Does Delayed Cord Clamping (DCC) at term in anemic mothers improve the infant’s hemoglobin level?

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Abstract

Objective: To evaluate the effect of delayed cord clamping on infant’s hemoglobin at two months of infant’s age for those who were born to mothers who had hemoglobin less than 11 grams/dl at time of delivery.

Material and Methods: A randomized controlled, prospective study was done over one year, between the period of 1st February 2012-31st of January 2013, at Prince Ali military hospital. One hundred and twelve (112) infants were included, in which we studied the hemoglobin and ferritin levels for these neonates from the cord and then at age of two months. All patients were full term and all were born to mothers who had their hemoglobin concentration less than 11 grams/dl at time of delivery. We randomly divided the patients into two groups, Group A (n=47) in which cord clamping was done immediately after delivery as usual, and group B (n=65) in which cord clamping was done after 120 seconds of delivery provided there were no fetal distress conditions.

We repeated the levels of hemoglobin and ferritin for (33) and (49) neonates of group A and B respectively for those who came back to continue the evaluation of their babies at two months of age.

Results: 112 neonates, who were divided into two groups, with early cord clamping as group A (47 infants) and delayed cord clamping as Group B (65 infants). The two groups were comparable for maternal age, parity, weight, supplemental iron intake, infant’s birth weight, gestational age and sex.

The hemoglobin concentration at two months of age was significantly higher in group B than group A which was found to be 10.7 mg/dl compared to 9.2 mg/dl respectively.

At two months of age we were able to recruit Eighty-two (82) infants, (33) infants from group (A) early cord clamping and (49) from group (B) delayed cord clamping, while we missed follow up with 30 infants as the enrolled mothers did not come back.

Twenty-five (25) out of thirty-three (33) infants in the early clamping group showed hemoglobin level of less than 10 mg/dl (75.7 %), while twenty-two (22) out of forty-nine (49) infants in the delayed clamping group showed hemoglobin levels of less than 10 mg/dl (44.8 %).

Ten (10) out of thirty-three (33) infants in the early clamping group (A) showed serum ferritin level of less than 50 micrograms /l (30.3 %), while only two(2) out of forty-nine (49) infants in the delayed group (B) revealed serum ferritin level of less than 50 micrograms /l (4 %).

Conclusions: Iron stores and hemoglobin in infancy can be improved in neonates born to anemic mothers by delaying cord clamping at birth.

Key words: cord clamping, anemia
Introduction
Iron store is a major influence of growth in children and iron deficiency anemia is a major public health issue. Anemia can cause long lasting cognitive and behavioral deficits, affecting both motor and mental development.(1, 2) Most women during pregnancy suffer from anemia; WHO estimates that 42% of pregnant women have anemia that needs supplement.(3) Many studies proved that the prevalence of anemia among children is associated with maternal hemoglobin (HB) level.(4)

One method to improve anemia in infants is by delaying cord clamping. The timing of cord clamping is still a controversial issue, but the current obstetric approach is to clamp the cord early. Many studies have shown that by delaying cord clamping, as much as 56 mg of iron can be transferred to the baby(4).

This study was conducted to assess the effect of delayed clamping on infants born to anemic mothers and whether this practice is worth adopting in delivery rooms.

Materials and methods
A randomized controlled prospective study was done over one year, between the period of 1st February 2012-1st of February 2013 at Prince Ali military hospital. One hundred and twelve infants were included. The inclusion criteria were:

1. Being full term.
2. Born to anemic mothers, hemoglobin less than 11 grams/dl.
3. No neonatal intensive care unit admission.
4. No neonatal resuscitation
5. Any mother with major pregnancy related complication like antenatal hemorrhage or eclampsia was excluded too.

Hemoglobin and ferritin levels for these neonates were from the cord and then at age of two months. We randomly divided the patients into two groups, Group A (n=47) in which cord clamping was done immediately after delivery as usual, and group B (n=65) in which cord clamping was done after 120 seconds of delivery provided there were no fetal distress conditions. Hemoglobin and ferritin levels from the cord of these patients were determined and were then repeated for 33 and 49 neonates of group A and B respectively; those who came back to continue the evaluation of their babies blood at two months of age. Maternal hemoglobin level was determined at time of delivery.

Results
112 neonates, were divided into two groups; early cord clamping as group A (47 infants) and delayed cord clamping as Group B (65 infants). The two groups were comparable for maternal age, parity, weight, supplemental iron intake, infant’s birth weight, gestation and sex.

At two months of age we were capable to recruit eighty-two (82) infants, (33) infants from group (A) early cord clamping and (49) from group (B) delayed cord clamping, while we missed follow up with 30 infants as the enrolled mothers did not come back.

Twenty-five (25) out of thirty-three (33) infants in the early clamping group showed hemoglobin level of less than 10 mg/dl (75.7 %), while twenty-two (22) out of forty-nine (49) infants in the delayed clamping group showed hemoglobin level of less than 10 mg/dl (44.8 %).

Ten (10) out of thirty-three (33) infants in the early clamping group (A) showed serum ferritin level of less than 50 micrograms /l (30.3 %), while only two(2) out of forty-nine (49) infants in the delayed group(B) revealed serum ferritin level of less than 50 micrograms /l ( 4 %).

Discussion
The umbilical cord of every newborn is clamped and cut at birth; should this practice be done early or late? It is still controversial. Early clamping is defined as immediate cut within 10-15 seconds of delivery, while late clamping is 45-60 seconds after delivery of the body.(5) The practice of early cord clamping ranges from 17-90% of infants worldwide.(6)

The average blood estimated to be transferred to the baby is 19-20ml/kg; three quarters occurs in the first minute(6, 7). This amount of blood is equal to 40-50mg/kg of extra iron which is added to 75mg/kg of body iron that term infants have.

This amount of iron seems sufficient to prevent iron deficiency anemia at infancy which is important for brain development, and prevents cognitive impairment.(1)

Our study showed that both serum ferritin and hemoglobin (HB) levels are increased significantly in patients with delayed cord clamping born to anemic mothers, which is comparable to other studies (1, 9, 10). The same results were observed regardless of the hematological status of the mother(11, 12, 13, 14). Some other studies showed increase in serum ferritin level alone; with no significant differences between the groups in HB level noticed(1, 15).

Other variables in studying the delayed cord clamping effect, like its effect on breastfed infants not receiving iron fortified milk or formula and infants with birth weight less than 3 kg, were not included in our study though it was proved by others (10).

The risks of delayed cord clamping include; polycythemia, volume overload, hyperbilirubinemia (4, 6, 7, 11). All were proved to be negligible with no actual extra threat to infants (6, 8, 11). Another complication regarding the mothers is the greater chance of postpartum bleeding, which was disproved by many studies.(8)
It is worth mentioning that delayed cord clamping is a concern in premature infants which were excluded from our study. Potential benefits include; late onset sepsis, decreased incidence of respiratory distress syndrome, intaventricular hemorrhage, and retinopathy of prematurity.(5)

Conclusion
Infants born to anemic mothers would benefit from delayed cord clamping as it would increase HB and ferritin level significantly. Whether to establish this practice in our hospitals, is an issue that needs to be discussed regarding training, safety and compliance.

References