

Frequency of Anemia in Delayed and Early Umbilical Cord Clamping after Birth in Newborn Babies

Anemia in Delayed and Early Umbilical Cord Clamping

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ABSTRACT

Objective: To detect the frequency of anemia in delayed and early umbilical cord clamping after birth in newborn babies.

Study Design: Randomized controlled trial study

Place and Duration of Study: This study was conducted at the Aziz Bhatti Shaheed Teaching Hospital Gujrat, Shifa Hospital Gujrat and Naseem Hospital Gujrat from January 2021 to December 2022.

Materials and Methods: Pregnant women were randomly selected. Total 244 pregnant women were selected. All needed investigations were done after history and examination of each pregnant woman. Two groups A and B were made. One selected pregnant woman was enrolled in group A and second selected woman was enrolled in group B. In group A umbilical cord was cut after 90 seconds of birth of newborn and In group B umbilical cord was cut within 10 seconds of birth of newborn. Hemoglobin of the newborn was detected on 10th hour of umbilical cord clamping. Newborn blood hemoglobin <13g/dl was considered as anemic. Descriptive statistic like mean or proportion was calculated for age of pregnant women and gestational age of newborn (preterm or full-term). An intention to treat analysis for anemia in newborn on 10th hour of umbilical cord clamping was performed.

Results: In group A 102(83.60%) and in group B 98(80.32%) pregnant women were 18-30 years of age, while pregnant women >30 years of age were 20(16.39%) in group A and 24(19.67%) in group B. In group A 54(44.26%) and in group B 52(42.62%) newborns were male, while female newborns were 68(55.73%) in group A and 70(57.37%) in group B. In group A 82(67.21%) and in group B 84(68.85%) were full-term newborns, while preterm newborns were 40(32.78%) in group A and 38(31.14%) in group B. Newborns in group A 44(36.06%) and in group B 42(34.42%) were having weight of 2-2.5kg, while newborns in group A 78(63.93%) and 80(65.57%) in group B were having weight of >2.5kg. In group A 02(1.63%) and in group B 18(14.75%) newborns were having anemia at 10th day of birth, while in group A 120(98.36%) and 104(85.24%) in group B were normal and not having anemia at 10th day of birth.

Conclusion: Delayed umbilical cord clamping may benefit both preterm and term newborns. In newborns, delayed umbilical cord clamping may increase hemoglobin levels at birth. It may decrease the need of blood transfusion in newborns. Because of increased red cell volume there may be increased chances of neonatal jaundice and sometimes phototherapy may be required.

Key Words: Umbilical cord clamping, Newborn babies, frequency of anemia

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INTRODUCTION

The concept of late and early clamping of umbilical cord is not new. Many years ago this concept was discussed to benefit the newborn.

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In series of studies it was seen previously that 80-100 ml of blood is transferred through placenta within 03 minutes after birth. Here first few breaths of newborn is very important because more than 90% of blood is transferred through placenta in first few beats of heart after birth.¹ Normally in a newborn first 03 minutes are important for transfer of blood through placenta. First few breaths play a vital role in transfer of blood through placenta. More than 80ml of blood is transferred during first minute of birth through placenta. Delayed cord clamping increases time for shifting of blood into newborn and it increases iron stores in the body of newborn. Moreover it also facilitates transfer of immunoglobulins and stem cells, which are helpful for organ repair.^{2,3} Comparison of the frequency of neonatal anemia in early versus delayed umbilical cord clamping demonstrates that neonatal anemia is significantly lower in delayed cord clamping.^{4,5} Whenever it is possible, delayed cord clamping should

be preferred over immediate cord clamping. Because delayed cord clamping saves baby from blood transfusion in later life.⁶ Iron deficiency may affect the brain development during early childhood. During newborn period enough iron stores may help in the brain development of newborn.⁷ The delayed cord clamping has significantly reduced the volume and total nucleated red cell counts of cord blood donation. This may be due to the transfer of blood into the baby due to delayed cord clamping.⁴ It has been observed that there is no difference in the neurodevelopment outcome in preterm babies exposed to delayed cord clamping compared with the milking of the umbilical cord.⁸ In newborns after cesarean section, umbilical cord milking improved hemoglobin levels and blood pressure compared with delayed cord clamping.⁹ There was increased in umbilical cord pO₂ levels in infants with delayed cord clamping however there was no difference in the pH levels.¹⁰

MATERIALS AND METHODS

Study was completed in two years in Aziz Bhatti Shaheed Teaching Hospital Gujrat, Shifa Hospital Gujrat and Naseem Hospital Gujrat. Pregnant women were randomly selected. Total 244 pregnant women were selected. All needed investigations were done after history and examination of each pregnant woman. Two groups A and B were made. One selected pregnant woman was enrolled in group A and second selected woman was enrolled in group B. In group A umbilical cord was cut after 90 seconds of birth of newborn and In group B umbilical cord was cut within 10 seconds of birth of newborn. Hemoglobin of the newborn was detected on 10th hour of umbilical cord clamping. Newborn blood hemoglobin <13g/dl was considered as anemic. Only healthy newborns were selected for study. A newborn with birth asphyxia, any congenital anomaly or sepsis was excluded from the study. Pregnant women with gestational diabetes mellitus, hypertension, hemoglobin less than 10g/dl, Rh incompatibility or bleeding tendency were also excluded from the study. Descriptive statistic like mean or proportion was calculated for age of pregnant women and gestational age of newborn (preterm or full-term).

