



Journal homepage: www.sciencearchives.org

ISSN: 2582-6697



Original Research Article

<http://dx.doi.org/10.47587/SA.2021.2108>



The relation between time of cord clamping and development of transient tachypnea of the newborn and polycythemia in term and near-term neonates

Soroor Anter Hamad¹, Ahmed Hashim² and Zainab Sulaiman

¹Department of Pediatrics, (MRCP-CH). University of Anbar, Iraq,

²Department of Pediatrics, (MRCP-CH). University of Tikrit, Iraq,

*Corresponding author: ah70.tucam@tu.edu.iq

Received: Feb 8, 2021 / Revised: Mar 8, 2021/ Accepted: Mar 18, 2021

Abstract

A cross-sectional hospital-based selected study was done on neonates delivered by c/s in Sulymania city /Iraq. At the time of delivery, the time of cord clamping was calculated in seconds from onset of the first cry to the time of cord-cutting each neonate was assessed for signs of TTN within 6 hrs of life, and PCV was measured within 6 hrs by capillary measures. The total numbers of cases were (43) case. (53.5%) were males and (46.5%) were females. (95.3%) of total study, cases were within normal weight and (88.4%) were term babies. All the study cases were delivered by c/s, (93%) were elective c/s while (7%) were emergency c/s. Regarding risk factors of TTN, (95.5%) of females of study cases have risk factors in form of elective c/s only, while (elective c/s + gestational DM) was (100%) among males. Additionally, the study cases that have risk factors in form of (elective c/s, PROM, SGA) were (100%) among females only. For males who have a risk factor of c/s in addition to being a male, their percentage was (100%) among study cases. (84%) of study, cases were developed TTN and (16%) were not. Finally, the results showed that there are no statistically significant differences in the time of cord clamping & whether they develop polycythemia or not, Chi² value was (4.977), and this value not significant at (0.05). There are no significant differences in the time of cord clamping & development of TTN and polycythemia in term and near term neonates.

Keywords Transient tachypnea, polycythemia, cord clamping, neonates

Introduction

TTN (transient tachypnea of the newborn) is a self-limiting condition that affects newborns all over the world has been seen by all clinicians who work with them (Kasap et al., 2008). In transient tachypnea of the infant (TTN), the medical history involves cesarean section delivery without labor or premature delivery (Derbant et al., 2011).

Twin pregnancies, maternal asthma, late prematurity, premature birth, gestational diabetes, and cesarean birth without labor are all important risk factors (Pramanik et al., 2015). Tachypnea, rapid breathing, grunting, retractions, hypoxia, increased oxygen requirement, and cyanosis in severe cases are all signs of respiratory failure (Utdibi et al., 2010). TTN is treated with a compassionate approach. In this condition, there is no evidence to support the use of oral furosemide or nebulized racemic epinephrine. Inhaled 2

agonists, such as albuterol (salbutamol), promote fluid clearance by increasing ENaC and Na⁺, K⁺-ATPase expression and stimulation. Albuterol can improve oxygenation once provided early in the initial symptoms of TTN, according to new evidence. Hct or hemoglobin concentrations >2 SD above the average value for gestational and postnatal age are considered to be Neonatal Polycythemia (Luchtman & Wilson, 2011). If the Hct from a peripheral venous specimen is >65 percent or the hemoglobin is >22 g/dL, a term infant is found polycythemic. In certain clinical cases, the hct is used to describe the disorder instead of the hemoglobin concentration (Oski & Naiman, 1982; Wiswell et al., 1986). Post-term neonates, small-for-gestational-age babies, diabetic mothers' infants, identical twins who bear the same placenta and develop twin-to-twin transfusion, and infants with chromosomal defects are all at higher risk for neonatal polycythemia. (Black & Maheshwari, 2009).

