blood to the newborn from the placenta; it can provide an infant with up to an additional 30% blood volume,⁸ which may improve pulmonary blood flow and left ventricular preload.⁹ In spontaneously breathing ELBW infants, DCC has short-term benefits on neonatal hemodynamic transition physiology.^{10–12} A recent meta-analysis of preterm infants receiving DCC compared with ICC reported on 10 studies (199 infants).¹³ Compared with ICC, DCC improves short-term outcomes of ELBW infants (mean difference 0.61; 95% CI, –2.52 to –1.92), including higher blood pressure and hemoglobin on admission and less frequent blood transfusions.¹³ Although DCC has been shown to reduce overall intraventricular hemorrhage (IVH) (mainly lower grades 1 and 2) by 50%,^{14,15} it has not been proved to reduce the incidence of severe (grade 3 or 4) IVH or death.¹³ Furthermore, these short-term benefits have failed to translate into improved neurodevelopment outcomes at later age.^{13,16}

Umbilical cord milking (UCM) is an alternate to DCC, is a faster technique of promoting placental transfusion, and takes approximately 5 seconds to 10 seconds.¹² The 2 interventions when compared showed no any difference in mean hemoglobin concentration at birth, number of blood transfusions in first 6 weeks of life,¹⁷ or long-term neurodevelopmental follow-up.¹⁷ Katheria and colleagues¹² showed UCM to be a more efficient technique than DCC to improve blood volume in premature infants when delivered by cesarean section. Alternative strategies include UCM¹² and initiation of resuscitation while the newborn remains attached to the cord.^{18,19} Additional evidence is awaited, however, from ongoing clinical trials before this can be translated into clinical practice.

Practical Aspects

Currently, the evidence is equivocal; there is minimal advantage to DCC, which has, at minimum, hematologic benefits; it is suggested that ELBW infants not requiring immediate resuscitation should receive DCC for at least 30 seconds.⁴ Infants could be either held above or below the level of the placenta.²⁰

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