An intention to treat analysis for anemia in newborn on 10th hour of umbilical cord clamping was performed.

RESULTS

Total 224 pregnant women were enrolled in the study. Group A (delayed cord clamping) and B (early cord clamping) were made containing 122 pregnant women in each group. In group A 102(83.60%) and in group B 98(80.32%) pregnant women were 18-30 years of age, while pregnant women >30 years of age were 20(16.39%) in group A and 24(19.67%) in group B. (Table 1) (Table 4)

In group A 54(44.26%) and in group B 52(42.62%) newborns were male, while female newborns were 68(55.73%) in group A and 70(57.37%) in group B. (Table 1) (Table 4)

In group A 82(67.21%) and in group B 84(68.85%) were full-term newborns, while preterm newborns were 40(32.78%) in group A and 38(31.14%) in group B. (Table 4)

Table No. 1: Age of Mother (n=244)

Age of Mother	Group A (delayed cord clamping) (n=122)	Group B (early cord clamping) (n=122)	Total (n=244)
18-30 Years	54 (44.26%)	52 (42.62%)	106 (43.44%)
>30 Years	68 (55.73%)	70 (57.37%)	138 (56.55%)

Table No. 2: Gender of Newborn (n=244)

Gender	Group A (delayed cord clamping) (n=122)	Group B (early cord clamping) (n=122)	Total (n=244)
Male	102(83.60%)	98(80.32%)	200(81.96%)
Female	20(16.39%)	24(19.67%)	44(18.03%)

Table No. 3: Anemia in Newborn (n=244)

Anemia Present	Group A (delayed cord clamping) (n=122)	Group B (early cord clamping) (n=122)	Total (n=244)
Yes	02(1.63%)	18(14.75%)	20(8.19%)
No	120(98.36%)	104(85.24%)	224(91.80%)

Table No. 1: Characteristics of Newborn and Mother.

Characteristics	Group a (delayed cord clamping) (n=122)	Group B(early cord clamping) (n=122)	Total (n=244)	
Age of mother	18-30 years	102(83.60%)	98(80.30%)	200(81.96%)
	>30 years	20(16.39%)	24(19.67%)	44(18.03%)
Gender of newborn	Male	54(44.26%)	52(42.62%)	106(43.44%)
	Female	68(55.73%)	70(57.37%)	138(56.55%)
Gestational age at birth	Full term	82(67.21%)	84(68.85%)	166(68.03%)
	Preterm	40(32.78%)	38(31.14%)	78(31.96%)
Newborn birth weight	2-2.5kg	44(36.06%)	42(34.42%)	86(35.24%)
	>2.5kg	78(63.93%)	80(65.57%)	158(64.75%)
Anemia in newborn	Yes	02(1.63%)	18(14.75%)	20(8.19%)
	No	120(98.36%)	104(85.24%)	224(91.80%)

Newborns in group A 44(36.06%) and in group B 42(34.42%) were having weight of 2-2.5kg, while newborns in group A 78(63.93%) and 80(65.57%) in group B were having weight of >2.5kg. (Table 4)

In group A 02(1.63%) and in group B 18(14.75%) newborns were having anemia at 10th day of birth, while in group A 120(98.36%) and 104(85.24%) in group B were normal and not having anemia at 10th day of birth. (Table 3) (Table 4)

DISCUSSION

Umbilical cord acts like a reservoir of blood and nucleated cells in it. By delaying the umbilical cord cutting this blood may be shifted to the body of the newborn. This blood may have a large amount of iron in it which may help to improve the iron stores of the newborn. In 2016, Allen and friends discussed that umbilical cord has significant blood immediately after birth which can be used for donation of cells as well. The amount of blood in cord rapidly decreases from 39% with immediate cord clamping to 17% with delayed cord clamping. It is because that with delayed cord clamping significant amount of blood is shifted into the newborn body.⁴ In our study, in group A(delayed cord clamping) only 1.63% newborns were anemic while in group B(early cord clamping) 14.75% newborns showed anemia. (Table No.03 , Table No.04). In 2015, Amir Rashid and others told that in delayed cord clamping group only 04% newborns were anemic while in early cord clamping group 13% newborns showed anemia.⁸ In our study hemoglobin of newborn was significantly increased due to delayed cord clamping. It may be beneficial for the development of brain (Table No.03, Table No.04. In another study by Grajeda and colleagues in 1997 discussed that due to delayed cord clamping there is significant rise in the hemoglobin of the newborn.⁸

Though in our study it is seen that delayed cord clamping may help to increase the hemoglobin concentration of the newborn but for better results babies should be followed for at least one year for proper growth and development monitoring. Moreover a large sample size at least more than thousand newborns should be studied for much better results.

CONCLUSION

Delayed umbilical cord clamping may benefit both preterm and term newborns. In newborns, delayed umbilical cord clamping may increase hemoglobin levels at birth. It may decrease the need of blood transfusion in newborns. Because of increased red cell volume there may be increased chances of neonatal jaundice and sometimes phototherapy may be required.

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