



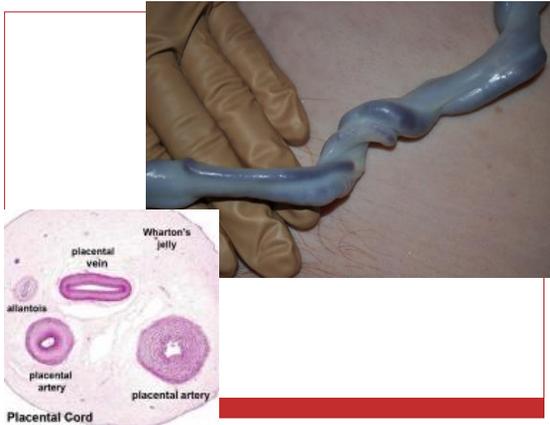
Objectives

1. Review history of cord clamping
2. Review current expert guidelines
3. Discuss benefits of delayed cord clamping in term and preterm neonates
4. Discuss risks of delayed cord clamping

The Umbilical Cord

Two Arteries
One Vein
Average length: 55 cm
Blood flows from the placenta through the umbilical vein to the fetus
Blood exits the fetus in the two umbilical arteries

An anatomical illustration of a fetus in a curled position. The umbilical cord is shown connecting the fetus to the placenta. The internal blood vessels are color-coded: two red arteries and one blue vein. The placenta is shown as a reddish, lobulated structure.



"Frequently the child appears to be born dead, when it is feeble and when, before the tying of the cord, a flux of blood occurs into the cord and adjacent parts. Some nurses who have already acquired skill squeeze (the blood) back out of the cord (into the child's body) and at once the baby, who had previously been as if drained of blood, comes to life again."

Aristotle 384-322 BC

Timeline of Cord clamping & cutting

- Described in 1688
- Routine practice by the 19th century
 - In 1801, Erasmus Darwin wrote, 'Another thing very injurious to the child, is the tying and cutting of the navel string too soon; which should always be left till the child has not only repeatedly breathed but till all pulsation in the cord ceases. As otherwise the child is much weaker than it ought to be.'¹²
 - Budin in 1875 measured the amount of blood left in the placentas of the after early vs. late ligation & found 92 more cubic centimeters available to the infant

Common practice to clamp early, typically within 30s of birth.



Immediate Cord Clamping

Modern Day Cord clamping

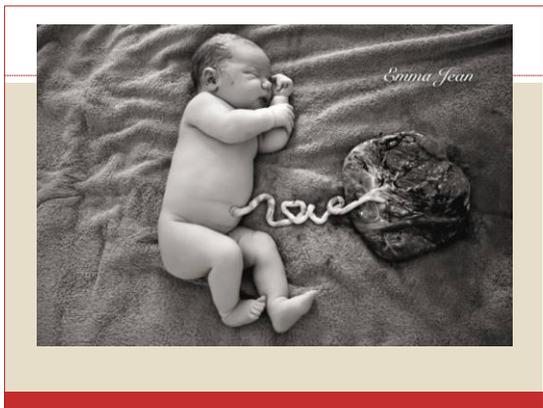
- **Early**
 - Clamping within 1 minute of delivery
- **Late**
 - Clamping more than 5 minutes after delivery
- Studies showing that 90% of blood volume was achieved within the first few breaths the infant took after birth
- Most practitioners clamped the cord within 15-20s of delivery

What is delayed cord clamping?

- Delayed umbilical cord clamping is prolongation of the time between delivery of a neonate and clamping of the umbilical cord.
- Immediate umbilical cord clamping is typically performed within 15 seconds of delivery, whereas delayed umbilical cord clamping is performed 25 seconds to 5 minutes after delivery.

The screenshot shows the One to One website with the tagline "your pregnancy, your midwife, your choice". It includes navigation links like "Our Service", "Advice Centres", and "Enquiries". A featured article titled "5 Benefits Of Delayed Cord Clamping" is highlighted. Below the article title, there is a snippet from a "shots" newsletter with the headline "Delayed Umbilical Cord Clamping May Benefit Children Years Later".

