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EDITORIAL

In time: how and when should we clamp the umbilical cord: does it really matter?



Em tempo: como e quando deve ser feito o clampeamento do cordão umbilical: será que realmente importa?

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There are several reasons to answer yes. The first one is that it is among the most frequently performed medical (or paramedical) interventions in human beings: 3,000,000 times a year in Brazil, 131,000,000 times a year in the world (that means 250 times a minute). Therefore, even a minimal influence of the way or of the timing of cord clamping on the infants' health becomes important, because of its potential massive impact. A MEDLINE search with the words "umbilical cord clamping" demonstrates the interest on this simple procedure (88 publications from January 2014 to April 2015). In the last 2 PAS meetings (USA), where most recently performed or ongoing research studies related to newborns are reported, there were workshops and many presentations about this issue.

It is clear, from RCTs and meta-analyses, that delayed cord clamping (DCC) in term newborns, for at least 1min after birth, results in a significant amount of blood passing from the placenta to the infant (placental transfusion): the infants' weight increases an average of 101g (approximately 96 cc of blood). As a result, hemoglobin is higher 48h after birth, and iron deficiency during infancy is less frequent.

DCC slightly increases the need for phototherapy. There is no evidence of maternal complications.¹

Therefore, ILCOR and other medical associations recommend DCC for vigorously born term infants.² But, what happens in real practice? The impressions of many of us, and numerous surveys suggest that the compliance with this recommendation is low.^{3,4} Why? There are several possible explanations. Many physicians act as if they were always in a rush. Recently, a lack of knowledge about the recommendation has been reported.⁵ Some obstetricians may still have fears based on a previously reported increased risk of maternal hemorrhage (not supported by current literature).¹ In few cases the cord is clamped early so blood can be collected for banking (an unsupported practice when performed for individual use). On the belief that gravity influences the volume of placental transfusion, another reason (or excuse) is that it is uncomfortable to hold the baby for 2 or 3min at the level of the vagina before the cord is clamped. We have recently demonstrated that, if the baby is held by the mother on her abdomen or chest, DCC results in a placental transfusion equivalent to that of infants held at the level of the introitus.⁶ This way, DCC can be easily performed, permitting at the same time immediate maternal infant contact, which potentially enhances bonding and successful breastfeeding. Still, observation of infants' position and breathing during those first minutes is essential.⁷

However, should DCC be performed in all births? Although the information is scarce, DCC appears to also be

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effective in term infants born by cesarean section.⁸ In premature infants, meta-analyses of several RCTs (which include a few very immature infants) have shown that DCC increases arterial blood pressure and decreases the use of vasopressors and blood transfusions, and the incidence of intraventricular hemorrhage (IVH).⁹ In premature infants it has been shown that umbilical cord milking produces effects on placental transfusion similar to those of DCC.¹⁰ Its main potential advantage is that it is a brief procedure which may decrease the risk of heat loss in immature infants when compared to DCC. However, in the way it was originally described, milking generates a very rapid and large blood transfusion, which implies potential risks.¹¹ A recent Cochrane review of 15 RCTs comparing early clamping vs. a group of either DCC or milking in premature infants demonstrates a decrease in necrotizing enterocolitis, IVH, and blood transfusions.¹²

In the last 2 years, several investigations in animals and physiologic studies in humans have explored in more detail the sequence of events at the time of birth in relation to cord clamping. It has been shown in lambs that when the cord is clamped before lung expansion, there is a brief and immediate rise in aortic and carotid blood pressure, followed by a rapid decrease in left ventricular output and heart rate. When breathing precedes cord clamping, there is a smoother transition and no bradycardia.¹³ Some of the complications in infants who were resuscitated at birth could be related to the difficult cardiovascular transition and hypovolemia occurring when the cord is immediately clamped, superimposed to preexisting asphyxia.¹⁴ Furthermore, in premature infants, rapid changes in blood pressure could be related to IVH. The paradigm of immediate cord clamping and subsequent ventilation for non breathing infants is currently a subject of controversy and clinical investigation.