According to one study, immediate cord clamping can decrease the number of red blood cells an infant gets at birth by more than half, resulting in short- and long-term neonatal problems like autism, infant anemia, childhood psychiatric disabilities, and hypoxic-ischemic brain damage, and it is not physiological. (Mercer, 2001). This study aims to look into the relationship between the time of cord clamping and the development of transient tachypnea in newborns as well as the development of polycythemia.

Subject and methods

A cross-sectional hospital-based selected study was done on full-term and near-term, neonates to assess the relationship between the time of cord clamping and the development of transient tachypnea of newborns and hematocrit level in newborns. The study was done in Safin private hospital in sulymania city /Iraq during the period from June 2020 to July 2020. The patients were selected by random sampling.

Each pregnant mother and her baby were assessed by a prepared questionnaire each child who delivered by c/s was classified as near term (36-36+wk), term (37-40wk). The time of cord clamping was calculated from the onset of a child crying to time of clamping and divided as (0-10sec), (11-20sec), (21-30sec), (31-40sec), (41-50sec), (51-60sec). Each child was weighed after birth, <2500mg considered as low birth weight (2500-4000mg) as normal weight, while >4000mg considered as large for gestational age. Each child included in the study was observed in the nursery for signs and symptoms of TTN. The child who developed TTN and was admitted to NICU was monitored for complications of TTN. Each child was sent for hematocrit level within 6hrs after birth, PCV level was classified as polycythemia >65%, normal (42%-65%).

PCV was done by collecting the blood in the heparinized capillary tube from the heel of the child, the blood was then centrifuged in a microcentrifuge for 5 minutes. This separates the blood into layers, then PCV recorded by PCV reader. The results were presented in tables and figures and statistical analysis was done using SPSS statistics version 20 using P-value. P-value less than 0.05 is considered significant.

Result

The total number of cases was 43. Table 1 shows the demographic characteristics of the study cases. It is shown that (53.5%) of the study members were (Males) and (465%) were (females). The normal weight (2.5-4.0 kg) were percent of (95.3%) from study members and (LBW & gt; 2.5kg) were (4.7%). On the other hand, the type of delivery was only (C/S) with a percent of (100%) from study members. About (GA) presented by two categories, (36-37) were with percent of (11.6%) and (& gt;37) with percent of (88.4%).

Table 1. Demographic Characteristics of study cases

Variable	Category	Frequency	%
Sex	Male	23	53.5
	Female	20	46.5
	Total	43	100.0
WT	LGA >4kg	-	-
	Normal (2.5-4.0 kg)	41	95.3
	LBW <2.5 kg	2	4.7
	Total	43	100.0
Type of delivery	NVD	-	-
	C/S	43	100.0
	Total	43	100.0
GA	< 36	-	-
	36-37	5	11.6
	>37	38	88.4
	Total	43	100.0

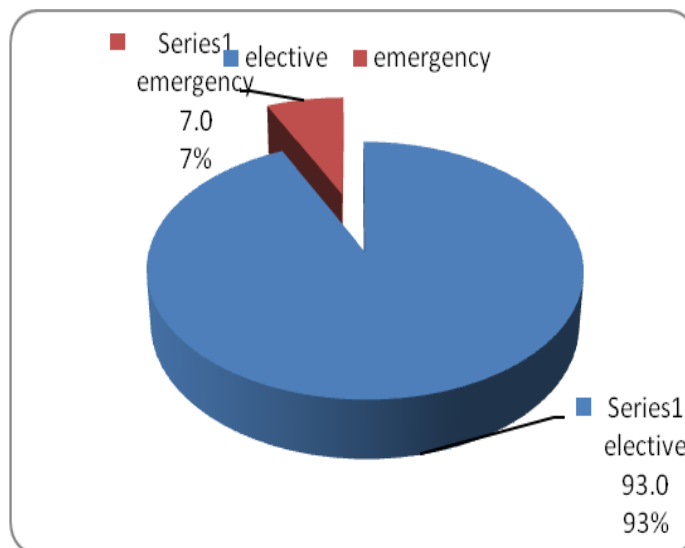


Fig.1 Distribution of study cases according to an indication of c/s

Fig.1 showed that 93% of study cases underwent elective c/s and 7% emergency c/s.

