Int. J. New. Chem., 2022, Vol. 9, Issue 4, pp. 559-566.

International Journal of New Chemistry

Published online in http://www.ijnc.ir/

Open Access

Print ISSN: 2645-7237

Online ISSN: 2383-188x

Original Research Article

Evaluation of the Relationship between Maternal Hemoglobin and Umbilical Cord Hemoglobin Level in Term Neonates after Spinal Anesthesia

Bahman Naghipour [1], Solmaz Fakhari [2] *

[1]Associate Professor of cardiac Anesthesiology, Department of Anesthesiology, Faulty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

[2]Associate Professor of Anesthesiology, Department of Anesthesiology, Tuberculosis and Lung Disease Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

Received: 2022-01-16 *Accepted: 2022-02-15* *Published: 2022-02-26*

ABSTRACT

Introduction: Given the contradictory results obtained in two internal studies, the question arises as to whether there is really a relationship between umbilical cord hemoglobin and maternal hemoglobin? And can these effects change during spinal anesthesia or not? In this study, we seek to answer this question. On the other hand, considering that in recent years the use of iron and folic acid supplements in Iran in health centers has been done in a controlled manner, this study can determine the effect of supplements on maternal hemoglobin and consequently the infant. **Material and Methods:** This study was performed during 2018 in Al-Zahra Hospital [affiliated to Tabriz University of Medical Sciences] and in women candidates for elective cesarean section who were anesthetized under spinal anesthesia. During cesarean section, blood samples were taken from the mother and the umbilical cord of the baby and the amount was compared with each other and their relationship was investigated. **Results:** The mean MCV in mothers was 83.75 femtoliters [64.3-103.3] with a standard deviation of 5.82, but in infants the mean was 102.18 femtoliters [88.2-109.2] with a standard deviation of 4.69. According to p-value = 0.503 [p> 0.05], it can be said that there is no statistically significant relationship between maternal MCV and neonatal MCV. **Conclusion:** In this study, it was found that maternal serum hemoglobin level and neonatal umbilical cord hemoglobin were significantly related to each other. However, other parameters such as maternal age, pregnancy rank, infant weight, neonatal sex, delivery method did not show a significant relationship with umbilical cord hemoglobin level. There was also no significant relationship between MCV and MCHC levels of mothers and infants.

Keywords: hemoglobin, spinal anesthesia, infants, MCV

***Corresponding Author: ORCID: 0000-0003-1946-3075**
E-mail: Solmazfakhari@gmail.com

Introduction

The average level of neonatal hemoglobin in different references is different. Fanarf is 14 to 20 mg / dL, and in the Hematology Oncology book 19.2 ± 2.3 It is also stated in some studies that infants born by cesarean section have lower hemoglobin than infants born by vaginal procedure [1, 2]. Because different studies have shown different amounts of umbilical cord blood hemoglobin, our aim in this study was to determine umbilical cord hemoglobin in full-term infants by normal delivery and cesarean section and its relationship with maternal hemoglobin [3, 4]. In a study conducted in 2018 in Mashhad, there was no relationship between maternal hemoglobin and umbilical cord hemoglobin [5]. Also, in a study conducted in Ahvaz in 2018, the average hemoglobin in the study group was 13.24 ±1.77, which was significantly less than the amount mentioned in the reference book. Also, there was a significant and direct relationship between maternal hemoglobin. And the hemoglobin of the newborn was so that with the decrease of the mother's hemoglobin, the hemoglobin of the newborn decreased and the hemoglobin of the newborns born by cesarean section was less than those born naturally [6, 7]. Given the contradictory results obtained in two internal studies, the question arises as to whether there is really a relationship between umbilical cord hemoglobin and maternal hemoglobin? And can these effects change during spinal anesthesia or not? In this study, we seek to answer this question. On the other hand, considering that in recent years the use of iron and folic acid supplements in Iran in health centers has been done in a controlled manner, this study can determine the effect of supplements on maternal hemoglobin and consequently the infant.

Material and Methods

This cross-sectional study was performed for one year from the beginning of 2018 to the beginning of 2019 in the maternity ward of Al-Zahra Hospital; Study participants were included in the study using available and purposeful sampling methods and were evaluated.

Inclusion/Exclusion criteria

Inclusion criteria included: pregnancy over 38 weeks, elective cesarean section candidate, spinal anesthesia candidate and consent to participate in the study and exclusion criteria included women with a history of anemia, women with preeclampsia, Women who received blood

products during the past three days were women with coagulation problems, low birth weight infants, twin pregnancies, and women with a history of hemophilia.

