

Neonatal Outcomes In Cord Clamping And Its Association With Hematological Parameters.

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Objective: To compare the neonatal outcomes in early and delayed cord clamping and to find its association with hematological parameters in neonates of Jinnah Postgraduate Medical Centre, Karachi.

Study Design and Setting: It was a cross sectional study conducted from 1st July 2016 to 31st December 2016 at Department of Obstetrics & Gynaecology, Jinnah Postgraduate Medical Centre, Karachi.

Methodology: 342 pregnant women were selected through convenient sampling technique meeting inclusion criteria after obtaining ethical approval all primigravida with age range of 25 to 45 years with singleton term pregnancy delivered through normal vaginal delivery, in 3rd stages of labour were included in the study. Multi-gravid women or any women with a Systemic disease such as hypertension, diabetes mellitus thyroid disorder, and cardiac disease were excluded. Demographic variables, blood parameters, were recorded. SPSS version 20.0 was used for data analysis. Neonatal outcomes were assessed in terms of neonatal haemoglobin, haematocrit, platelet count and bilirubin level with respect to early and delayed cord clamping. Descriptive statistics were calculated. P-value = 0.05 was taken as significant.

Results: the total of 342 pregnant women selected for this study, divided into 2 groups depending upon early (gp-1) or late clamping(gp-2). The mean haemoglobin in group 1 was 13.2 mg/dl and in group 2 was 13.4 mg/dl. Mean haematocrit in group 1 was 40.8 % and in group 2 were 41.3 %. (P-value=0.03). Polycythemia in group 1 was found to be present in 5 (2.92%) neonates while in group 2, 19 (11.11 %) neonates had polycythemia (p-value=0.003). High bilirubin in group 1 was present in 7 (4.09 %) of neonates while 33 (19.30 %) neonates in group 2 had high bilirubin.(p-value=0.001)

Conclusion: Our study showed that neonates with late clamping had lower incidence of anaemia, higher haematocrit as compared to early clamping but were prone to a higher levels of bilirubin as well as polycythemia. Significant variations for haematocrit, polycythemia and bilirubin were found.

Key Word: neonatal outcome, cord clamping, hematological parameters

INTRODUCTION:

Umbilical cord clamping is one of the oldest interventions that humans have done. Timing of Cord clamping is still controversial and debatable. It may be early cord clamping (ECC) (clamp Of cord <60 seconds after delivery) or delayed cord clamping (DCC) (Clamp of cord 60-180 Seconds after delivery) ¹. Nowadays DCC is thought to be a new intervention. Through placental Transfusion new born can achieve 30% rise in blood volume and 60% rise in red blood cells².

Several theories about the potential benefits and risks of delaying cord clamping of the umbilical Cord have been

postulated and studied in recent years. Chief advantages of DCC are Increased haemoglobin and haematocrit level not only for neonatal period but there is ultimate Reduction of iron deficiency anaemia and its consequences like impaired cognitive. Functions and low immunity with resultant increased risk of infections in Infancy³.

Prior physiological studies have demonstrated that about 25-60% of total fetoplacental blood Volume found in placental circulation which is equivalent to 54-160ml or 60% of fetal red cells⁴. And blood is a well known source of hematopoietic stem cells⁵. Many studies conducted in past have proved that by delayed cord clamping newborn can get 20-40ml of extra blood which is About 30-35 mg of Iron^{6,7} so hypovolemic damage, Iron loss and, as well as of several blood Disorders and type 2 diabetes, as a consequence of loss of hematopoietic stem cells⁸. Early cord Clamping has been supposed as a prime origin of anemia in infancy. So some of Researchers are in favour of DCC and endorse that delayed cord clamping as a low-cost. Intervention to reduce anaemia during first six months of life⁹. Others realize that blood overload from delayed cord clamping can produce respiratory distress, polycythemia and jaundice^{10,11}. while with early cord clamping maternal blood loss following birth can be reduced significantly¹².

Several reviews have studied the potential benefits and risks of late vs early clamping of the umbilical cord. In a recent

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study of cord clamping in the preterm population, late clamping showed some potential benefit in terms of decreased need for blood transfusion and lower risk of intra-ventricular haemorrhage¹³. Reviews to date of studies in term infants provided no strong evidence for the superiority of either clamping strategy¹⁴.

