www.jpnim.com Open Access eISSN: 2281-0692
Journal of Pediatric and Neonatal Individualized Medicine 2013;2(1):11-14
doi: 10.7363/020104

Editorial

To clamp or not to clamp late?

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When you set sail to Ithaca,
wish for the road to be long,
full of adventures, full of knowledge
C.P. Kavafy (1863-1933)

Keywords

Early cord clamping, late cord clamping.

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How to cite

Iacovidou N, Syggelou A, Xanthos T. To clamp or not to clamp late? J Pediatr Neonat Individual Med. 2013;2(1):11-4. doi: 10.7363/020104.

When resuscitating a neonate, one encounters controversial issues, some of which cause a great deal of confusion. One of these issues is the question as to when should the umbilical cord be clamped. Clamping and cutting the umbilical cord at birth is the oldest intervention in humans [1]. The question as to when to clamp the cord has been asked for at least 200 years. Erasmus Darwin in 1801 quoted his concerns on the issue, and wrote that "*another thing very injurious to the child is the tying and cutting of the navel string too soon*" [2]. Since then, the optimal timing for cord clamping has remained controversial and under ongoing discussion and debate for term [1, 3], preterm neonates [4-7] and for neonates in resource-limited countries, where transfusion for anaemia carries high risk of transmission of infections [8]. Furthermore, for this particular group of neonates, if anaemia in infancy could be reduced by delayed cord clamping, it would be very beneficial for better neurodevelopmental outcome.

When the cord is clamped and cut at birth, the neonate is separated from the placenta. The time from delivery of the neonate until delivery of the placenta represents the third stage of labour. There are two approaches to managing this stage of labour: the first is the 'expectant or physiological' management, during which the placenta is allowed to deliver spontaneously; the second is the 'active' management, which was introduced in the 70s in an attempt to control post-partum haemorrhage [3] and involves administration of oxytocin after delivery of the baby, early cord clamping and delivery of the placenta by controlled cord traction. Prendiville et al in 2000 in a Cochrane systematic review reported that routine active management is superior to expectant management, with regards to blood loss and post-partum haemorrhage, and that it should be the management of choice for women expecting a single baby by vaginal delivery in maternity hospitals [9]. However, as there are no guidelines, considerable differences concerning the management of the third stage of labour exist among various parts of the world.

Little concern, though, was initially given on possible effects of these interventions on the baby. At present, there are several studies comparing early vs. delayed cord clamping. The definition of 'early clamping' is more consistent among various studies, and is usually set at less than one minute of birth. The timing of 'delayed clamping' as well as the position at which the baby is held until the cord is clamped varies considerably from 1-5 min, to when the cord stops pulsating or even after placenta descents [3].

Twenty-five to 60% of the total blood circulating in the foetal-placental circulation at term is found in the placental circulation and 60% of the foetal red blood cells, rich in hematopoietic stem cells, are found therein [10]. Early studies reported that early clamping of the cord (within the first 5 to 10 seconds of birth) deprives the neonate of about 20-40 ml/kg of blood [11, 12], with concomitant deprivation of iron [13], therefore the newborn remains at increased risk of hypovolemia, anaemia, and of the consequences of the loss of hematopoietic stem cells (type 2 diabetes) [14]. Early cord clamping may also increase the likelihood of foeto-maternal transfusion. However, very little data exist on the issue and results of small non-randomised studies suggested that if cord clamping is delayed there might be a reduction in foeto-maternal transfusion [15, 16].

Delayed cord clamping, as mentioned previously, allows transfusion of the foetal blood in the placenta to the neonate at birth. This may be associated with higher haemoglobin levels [17], increased iron stores and reduced incidence of anaemia in infancy [18], better circulation of blood to vital organs, and better adaptation to extra uterine life. Delayed cord clamping has been associated with increased incidence of jaundice and need for phototherapy [19], and with a reduction in the length of the third stage of labour.

For preterm neonates the risks and benefits of early vs. delayed cord clamping remain the subject of debate, and the optimal timing to clamp the cord is still unclear [20]. Preterm neonates may need either assisted transition to extra uterine life or resuscitation more often than term neonates, therefore, leaving the cord unclamped for longer at the time of birth, may defeat prompt intervention. Concerns about the increased incidence of polycythaemia, unintentional hypothermia, hyperbilirubinaemia requiring exchange transfusion, and the possible risk of intraventricular haemorrhage, have not been confirmed. Delayed cord clamping has been associated with reduced incidence of respiratory distress and less need for blood transfusion later in life [4-7].

Finally, regarding maternal outcome of the timing of cord clamping McDonald et al in their 2008 Cochrane review reported that delaying cord clamping at least two to three minutes seems not to increase the risk of postpartum haemorrhage [3].

International Liaison Committee on Resuscitation (ILCOR) after consideration of available published evidence in 2010 issued the following recommendation: "*Delay in umbilical*

cord clamping for at least 1 min is recommended for newborn infants not requiring resuscitation. There is insufficient evidence to support or refute a recommendation to delay cord clamping in babies requiring resuscitation". There are limited data on the hazards or benefits of delayed cord clamping in the non-vigorous infant [21, 22]. As to the timing of cord clamping in the compromised neonate, the current position is "*there are limited data on the hazards or benefits of delayed cord clamping in the non-vigorous infant*".

Similar recommendation was issued by the European Resuscitation Council latest guidelines (2010): "*Delay in umbilical cord clamping for at least 1 min is recommended for newborn infants not requiring resuscitation. A similar delay should be applied to premature babies being stabilised. For babies requiring resuscitation, resuscitative intervention remains the priority*" [23].

But where are we now? Even though many aspects of the timing for cord clamping have been clarified, some questions still remain unanswered. If delayed cord clamping is to become a standard approach which timing is the optimal? Three, 4 or 5 minutes after birth? Or until cord pulsation has stopped? And depending on the mode of delivery should timing be the same or different for normal vaginal delivery or for caesarean section? In the compromised neonate, or the very preterm one, could resuscitation begin with the neonate attached to the placenta, if practical problems could be overcome? And if yes, the approach would still be the same? What is the maternal outcome depending on the time to cord clamping?

It is clear that more randomized controlled studies are needed in normal and compromised neonates, in order to address these questions, before we practice delayed cord clamping with safety for the babies and the mothers.

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