

# Early Versus Late Clamping of the Umbilical Cord in Full-term Neonates

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## ABSTRACT

**Background:** Optimal timing for clamping of the umbilical cord at birth is unclear. Early cord clamping allows for immediate resuscitation of the newborn. Late cord clamping may facilitate transfusion of blood between the placenta and the baby.

**Aim:** To compare the potential benefits and harms of early versus late cord clamping in term infants.

**Methods:** This randomized controlled trial study was carried out at Bhatti International Trust Teaching Hospital, Lahore from 03-02-2014 to 04-09-2014. Total 200 cases were selected and divided into two groups; group A (early cord clamping) while in group B (late cord clamping) techniques were applied. Each group comprised of 100 patients.

**Results:** Majority of the patients in both groups were recorded between 20-25 years i.e. 62% (n=31) in early and 54% (n=27) in delayed cord clamping group, the final outcome of the study was calculated, haematocrit levels was  $46.88 \pm 3.08$  in early and  $53.42 \pm 3.92$  in delayed group. Statistically the difference was significant ( $P < 0.05$ ).

**Conclusion:** The benefits of term babies in late cord clamping seem to outweigh the risks of adverse outcomes, including neonatal jaundice requiring phototherapy than early cord clamping.

**Key words:** Full-term, Umbilical cord, Timing of cord clamping, Haematocrit

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## INTRODUCTION

Without doubt the most common of all operations is the clamping and cutting of the umbilical cord. The appropriate timing of this procedure has been argued over many years with its pros and cons<sup>1</sup>. When done within first minute after birth it is called Early Cord clamping, while when done after one minute after birth is known as delayed cord clamping<sup>2</sup>. For both these procedure there is no consensus whatsoever when current evidence is considered<sup>3</sup>. Early cord clamping has been considered to be an integral part of management of third stage of labor<sup>4</sup>. The additional blood that a new born acquires is 30% in delayed cord clamping compared to early cord clamping<sup>5</sup>. However the mortality and morbidity is increased if the cord is clamped before the first respiration<sup>6</sup>. By getting the additional 30% blood the iron stores and blood volume in infancy are substantially increased, however there is interference with bonding of mother and neonate<sup>7</sup>. A committee opinion titled "Timing of umbilical cord clamping after birth." published three years ago by the American College of Obstetricians and Gynaecologists recommend that delayed cord clamping be practiced in preterm infants<sup>8</sup>. Hyperviscosity is the main side effect of delayed cord

clamping<sup>9</sup>. The need for transfusion is hypothetically reduced preterm infants decreasing the need for transfusion, intraventricular haemorrhage and mortality<sup>10</sup>. There is wide variation in the practice for umbilical cord clamping in Pakistani maternity wards, many of which have no written guidelines. We argue that national guidelines for umbilical cord clamping of neonates should be established.

## PATIENTS AND METHODS

This randomized controlled trial study comprised 200 cases and carried out at Bhatti International Trust Teaching Hospital, Lahore from 3-2-2014 to 4-09-2014. They were divided into two groups; group A (early cord clamping) and group B (delayed cord clamping) techniques were applied. Each group comprised 100 patients. Patients age range 25-40 with parity <6, 37 or more weeks' gestation, vaginal delivery (spontaneous and induced) and cesarean section were included. Patients having pre-term infants, low-birth weight, placental abruption or previa were excluded from the study. Data was analyzed by SPSS-19.

## RESULTS

Majority of the patients in both groups were recorded between 20-25 years i.e., 31(62%) in early and 27(54%) in delayed cord clamping group with mean and standard deviation was  $27.89 \pm 4.52$  in early and  $26.23 \pm 4.23$  years in respectively (Table 1). According

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to gestational age, 21(42%) in early and 26(52%) in delayed group were between 32-34<sup>+6</sup> weeks of gestation while 29(58%) in early and 24(48%) in delayed group were recorded between 35-36 weeks of gestation (Table 2). The final outcome of haematocrit levels was 46.88±3.08 in early and 53.42±3.92 in delayed group. P value was calculated as 0.002 which is significant (Table 3).

Table 1: Frequency and percentage of the patients

Age (years)	Early Cord Clamping		Late Cord Clamping	
	No.	%	No.	%
20 – 25	31	62.0	27	54.0
26 – 30	14	28.0	17	34.0
31 – 35	5	10.0	6	12.0
Mean±SD	27.89±4.52		26.23±4.23	

Table 2: Frequency and percentage of gestational age

Gestational age (years)	Early Cord Clamping		Late Cord Clamping	
	No.	%	No.	%
32 – 34 <sup>+6</sup>	21	42.0	26	52.0
35 – 36	29	58.0	24	48.0

Table 3: Comparison of hematocrit in early versus late cord clamping of the umbilical cord in term neonates

Hematocrit levels	Early Cord Clamping		Late Cord Clamping	
	No.	%	No.	%
45 – 50	45	90.0	7	14.0
51 – 55	3	6.0	19	38.0
56 – 60	2	4.0	24	48.0
Mean±SD	46.88±3.08		53.42±3.92	
P value	0.002			

## DISCUSSION

Among the many transitions from intrauterine to extrauterine life is increased pulmonary venous return as preload for the left heart. When umbilical cord is clamped early there is decreased venous return and consequently decreased cardiac output.<sup>11</sup>

When done within first minute after birth it is called Early Cord clamping, while when done after one minute after birth is known as delayed cord clamping.<sup>12</sup> Historically early cord clamping has been practiced universally worldwide.<sup>13</sup> In our study 48% of late cord-clamping group had haematocrit levels within 56-60% range compared with 4% in early cord clamping group and this was statistically significant. This is consistent with other international studies which show that delayed cord clamping reduces anaemia in infancy in developing countries.<sup>14</sup>

When mothers are anaemic delayed cord clamping results in increased iron stores and hemoglobin.<sup>15</sup> It has been found that haemoglobin is still higher at three months of age in the above mentioned infants. This is especially important in

developing countries where maternal and foetal anaemia are prevalent<sup>16</sup>. Lainez Villabona et al<sup>17</sup> showed early or late clamping and cutting of umbilical cord have no advantage over each other. The haematocrit is higher in delayed cord clamping with the likelihood being six times. When these infants enter sixth months they are likely to have more iron in the range of 27-47 mg more iron, which could in turn prevent iron deficiency anaemia in the pre weaning period<sup>18, 19</sup>.

Delayed cord clamping has the added advantage of improved cerebral oxygenation<sup>20</sup>. Further early cord clamping results in higher lead concentrations due to low iron stores<sup>21</sup>. In malaria endemic areas delayed cord clamping improves haematological status of term infants at 4 months of age<sup>19,22</sup>. However Apgar scores are not improved by delayed cord clamping<sup>3</sup>. The limitation of phototherapy undermines the advantages of delayed cord clamping when jaundice develops<sup>12</sup>. But this is a rare occurrence fortunately<sup>23</sup>.

Delayed cord clamping decreases inflammatory effects associated with childbirth.<sup>1</sup> These include apnoea of grey areas and signs of foetal distress.<sup>24</sup> Despite all its advantages delayed cord clamping delays resuscitation and longer transition times to neonatal circulation<sup>25, 26</sup>. In most under developed world delayed cord clamping is likely to have most public health benefits<sup>27</sup>. Irish workers have demonstrated the following benefits of delayed cord clamping higher haematocrit and haemoglobin values and larger left ventricle diameter at the end of the diastole<sup>28</sup>.

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