Methods

The neonatal blood sample was taken from the umbilical cord in the maternity ward and sent to a specific laboratory to measure hemoglobin, MCV, MCH and MCHC for a maximum of one day in the refrigerator at 1-6 ° C. . At the same time, a history was taken from the mother and the baby's details were recorded. In the history of the infant's mother, the questions were as follows: maternal age, maternal parity, type of delivery, amount of iron supplementation during pregnancy, bleeding near delivery of the mother's blood based on the hospital record. In the form of infant characteristics, sex, birth weight, maturity or prematurity were checked. Data obtained in SPSS software. We imported the V20 and processed it.

Ethical considerations

This study was conducted after approval by the ethics committee of Tabriz University of Medical Sciences [IR.TBZMED.REC.1399.368] and in coordination with the head of Al-Zahra Hospital [affiliated to Tabriz University of Medical Sciences]. Written informed consent was obtained from all mothers and they were not charged for the tests performed in this study.

Data analysis

In describing the data, appropriate tables and statistical indicators such as mean, etc. have been used, and in data analysis, first the normality of the data using a one-sample Klomogorov-Smirnov test [Kolmogorov- Smirnov] was examined and with confirmation of normality, appropriate parametric methods such as T-test and Pearson-Vasperman correlation coefficient were used. The software used in this study was SPSS v.21 and the significance level of the tests was less than 5%.

Results

The normality of maternal and neonatal hemoglobin data was assessed by Kolmogorov-Smirnov test and according to the value of p-value = 0.05 [mother] and the value of p -value=0.200 in the

newborn, the hypothesis of normality of the data The mean neonatal hemoglobin was 14.4 g/dL [9-15.3] with a standard deviation of 1.73. The mean hemoglobin of the mothers participating in the study was 12 g/dL [9-15] with a standard deviation of 1.1. According to p-value=0.032 [p <0.05], it can be said that there is a statistically significant relationship between hemoglobin and maternal and neonatal levels. [Pearson Correlation=0.208]. The normality of maternal age data was checked by Kolmogorov-Smirnov test and according to the value of p-value=0.089 [mother], the hypothesis of normality of the data is confirmed. The average age of mothers is 27.11 years [16 - 40] with a standard deviation of 3.5 which according to the table and the amount of p-value=0.116 [p>0.05] can be said that there is a statistically significant relationship between the amount of hemoglobin in infants and maternal age There is no case study. [Pearson correlation=0.153]

Table 1 Evaluation of the relationship between hemoglobin level of neonatal blood based on maternal pregnancy rank

Infant HG	SD	Mean	N
First pregnancy	1.50	14.02	38
Second pregnancy	1.45	14.85	40
Third pregnancy	2.55	14.96	31
Fourth pregnancy	0.59	14.01	3
Fifth pregnancy	----	16.98	1

According to the table and the amount of p-value = 0.926 [p> 0.05], it can be said that there is no statistically significant relationship between the amount of neonatal hemoglobin and pregnancy rank of the studied mothers [spearman correlation=0.009] The normality of neonatal weight data was checked by Kolmogorov-Smirnov test and according to the value of p-value =0.200 [mother], the hypothesis of data normality is confirmed. The mean weight of the neonates participating in the study was 3276.2 grams [2200-4200] with a standard deviation of 377.34. According to p-value=0.257 [p>0.05], it can be said that there is no statistically significant relationship between neonatal hemoglobin and neonatal weight. Considering the p-value = 0.581 [p> 0.05], it can be said that the difference between the mean neonatal hemoglobin levels in the two groups based on neonatal sex is not statistically significant. Among the 107 children participating, 56 One was born by cesarean section and 51 were born by normal delivery.

According to the p-value = 0.360 [p> 0.05], it can be said that the difference between the mean hemoglobin levels of the neonates in the two groups was based on the type of delivery. Mothers are not statistically significant. The mean MCV in mothers was 83.75 femtoliters [18-95] with a standard deviation of 5.82, but in infants this mean was 102.18 femtoliters [92-115]. The standard deviation was 4.69 which according to p-value =0.503 [p> 0.05] it can be said that there is no statistically significant relationship between maternal MCV and MCV of neonates studied. The mean MCH of mothers was 28.06 pg / cell [19.3 - 19.9] with standard deviation of 2.59 and the mean of neonates was 34.80 pg / cell [23.50 - 35.3] with standard deviation of 2.41. This can be said according to the p-value=0.30 [p>0.05] There is no statistically significant relationship between maternal MCH and neonatal MCH of neonates. Liter [26.8 - 36.6] with a standard deviation of 1.97 which according to the p-value=0.178 [p>0.05] can be said that there is a statistically significant relationship between the amount of MCHC There are no mothers and MCHC levels of the studied infants.