Table 2 showed that risk factor TTN of (elective C/S) was (21) among females with percent of (95.5%) and (1) case among males with percent of (4.5%), and two risk factors for TTN related (elective C/S, gestational DM) were in one male case with (100%). While (elective C/S, PROM, small for gestational age risks) were for one female case with (100%). (elective C/S, small for gestational age risks) were for one female case with (100%). (Male risk factor) was for three males with percent of (100%), finally (male, elective C/S) was only for males with (15 cases / 100%). The total risk factors for TTN among females were (23) cases with (53.5%) and males were (20) cases with a percent of (46.5%).

Table 2. Distribution of study cases according to risk factors of TTN * sex

Risks factors for TTN	Sex		Total
	Female	Male	
Elective C/S	21	1	22
	95.5%	4.5%	100.0%
Elective C/S, gestational DM	0	1	1
	0.0%	100.0%	100.0%
Elective C/S, PROM, small for gestational age	1	0	1
	100.0%	0.0%	100.0%
Elective C/S, small for gestational age	1	0	1
	100.0%	0.0%	100.0%
Male	0	3	3
	0.0%	100.0%	100.0%
Male, elective C/S	0	15	15
	0.0%	100.0%	100.0%
Total	23	20	43
	53.5%	46.5%	100.0%

Table 3. Showed that time of cord clamping was (11-20 seconds) for (7) cases, the females were (2) with percent of (28.6%) and the male cases were (5) with percent of (71.4%). And the time of cord clamping during (21-30 seconds) was for (20) cases distributed (10) for females and (10) for males with percent of (50%) for each of them. Time of cord clamping during (31-40 seconds) was (4) cases, (3) among females with percent of (75%) and (1) male with percent of (25%) from study members. Within 10 seconds were (12) cases, distributed for females with percent of (66.7%) and (33.3%) for males.

Table 3. Distribution of study cases regards to the time of cord clamping

Time of cord clamping	Sex		Total
	Female	Male	
Within 10 sec	8	4	12
	66.7%	33.3%	100.0%
11-20 sec	2	5	7
	28.6%	71.4%	100.0%
21-30sec	10	10	20
	50.0%	50.0%	100.0%
31-40 sec	3	1	4
	75.0%	25.0%	100.0%
Total	23	20	43
	53.5%	46.5%	100.0%

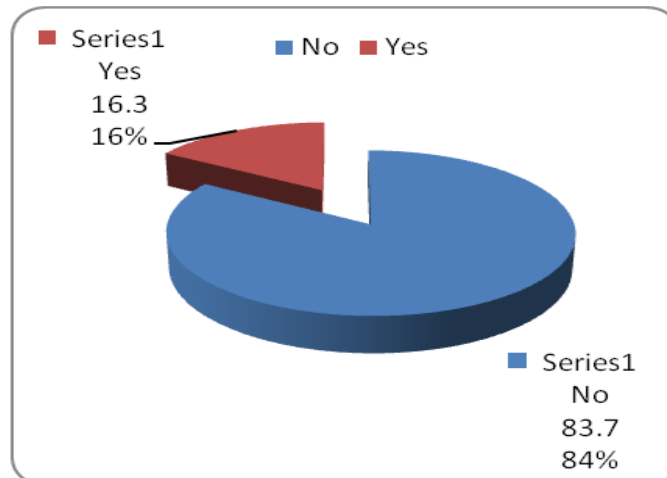


Fig. 2 show that 84% of study cases developed TTN and 16% not develop

Fig. 2 Distribution of study cases according to whether they develop TTN or not. The result in Table 4. Showed that 2 females developed signs of TTN after 1 hour with a percent of 66.7%, and 1 male with a percent of 45.9%. While 1 female developed signs of TTN immediately with a percent of 33.3% and 2 males with a percent of 66.7% from study members. The study showed that 37 cases of no developed signs of TTN distributed 20 among females and 17 for males.