The slide features the title "Gorilla Birth" in a serif font, followed by a small circle icon. Below this, a green bullet point lists "Gorilla Birth -- Urban Gorilla". The background is a light beige color.



Guidelines

- ACOG
 - Committee Opinion 2012
 - No good evidence to support or refute benefits of delayed cord clamping in term infants
 - Evidence does support delayed cord clamping in preterm infants
- WHO
 - 2012
 - Delayed umbilical cord clamping (not earlier than 1 min after birth) is recommended for improved maternal and infant health and nutrition outcomes

How much blood is given to the baby by delaying cord clamping?

- Delayed cord clamping may increase the neonate's blood volume by as much as 8% to 24%.
 - 80ml of blood at 1 minute
 - 100ml of blood at 3 minutes
- Transfusion of blood from placenta to baby through the cord

Simkin video

- [Blood demonstration](#)

What are the benefits?

- Increase blood volume
- Decreased need for transfusion
- Decreased intracranial hemorrhage in preterm infants
- May prevent iron deficiency in the 1st year of life
- Longer duration of placental transfusion after birth may be beneficial because this blood is enriched with immunoglobulins and stem cells, which provide the potential for improved organ repair and rebuilding after injury from disorders caused by preterm birth

What is the risk?

- Timely resuscitation
- Excessive placental transfusion
 - Jaundice?
- Excessive maternal hemorrhage
- Technical difficulties
 - Warming of infant during cesarean section
 - Parents who desire cord blood banking

What does the data show?

- Preterm infants and Term infants have different benefits and risks

Long term???



- One small study showed no difference in infant development at 7 months
- Current trial going on in Australia for infants delivered at <30 weeks gestation -- Australian Placental Transfusion Study [APTS]

Term infants

- Cochrane Review -- 15 randomized trials of delayed cord clamping in term neonates, including 3911 women
 - Higher neonatal hemoglobin concentration at 24 to 48 hours of life
 - Lower likelihood of iron deficiency at 3–6 months
 - Increased risk of jaundice requiring phototherapy

Jaundice

- The risk of jaundice must be weighed against the risk of iron deficiency.
- *“In developed nations where phototherapy is widely available, delayed umbilical cord clamping to increase iron stores has low potential for morbidity.”* -- SMFM

No difference in volume of placental transfusion placed on mom's chest or held at the level of the vagina



Delivery position of baby?

How about risks to the mother?

- Theoretical risks include delaying delivery of the placenta delays uterine contraction and increases blood loss
- In cesarean deliveries, maternal blood loss also occurs through the hysterotomy incision, and delaying closure may lead to increased risk of hemorrhage

Maternal risks

- Very few studies
- Cochrane Review 2008
 - 2989 mothers
 - No difference in rates of postpartum hemorrhage
 - no differences were seen in mean blood loss, need for transfusion, postpartum hemoglobin concentration, or need for manual removal of the placenta

“Milking” the cord

- Squeezing the blood down the cord to the baby
 - Typically, the delivering provider will “strip” a segment of the umbilical cord toward the fetal umbilicus 3–4 times before clamping the umbilical cord
 - Rapid bolus of blood to the infant



“Milking”

- One small trial involving infants born between 24 and 28 weeks looked at milking vs. immediate clamping
 - Higher initial Hb concentration
 - Higher mean systemic blood pressure
 - Reduced need for blood transfusion
 - Higher urine output during the first 72 hours
 - Shorter duration of mechanical ventilation and supplemental oxygen

Contraindications

- Infants
 - Congenital anomalies
 - Reversed or absent end diastolic flow
 - Severe depression
- Maternal
 - Placental abnormalities with increased risk of hemorrhage
 - Accreta, previa, abruption
 - Severe anemia