The objective of this study was to compare the neonatal outcomes in early and delayed cord clamping and to find their association with different haematological parameters in neonates of Jinnah Postgraduate Medical Centre, Karachi.

METODOLOGY:

This is cross sectional observational study. Three hundred forty two patients were selected through non-probability Convenient sampling. Sample size was calculated on the prevalence of 50%. This study was conducted in department of obstetrics and gynaecology Jinnah postgraduate medical center Karachi. All primigravidas with age range of 24-45 with Singleton pregnancy present in 3rd stage of labour at 37 or more weeks of gestational age were included in the study. Women with history of medical disorders like hypertension, diabetes, thyroid dysfunctions and hematological disorders were excluded from the study. Pregnant women were divided in two groups in group cord was clamped within 1 minute after the birth while in group 2 cord was clamped between 1-3 minutes. All other aspects of obstetric care was managed according to standard practice in the hospital. Data was entered and analyzed in SPSS version 20. Descriptive analysis was performed. Mean and standard deviation were calculated for quantitative variables such as maternal age, gestational age, haemoglobin level, hematocrit, serum bilirubin level, and cord clamping time. Frequencies and percentages were calculated for quantitative variables i-e polycythemia, low Hematocrit, high serum bilirubin and anaemia. Chi square and t- Test were applied and p-value of less than and equal was taken as significant.

RESULTS:

Total 342 patients were selected for this study. Patients were divided equally in two Groups each group comprises of 171 patients. early cord clamping was done in group 1. Patients while delayed cord clamping in group 2 patients. The mean maternal age in group 1. Was 35.63±5.99 years and in group 2 was 34.80±5.98 years. The mean gestational age in group 1 was 38.54±0.95 and in group 2 was 38.46±0.95. The mean cord clamp time in group 1 Was 45.32±1.07 seconds while in group 2 was 118.63±33.18 seconds. Mean hemoglobin level in group 1 was 13.11±1.33mg/dl and in group 2 was 13.44±1.07mg/dl. Mean hematocrit in group 1 was 40.89±3.77% and in group 2 was 41.39±3.02%. The mean bilirubin in group 1 was 9.15±5.76 mg/dl while in group 2 was 13.11±10.13mg/dl mentioned in (Table 1). In group 1

12(7%) neonates were anemic while 159(92.98%) of neonates were normal. In group 2 only 5(2.92%) neonates were

anemic while 166 (97.08) had no anemia (p-value 0.08). in group 1 there were 19(11.11%) neonates having low hematocrit while 152(88.89%) of neonates were anaemic. in group 2 only 8(4.68%) neonates had low hematocrit while 163(95.32%) did not (p-value 0.03). Polycythemia in group 1 was found to be present in 5(2.92%) of neonates while 166(97.18%) did not. In group 2 19(11.11%) neonates had polycythemia while 152(88.89%) did not (p-value 0.003). High bilirubin in group 1 was found to be present 7(4.09%) of neonates While 164(95.91%) did not. In Group 2 33(19.3%) neonates had high bilirubin while 138(80.70%) did not. (P-value 0.001) Table 2.

DISCUSSION:

The impact of Iron deficiency anaemia has serious implication on newborn health like impaired neurodevelopment, which can affect individual's cognitive, motor and behavioral abilities¹⁵. Many studies proved that with delayed cord clamping, Anaemia and its detrimental effects can be avoided in the period of infancy¹⁶ and it is accepted generally as low cost effective intervention¹⁷. By delaying cord clamping the amount of total Iron reaches in newborn circulation is enough for the period of three months of life¹⁸. We noticed in our study that in DCC group there is slight decrease in anaemia

Table 1: Baseline characteristics of the two groups and their mean difference

Variable	Groups	n	Mean	Standard deviation	P-value
Age of Mothers (Years)	Group 1	171	35.63	5.99	0.86
	Group 2	171	34.80	5.98	
Gestational Age (weeks)	Group 1	171	38.54	0.95	0.94
	Group 2	171	38.46	0.94	
Cord clamping Time (seconds)	Group 1	171	45.32	7.94	0.001
	Group 2	171	118.63	33.18	
Hemoglobin level (mg/dl)	Group 1	171	13.29	1.33	0.12
	Group 2	171	13.44	1.07	
Hematocrit (%)	Group 1	171	40.89	3.77	0.02
	Group 2	171	41.39	3.02	
Bilirubin (mg/dl)	Group 1	171	9.15	5.76	0.001
	Group 2	171	13.11	10.13	

Table 2: Frequency of different hematological variation in each group.

