Original Research Article

Effect of timing of umbilical cord clamping on neonatal hemoglobin level

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Abstract

Anemia is common among children in developing countries. In the National Family Health Survey III of India 70% of children were anemic. Anemia during infancy and early childhood has been shown to affect cognitive brain function. A total of 110 subjects were divided into 2 groups as early and delayed cord clamping. There was a significant increase in delayed clamping group in haemoglobin levels after 48 hours with p-value.0001. A brief delay in clamping of the umbilical cord after birth offers health benefits to the newborn with no adverse effects to the mother or infant.

Key Words: Anemia delayed clamping early clamping haemoglobin.

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INTRODUCTION

Optimal timing for clamping the umbilical cord at birth is unclear and remains a subject of debate. Early clamping allows for immediate transfer of the infant to the paediatrician. Delayed clamping allows blood flow between the placenta, the umbilical cord and the baby to continue. The blood which transfers to the baby between birth and cord clamping is called placental transfusion. Placental transfusion improves circulating volume at birth which in turn improves outcome for pre-term infants[1]. Placental transfusion occurs most rapidly in the first moments after birth. Approximately 25% of the transfer occurs in the first 15-30seconds between 50-78% is completed within 1 minute and gradually slows to completion in approximately 3 minutes.[2] Physiologic studies in term infants show that a transfer from the placenta of approximately 80 mL of blood occurs by 1 minute after birth reaching approximately 100mL at 3 minutes after birth. This additional blood can supply extra iron amounting to 40-50 mg/kg of body weight. This extra iron combined with body iron (approximately 75 mg/kg of body weight) present at birth in a full-term newborn may help to prevent iron deficiency during the first year of ife[3.]

MATERIALS AND METHODS

The work was carried out at Government Maternity Hospital Hanamkonda and Government General Hospital Siddipet in the department of Obstetrics and gynaecology for the selection of subjects. Prior to the study consent was obtained from the Ethical Committee and written consent was obtained at the time of admission to the delivery ward. We have selected 110 subjects of term newborns by excluding the criteria of multiple births, IUGR by antenatal scans, true knot of umbilical cord, Rh incompatibility, retroviral positive mothers, infants of diabetic mothers with macrosomia, newborns requiring resuscitation, meconium stained liquor and major congenital anomalies or chromosomal anomalies. We had explained the aim of the research protocol and the methods to be used to the pregnant women in the antenatal clinic to identify those who were eligible to for the study and willing to participate. Along with routine investigations haemoglobin estimation was done by

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Sahli's method after 48 hours. Under aseptic precautions by using sterile disposable syringes 2ml of blood was collected. Early clamping was done as early as possible within 10-15 seconds and delayed cord clamping was done at 60 seconds after birth because maximum placental transfusion up to 50-75% occurs by 1 minute after birth.

OBSERVATIONS AND RESULTS

A total of 110 subjects were examined and divided into two groups as early and delayed cord clamping respectively. The data obtained was analyzed by using unpaired student's t-test for difference of means with unequal variances for statistical analysis. There was a significant increase in haemoglobin during delayed clamping of umbilical cord with p-value 0.0001 as shown in the table.

Table 1: Comparison of haemoglobin level during early and delayed clamping

VARIABLE	GROUP	MEAN	SD	t-value	p-value
HAEMOGLOBIN AT 48 hrs (g/dl)	EARLYCLAMPING (n=55)	19.625	1.4507	7.64	0.0001
	DELAYEDCLAMPING (n=55)	17.192	1.863		

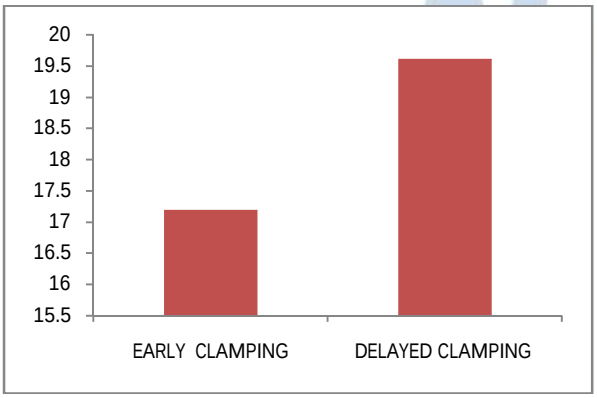

Figure 1:

DISCUSSION

Iron deficiency is estimated to be the most common nutritional deficiency worldwide and is particularly prevalent among infants and children. Nationally representative data collected by the Demographic and Health Surveys show a high percentage of infants worldwide are anemic by 6-9 months of age. In India 81% of infants between 6 and 9 months of age become anemic mostly due to iron deficiency anemia[4] WHO recommends late cord clamping (approximately one to three minutes after birth) for all births for improved haematological status while initiating simultaneous essential newborn care. The high prevalence of anemia in 6 to 9 months old children raises the concern that birth iron stores in some infants are inadequate to sustain growth and development through the first 6 months of life. Postnatal factors also contribute to early depletion of iron stores and development of anemia. Maternal iron deficiency during pregnancy can predispose off spring to the development of iron deficiency during infancy with potentially lifelong sequelae. However because of the links between maternal iron status and neonatal iron status intervention on infants alone will be insufficient to reduce levels of infant iron deficiency; the improvement of maternal iron status (before, during and after pregnancy) is also critical.[5] In term infants umbilical cord clamping between 30 and 180 seconds after birth results in higher concentrations of Hb and hematocrit during the neonatal period increased serum ferritin levels and a a lower incidence of iron deficiency anemia at 4-6 months of age. These are important benefits for children in low and middle income countries where iron deficiency anemia is highly prevalent.[6,7]

CONCLUSION

We conclude that delayed cord clamping resulted in a significantly higher neonatal hemoglobin at 48 hours of life as compared to early clamping with no adverse outcomes i.e., hyperbilirubinemia, respiratory distress and admission to NICU. Further studies are required to show whether the increase in birth iron stores persists throughout infancy especially at 6-12 months of age when iron deficiency anemia is most prevalent. Also the long term effects of enhancing placental transfusion on the growth and neuro developmental outcomes of preterm neonates needs to be assessed further.

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