Table 4. Distribution of cases according to time developed signs of TTN * sex

Have signs and symptoms of TTN	Sex		Total
	Female	Male	
Have not signs and symptoms of TTN	20	17	37
	54.1%	45.9%	100.0%
Tachypnea	1	0	1
	100.0%	0.0%	100.0%
tachypnea, grunting, cynosis	0	1	1
	0.0%	100.0%	100.0%
tachypnea, grunting, nasal flaring	2	1	3
	66.7%	33.3%	100.0%
tachypnea, grunting, nasal flaring, cyanosis	0	1	1
	0.0%	100.0%	100.0%
Total	23	20	43
	53.5%	46.5%	100.0%

Table 5 showed that 1 female have signs and symptoms of TTN related to tachypnea, and 1 male have signs and symptoms of TTN related to (tachypnea, grunting and cyanosis), while the (tachypnea, grunting nasal flaring) were 2 among females and 1 among males, finally the study member have signs and symptoms of TTN related to (tachypnea, grunting, nasal flaring and cyanosis) just among male with 1 frequency.

Table 5. Distribution of study cases according to signs and symptoms of TTN

Have signs and symptoms of TTN	sex		Total
	Female	Male	
Have not signed and symptoms of TTN	20	17	37
	54.1%	45.9%	100.0%
Tachypnea	1	0	1
	100.0%	0.0%	100.0%
tachypnea, grunting, cynosis	0	1	1
	0.0%	100.0%	100.0%
tachypnea, grunting, nasal flaring	2	1	3
	66.7%	33.3%	100.0%
tachypnea, grunting, nasal flaring, cyanosis	0	1	1
	0.0%	100.0%	100.0%
Total	23	20	43
	53.5%	46.5%	100.0%

Table 6 showed that the 2 females and 2 males have a complication of TTN related to hypoxia with a percent of (50%) for each of them and (39) from study members have no complication.

Table 6. Distribution of study cases according to complication developed in TTN cases

complications of TTN	Sex		Total
	Female	Male	
Have no complication of TTN	21	18	39
	53.8%	46.2%	100.0%
Hypoxia	2	2	4
	50.0%	50.0%	100.0%
Total	23	20	43
	53.5%	46.5%	100.0%

Table 7 showed that one male has a risk factor of polycythemia related to maternal DM and one female has a placental insufficiency risk factor, while 41 members have no risk factors of polycythemia.

Table 7. Distribution of study cases according to risk factor for polycythemia

Did he/she have any risk factors of polycythemia?	Sex		Total
	Female	Male	
maternal DM	0	1	1
	0.0%	100.0%	100.0%
No	22	19	41
	53.7%	46.3%	100.0%
placental insufficiency	1	0	1
	100.0%	0.0%	100.0%
Total	23	20	43
	53.5%	46.5%	100.0%

Table 8 Showed that 6 babies with a percent of (85.7%) don't develop any signs of TTN during (11-20 sec) from the time of cord clamping and 1 baby with a percent of (14.3%) developed signs during (11-20 sec) from the time of cord clamping. And the results showed that 19 babies with a percent of (95%) don't develop any signs of TTN during (21-30 sec), from the time of cord clamping, while 1 baby with a percent of (5%) developed signs of TTN during (21-30 sec) from the time of cord clamping. Several 3 babies with percent of (75%) don't develop any signs of TTN during (31-40 sec) and 1 baby with percent of (25%) developed signs of TTN during (31-40 sec) from the time of cord clamping. the results showed that 4 (33.3%) from study members developed signs of TTN (within 10 sec) and 8 (66.7%) from the study members didn't develop any signs of TTN (within 10 sec) from the time of cord clamping.

Finally, the results showed that there are no statistically significant differences in the time of cord clamping & whether they develop signs and symptoms of TTN, Chi² value was (4.671), and this value not significant at (0.05).

