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Do we clamp the umbilical cord too soon?

USF researchers: Early clamping may interrupt humankind's first 'natural stem cell transplant'

Tampa, Fla. (May 24, 2010) – The timing of umbilical cord clamping at birth should be delayed just a few minutes longer, suggest researchers at the University of South Florida's Center of Excellence for Aging and Brain Repair.

Delaying clamping the umbilical cord for a slightly longer period of time allows more umbilical cord blood volume to transfer from mother to infant and, with that critical period extended, many good physiological "gifts" are transferred through 'nature's first stem cell transplant' occurring at birth.

The USF review is published in a recent issue of the *Journal of Cellular and Molecular Medicine* (14:3).

"Several clinical studies have shown that delaying clamping the umbilical cord not only allows more blood to be transferred but helps prevent anemia as well," said the paper's lead author Dr. Paul Sanberg, director of the Center. "Cord blood also contains many valuable stem cells, making this transfer of stem cells a process that might be considered 'the original stem cell transplant'."

At birth, the placenta and umbilical cord start contracting and pumping blood toward the newborn. After the blood equilibrates, the cord's pulse ceases and blood flow from mother to newborn stops. In recent Western medical practice, early clamping -- from 30 seconds to one minute after birth -- remains the most common practice among obstetricians and midwives, perhaps because the benefits of delaying clamping have not been clear. However, waiting for more than a minute, or until the cord stops pulsating, may be beneficial, the authors said.

Birthing methods have also changed over the last century. Throughout human history and currently in cultures and areas where delivering mothers squat to deliver, gravity helps speed the stem cell transfer. Today, the cord may be clamped early for a number of reasons, including the medical resuscitation and stabilizing of infants or the notion that delaying clamping might lead to adverse effects or, more recently, to quickly facilitate umbilical cord banking.

According to study co-author Dr. Dong-Hyuk Park, the relationship between cord clamping time and the transfer of stem cells needs to be understood through the early weeks of the perinatal period and the process of 'hematopoiesis,' the formation of blood cells that begins as early as two weeks into pregnancy. A transfer of pluripotent stems cells continues throughout pregnancy, however, and for a time through the umbilical cord following delivery.

"Several randomized, controlled trials, systematic reviews and meta-analyses have compared the effects of late versus early cord clamping," said Dr. Park. "In pre-term infants, delaying clamping the cord for at least 30 seconds reduced incidences of intraventricular hemorrhage, late on-set sepsis, anemia, and decreased the need for blood transfusions."

Another potential benefit of delayed cord clamping is to ensure that the baby can receive the complete retinue of clotting factors.



IMAGE: Dr. Paul R. Sanberg is director of the University of South Florida Center for Aging and Brain Repair.

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Yet, there is debate and disagreement on early versus later clamping. The side favoring delayed clamping, the authors noted, cite the value of the infant's receiving umbilical cord blood (UCB)-derived stem cells, known to be pluripotent.

"The virtue of the unique and immature features of cord blood, including their ability to differentiate, are well known," added Dr. Sanberg.

The researchers concluded that many common disorders in newborns related to the immaturity of organ systems may receive benefits from delayed clamping. These may include: respiratory distress; anemia; sepsis; intraventricular haemorrhage; and periventricular leukomalacia. They also speculate that other health problems, such as chronic lung disease, prematurity apneas and retinopathy of prematurity, may also be affected by a delay in cord blood clamping.

"There remains no consensus among scientists and clinicians on cord clamping and proper cord blood collection," concluded co-author and obstetrician Dr. Stephen Klasko, senior vice president of USF Health and dean of the USF College of Medicine. "The most important thing is to avoid losing valuable stems cells during and just after delivery."

The authors agreed that delaying cord clamping should appropriately be delayed for pre-term babies and babies born where there is no effort to bank umbilical cords, and for babies born where there is limited access to health care and where nutrition may be poor.

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The mission of the University of South Florida Center of Excellence for Aging and Brain Repair (<http://health.usf.edu/medicine/neurosurgery/ceabr/index.htm>) is to develop new therapeutic strategies to promote repair and regeneration of aging and diseased brain. Building on a foundation of excellence in basic and clinical research, the Center focuses on translating innovative ideas into industrial partnerships, educational and clinical services to address key needs of the community and those suffering from brain injury and disease.

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