Discussion

In this study, there was no case of bleeding around childbirth, so although it has not been studied in the mentioned goals, it has not been studied in similar studies. In this study, a total of 107 pregnant mothers were studied, of which 11 were under 20 years old, 33 were 25-21 years old, 31 were 26-30 years old and 32 were over 31 years old, but according to P = 0.269 It can be said that the relationship between the mean hemoglobin level of the neonates in the study with the age groups of the mothers was not statistically significant. The mean age of the mothers was 27.11±5.30 [range 16-40] and the mean neonatal hemoglobin was 14.4±1.73, which again showed a statistically significant relationship between the two [8, 9]. In a similar study, the mean neonatal hemoglobin was 13.24 ±1.77 and the mean neonatal hemoglobin in our study was higher than 1 mg / dl. Among the mothers studied, the pregnancies were in the first 36, 38 second, 30 third, 2 fourth and only one fifth. However, the mean neonatal hemoglobin showed a significant relationship with the maternal pregnancy rank [10, 11]. The mean weight of the neonates was 3276.377 ±34.34 [limited = 4200-2200] g. None of the weight or mean weight groups showed a significant relationship with hemoglobin level. In a similar study by Dr. Ma'mouri, as in our study, there was no statistically significant relationship between umbilical cord hemoglobin and birth weight and birth rank [12]. In one study, however, maternal

hypoglycemia was associated with weight gain at birth and gestational age [4]. In another study, however, a significant association was found between maternal calcium deficiency and low birth weight. In our study, there were 50 male and 57 female infants, which again did not show a statistically significant relationship between the sex of the infant and his hemoglobin level. This relationship was not studied in any study [13-15]. In a similar study, unlike our study, the neonates, especially those born by cesarean section, were exposed to early and exacerbated physiological anemia. In our study, the mean MCV of mothers and neonates was 83.75 ±5.82 [range 64.3 to 10.8] and 102.18 ±4.69 [range 110.2-88.9], respectively. No significant difference was observed between the MCV levels of the two groups. The mean MCH rate of mothers and infants was 28.06 ±2.59 and 34.80 ±2.41, respectively, which was not significant [p = 0.3] and also the mean MCHC relationship [16-18]. Mothers [33.35 ±1.53] and infants [33.88 ±1.97] were not significant. But a significant relationship was found between the mean hemoglobin of mothers [12 ± 1.10, range: 9-15] and neonates [14.4 ± 1.73, range: 9 -18.3] [19-21]. Contrary to our study in another study, no correlation was found between maternal and infant hemoglobin, but most infants with umbilical cord hemoglobin less than 14 gr / dl were born to mothers with hemoglobin less than 11 gr / dl. Perhaps this difference in the conclusions of the two studies is due to the sampling of Dr. Mosouri [22] [infants with birth weight over 2500 g and gestational age more than 37 weeks] because he has limited the research sample in the neonatal group and the possibility of hemoglobin disorder in this group Infants are reduced [23-25]. But in another study, like our study [26], there was a significant and direct relationship between maternal and infant hemoglobin, so that with decreasing maternal hemoglobin, the infant's hemoglobin decreased [27-29].

Conclusion

In this study, it was found that maternal serum hemoglobin level and neonatal umbilical cord hemoglobin were significantly related to each other. However, other parameters such as maternal age, pregnancy rank, infant weight, neonatal sex, delivery method did not show a significant relationship with umbilical cord hemoglobin level. There was also no significant relationship between MCV and MCHC levels of mothers and infants.