Table 8. Distribution of study cases regarding the time of cord clamping & whither they develop signs symptoms of TTN

Time of cord clamping	Did the baby develop any signs of TTN?		Chi ²	Df.	P-value
	No	Yes			
within 10 sec	8 66.7%	4 33.3%	4.671 ^a	3	0.198
11_20 sec	6 85.7%	1 14.3%			
21_30 sec	19 95.0%	1 5.0%			
31_40 sec	3 75.0%	1 25.0%			
Total	36 83.7%	7 16.3%			

Table 9 showed that 4 babies with a percent of (57.1%) were normal (<65%) during (11-20 sec) from the time of cord clamping and 3 babies with a percent of (42.9%) were polycythemia during (11-20 sec) from the time of cord clamping. The result also showed that (9) babies with a percent of (45%) were normal (<65%) during (21-30sec) from the time of cord clamping and 10 babies with percent of (50%) were polycythemia during (21-30sec) from the time of cord clamping. And no data for 1 baby. There are 4 cases normal during (31-40 sec) from the time of cord clamping and no polycythemia during (31-40 sec). Finally, 7 babies with a percent of (58.3%) were normal (<65%) within 10 sec and 5 babies with a percent of (41.7%) were polycythemia within 10 sec. Finally, the results showed that there are no statistically significant differences in the time of cord

clamping & whether they develop polycythemia or not, Chi² value was (4.977), and this value not significant at (0.05).

Table 9. Distribution of cases according to time of cord clamping and whether they develop polycythemia or not

Time of cord clamping	PCV within 6 hrs of birth ?			Chi2	Df.	P value
	No answer	normal (<65%)	polycythemic (>65%)			
within 10 sec	0	7	5	4.977a	3	.547
	0.0%	58.3%	41.7%			
11_ 20 sec	0	4	3			
	0.0%	57.1%	42.9%			
21_30 sec	1	9	10			
	5.0%	45.0%	50.0%			
31_ 40 sec	0	4	0			
	0.0%	100.0%	0.0%			
Total	1	24	18			
	2.3%	55.8%	41.9%			

Discussion

In this study, the risk factors of TTN, (95.5%) of females of study cases have risk factors in form of elective c/s only, while (elective c/s + gestational DM) was (100%) among males. Additionally, the study cases that have risk factors in form of (elective c/s, PROM, SGA) were (100%) among females only. males who have a risk factor of c/s in addition to being a male their percentage was (100%) among study cases. this agrees with a study was done by Ghaith W. Hamdoon in Iraq (Hamdoon, 2018) (66.7%) of study cases (males) developed signs of TTN immediately after birth and needed NICU admission, However, (66.7%) of study cases were females who developed TTN after 1 hr of life this agree with a study which was done by Thomas A. Parker, John P. Kinsella which show that TTN developed within few hrs after birth (Jensen *et al.*, 2017).

The results showed that there are no statistically significant differences in the time of cord clamping & whether they develop signs and symptoms of TTN, Although (Cernadas *et al.*, 2006; Mustafa & Al-Samarraie, 2020) reported that there was a small increase in the respiratory rate in infants who had their cords clamped late, but no additional respiratory therapy was needed for these babies (McDonald and Middleton 2008) discovered that both the delayed and immediate clamping classes had a comparable number of infants admitted to either stage of neonatal intensive care unit for respiratory distress.

Finally, the results showed that there are no statistically significant differences in the time of cord clamping & whether they develop polycythaemia or not, this agrees with

a study done by A Jahazi, M Kordi, N B Mirbehbahani & S R Mazloom in which they compare the effect of early (30 sec) and late (3min.) cord clamping on neonatal hematocrit at 2 and 18 h of life (Jahazi *et al.*, 2008; Mustafa *et al.*, 2020)

Conclusion

There are no significant differences in the time of cord clamping & development of TTN and polycythemia in term and near-term neonates.

Ethical Considerations

The study was approved by the ethical committee. All Research participants haven't been subjected to any kind of harm in any way.

Conflict of Interest

The author hereby declares no conflict of interest.