Variable	Group 1 n=171		Group 2 n=171		P-value
	Yes (%)	No (%)	Yes (%)	No (%)	
Anaemia	12(7%)	159(93%)	05 (3%)	166(97%)	0.08
Low hematocrit	19(11%)	152(89%)	08(5%)	163(95%)	0.03
Polycythemia	05(3%)	166(97%)	19(11%)	152(89%)	0.003
High bilirubin	07(4%)	164(96%)	33(19%)	138(81%)	0.001

that is 5 out of 171 babies had anaemia while in group of ECC 12 Newborn had anaemia while increased hyperbilirubin (33 out of 171), hematocrit (41 out of 171) and polycythemia (19 out of 171) were found in group 2. Similar finding was noted in study by Nesheli HM¹⁹, it was reported the mean hemoglobin in early cord clamping group of 30 neonates to be 10.68 mg/dl while in delayed cord clamping group of 30 neonates to be 11.56 mg/dl. Mean hematocrit in early cord clamping group was 31.36 and in delayed cord clamping was 34.26 was noted in, Another study supports the same finding by Cernadas JM et al²⁰, anemia in early clamping group of 90 neonates was reported to be present in 8 (8.9%) of neonates while none of the neonates in delayed clamping group reported anemia. Polycythemia was found in 5 (4.4%) of neonates in early clamping group and 13 (14%) neonates with delayed clamping was found to have polycythemia. Early clamping group had a mean hematocrit of 51.1 % while in late clamping group it was 56.4 % and the mean hematocrit in early clamping to be 53.50% among 92 neonates while in the late clamping group it was 59.40 % among 90 neonates.

Another study by Chaparro CM et al recorded the mean hematocrit among 155 neonates of early clamping to be 59.50 % while in 166 neonates of late clamping it was 62 %. No neonates were reported to have polycythemia²¹. In a study by Nelle M et al mean hematocrit of 15 neonates with early clamping was 43% and 15 neonates with late clamping was 59%. No neonates were reported to have polycythemia in both early and late clamping group²². Mean bilirubin in early clamping group was 6.1 mg/dl while in late clamping it was 5.8 mg/dl. No neonates were reported to have polycythemia in the early clamping group while only 3 neonates were found to have polycythemia in the late clamping group²³.

Aziz SF et al recorded a mean hematocrit of 43% among 15 neonates with early clamping while in 15 neonates with late clamping it was reported as 59%²⁴. In a study by Linderkamp O et al the mean hematocrit in early clamping group was reported to be 44 % among 15 neonates while in the late clamping group it was 59 % among 15 neonates. None of the neonates were reported to have polycythemia in both groups²⁵. This finding is not consistent with our finding. ACOG acknowledge the risk of excessive placental transfusion with DCC where other risk factors for fetal polycythemia exist, such as maternal Diabetes, IUGR and high altitude²⁶.

Previously it was thought that with the help of ECC Postpartum Hemorrhage can be avoided but recent studies shows no clear benefit²⁷. We also did not observed this finding for the reason of DCC. Contraindication for DCC are APH/abruption placenta vasa previa, p. previa, umbilical cord avulsion, cord prolapsed, fetal compromise in multiple pregnancy.

These studies show a more or less similar finding to our study with regards to anemia, bilirubin, hematocrit, polycythemia. The quantitative approach of our study has assured that we have assessed the difference of blood parameters in the early vs. late clamping groups, However, the study might not be immune from selection and observer bias. Considering the views of our observations and to what extent they are consistent with the demographic variables would be revealing to discover more facts about neonatal outcomes which will help clinicians in reducing the burden of anemia at the preliminary level

CONCLUSION:

Neonates with late clamping had lower incidence of anemia, higher haematocrit as compared to early clamping but were prone to a higher levels of bilirubin as well as polycythemia. Significant variations for haematocrit, polycythemia and bilirubin were found.

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