In many premature infants who are electively delivered because of maternal or fetal risks, the onset of spontaneous breathing frequently occurs after 30 s or even longer periods. In those cases, we have been routinely requesting the obstetricians to clamp and cut the cord immediately, so assisted ventilation can start. But why? If the clamping of the cord is delayed in those infants, a functioning placenta continues to supply gas exchange. Provided we can prevent heat losses, why should we do it that way? Probably, the most realistic answer is, "because that is the way we have always done it". Ongoing studies on resuscitation at the bedside with an intact cord, as well as physiologic research in animals and humans may provide a more rational answer. Until then, we have to live with the uncertainty of whether what we do is appropriate or not. Serious research including well designed trials evaluating unsupported, but frequently performed procedures, is the basis for progress in many areas of medicine, including neonatal care at the time of birth.

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Conflicts of interest

The author declares no conflicts of interest.

References

1. McDonald SJ, Middleton P, Dowswell T, Morris PS. Effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes. *Cochrane Database Syst Rev*. 2013;7:CD004074.
2. Perlman JM, Wyllie J, Kattwinkel J, Atkins DL, Chameides L, Goldsmith JP, et al. Part 11: Neonatal resuscitation: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Circulation*. 2010;122 Suppl. 2:S516–38.
3. Farrar D, Tufnell D, Airey R, Duley L. Care during the third stage of labour: a postal survey of UK midwives and obstetricians. *BMC Pregnancy Childbirth*. 2010;10:23.
4. Zapata Barrios J, Albornoz G, Musante G, Pedraza A, Prudent L. Timing of umbilical cord clamping of term infants in a large maternity center in Buenos Aires [Abstract 374]. *J Perinat Med*. 2011;39:386.
5. Jelin AC, Kuppermann M, Erickson K, Clyman R, Schulkin J. Obstetricians' attitudes and beliefs regarding umbilical cord clamping. *J Matern Fetal Neonatal Med*. 2014;27:1457–61.
6. Vain NE, Satragno DS, Gorenstein AN, Gordillo JE, Berazategui JP, Alda MG, et al. Effect of gravity on volume of placental transfusion: a multicentre, randomised, non-inferiority trial. *Lancet*. 2014;384:235–40.
7. Davanzo R, De Cunto A, Paviotti G, Travan L, Inglese S, Bovedani P, et al. Making the first days of life safer: preventing sudden unexpected postnatal collapse while promoting breastfeeding. *J Hum Lact*. 2015;31:47–52.
8. Ceriani Cernadas JM, Carroli G, Lardizábal J. Effect of timing of cord clamping on neonatal venous hematocrit values and clinical outcome at term: a randomized, controlled trial: in reply. *Pediatrics*. 2006;118:1318.
9. Rabe H, Reynolds G, Diaz-Rossello J. A systematic review and meta-analysis of a brief delay in clamping the umbilical cord of preterm infants. *Neonatology*. 2008;93:138–44.
10. Rabe H, Jewison A, Alvarez RF, Crook D, Stilton D, Bradley R, et al. Milking compared with delayed cord clamping to increase placental transfusion in preterm neonates: a randomized controlled trial. *Obstet Gynecol*. 2011;117:205–11.
11. Hosono S, Mugishima H, Fujita H, Hosono A, Minato M, Okada T, et al. Umbilical cord milking reduces the need for red cell transfusions and improves neonatal adaptation in infants born at less than 29 weeks' gestation: a randomised controlled trial. *Arch Dis Child Fetal Neonatal Ed*. 2008;93:F14–9.
12. Rabe H, Diaz-Rossello JL, Duley L, Dowswell T. Effect of timing of umbilical cord clamping and other strategies to influence placental transfusion at preterm birth on maternal and infant outcomes. *Cochrane Database Syst Rev*. 2012;8:CD003248.
13. Bhatt S, Alison BJ, Wallace EM, Crossley KJ, Gill AW, Kluckow M, et al. Delaying cord clamping until ventilation onset improves cardiovascular function at birth in preterm lambs. *J Physiol*. 2013;591:2113–26.
14. Hooper SB, Te Pas AB, Lang J, van Vonderen JJ, Roehr CC, Kluckow M, et al. Cardiovascular transition at birth: a physiological sequence. *Pediatr Res*. 2015;77:608–14.