Consent for publication

The author declares that the work has consent for publication.

Funding support

The work was supported by the researchers themselves.

References

- Black .LV., Maheshwari A. (2009). Disorders of the fetomaternal unit: hematologic manifestations in the fetus and neonate. *Semin Perinatol*, 33:12–19
- Cernadas J., Carroli G., Pellegrini L., *et al.* (2006). The effect of timing of cord clamping on neonatal venous hematocrit values and clinical outcome at term: A randomized, controlled trial. *Pediatrics*, 117:779–786
- Derbent A., Tatli M.M., Duran M., Tonbul A., Kafali H., Akyol M. (2011). Transient tachypnea of the newborn: effects of labor and delivery type in term and preterm pregnancies. *Arch Gynecol Obstet*. 283(5):947-51.
- Hamdoon G.W. (2018). Risk factors for development of transient tachypnea of newborns. *Ann Coll Med Mosul*, 40(1):15-19.
- Jahazi A., Kordi M., Mirbehbahani,N.B.& Mazloom,S.R. (2008). The effect of early and late umbilical cord clamping on neonatal hematocrit. *Journal of Perinatology*, volume 28, pages523–525.
- Jensen, E.A. Mong, A. Biko, D.M. Maschhoff, K.L. Kirpalani, H. (2017). *Assisted Ventilation of the Neonate*. 6th Ed. Page: 67-79.
- Kasap B., Duman N., Ozer E., Tatli M, Kumral A., Ozkan H. (2008). Transient tachypnea of the newborn: predictive factor for prolonged tachypnea. *Pediatr Int. Feb.* 50(1):81-84.
- Kliegman R.M., Geme J.S. (2020). *Nelson textbook of Pediatric*. 21st Ed. USA.
- Luchtman J.L., Wilson D.B. (2011). Hematologic problems in the fetus and neonate. In: *Neonatal-Perinatal Medicine*, 9, Martin RJ, Fanaroff AA, Walsh MC (Eds), Elsevier Mosby, St. Louis. p.130
- McDonald S.J., Middleton P. (2008). Effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes (review). *Cochrane Database Syst Rev*, 2:CD004074.
- Mercer J.S. (2001). Current best evidence: A review of the literature on umbilical cord clamping. *J Midwifery Women's Health*, 46: 402-414
- Mustafa, M.A., AL-Samarraie M.Q., Ahmed M. T. (2020). Molecular techniques of viral diagnosis, *Science Archives*, 1(3), 89-92

Mustafa, M.A & AL-Samarraie, M.Q . (2020) .SECONDARY MENOPAUSE and its RELATIONSHIP to HORMONAL LEVELS AMONG WOMEN at SALAH AL-DIN HOSPITAL . European Oski F.A., Naiman J.L. (1982). Polycythemia and hyperviscosity in the neonatal period. In: Hematologic Problems in the Newborn, 3 ed, Oski FA (Ed), WB Saunders, New York. p.87.

Pramanik A.K., Rangaswamy N., Gates T. (2015). Neonatal respiratory distress: a practical approach to its diagnosis and management. *Pediatr Clin North Am*, 62:453–469.

Journal of Molecular & Clinical Medicine . Volume 7, Issue 09, PP 96-104.

Utdibi E., Gries K., Bücheler M., Misselwitz B., Schlosser R.L., Gortner L. (2010). Impact of labor on outcomes in transient tachypnea of the newborn: population-based study. *Pediatrics*, 125(3):e577-83.

Wiswell T.E., Cornish J.D., Northam R.S. (1986). Neonatal polycythemia: frequency of clinical manifestations and other associated findings. *Pediatrics*,78:26.

This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).



How to cite this article:

Hamad , S.A., Hashim, A. and Hashim, A. (2021). The relation between time of cord clamping and development of transient tachypnea of the newborn and polycythemia in term and near tem neonate. *Science Archives*, Vol. 2 (1), 50-55. <http://dx.doi.org/10.47587/SA.2021.2108>