References

1. AM. Fard, MM. Fard, Eurasian Journal of Science and Technology, 2:14 (2022)
2. S. Saedi, A. Saedi, MM. Ghaemi, M. Milani Fard, Eurasian Journal of Science and Technology, 2:233 (2022)
3. R. Alimoradzadeh, H. Mirmiranpour, P. Hashemi, S. Pezeshki, SS. Salehi, Journal of Neurology & Neurophysiology, 10:1 (2019)
4. R. Alimoradzadeh, MA. Abbasi, F. Zabihi, H. Mirmiranpour, Iranian Journal of Ageing, 15:524 (2021)
5. MB. Abhari, PF. Afshar, R. Alimoradzadeh, H. Mirmiranpour, Immunopathologia Persa, 6: e10 (2019)
6. F. Zabihi, MA. Abbasi, R. Alimoradzadeh, Annals of the Romanian Society for Cell Biology, 1: 2573 (2019)
7. R. Alimoradzadeh, MA. Abbasi, F. Zabihi, H. Mirmiranpour, Iranian Journal of Ageing, 15:8 (2021)
8. F. Fu, J. Lou, D. Xi, Y. Bai, G. Ma, B. Zhao, D. Liu, G. Bao, Z. Lei, M. Wang, Eur. Radiol., 30:5489 (2020)
9. C.R. Jutzeler, L. Bourguignon, C.V. Weis, B. Tong, C. Wong, B. Rieck, H. Pargger, S. Tschudin-Sutter, A. Egli, K. Borgwardt, M. Walter, Travel medicine and infectious disease, 37:101825 (2020)
10. F.E. Sadr, Z. Abadi, N.E. Sadr, M.M. Fard, Annals of the Romanian Society for Cell Biology, 25: 6839 (2021)
11. K. Ghajarzadeh, M.M. Fard, H. Alizadeh Otaghvar, S.H.R. Faiz, A. Dabbagh, M. Mohseni, S.S. Kashani, A.M.M. Fard, M.R. Alebouyeh, Annals of the Romanian Society for Cell Biology, 25:2457 (2021)
12. K. Ghajarzadeh, M.M. Fard, H. Alizadeh Otaghvar, S.H.R. Faiz, A. Dabbagh, M. Mohseni, S.S. Kashani, A.M.M. Fard, M.R. Alebouyeh, Annals of the Romanian Society for Cell Biology, 25:2449 (2021)
13. K. Ghajarzadeh, M.M. Fard, M.R. Alebouyeh, H. Alizadeh Otaghvar, A. Dabbagh, M. Mohseni, S.S. Kashani, A.M.M. Fard, S.H.R. Faiz, Annals of the Romanian Society for Cell Biology, 25: 2466 (2021)

14. M. Carotti, F. Salaffi, P. Sarzi-Puttini, A. Agostini, A. Borgheresi, D. Minorati, M. Galli, D. Marotto, A. Giovagnoni, La Radiologia Medica., 125:636 (2020)
15. R. Alimoradzadeh, H. Mirmiranpour, P. Hashemi, S. Pezeshki, S.S. Salehi, J. Neurology Neurophys., 10:1 (2019)
16. R. Alimoradzadeh, M. Mokhtare, S. Agah, Iran. J. Age., 12:78 (2017)
17. S. Etemadi, B. Mahmoodiyeh, S. Rajabi, A. Kamali, M.M. fard, Ann. Romanian Soc. Cell Biol., 25:2417 (2021)
18. S. Saedi, A. Saedi, MM. Ghaemi, M. Milani Fard, Eurasian Journal of Science and Technology, 2:180 (2021)
19. A. Firoozfar, M. Dousti, Magazine of Civil Engineering, 90:119 (2019)
20. B. Ebadian, A. Fathi, S. Khodadad, International Journal of Dentistry., 2021:1 (2021)
21. B. Ebadian, A. Fathi, M. Savoj, International Journal of Dentistry., 2021:1 (2021)
22. *B. Barakati, R. Khodadadi, P. Asadi, A. Fathi, Turkish Onilne Journal of Qualitative Inquiry., 12:11401 (2021)*
23. *SM. Monajem Zade, M. Elyaskhil, A. Fathi, SM. Asadinejad, Turkish Online Journal of Qualitative Inquiry., 12:5715 (2021)*
24. AH. Ashtiani, N. Mardasi, A. Fathi, The Journal of Prosthetic Dentistry., 126:803 (2021)
25. A. Fathi, R. Giti, M. Farzin, Annals of Dental Specialty., 6:338 (2018)
26. A. Fathi, M. Farzin, R. Giti, MH. Kalantari, The Journal of prosthetic dentistry., 122:565 (2019)
27. E. Ghasemi, AH. Fathi, S. Parvizinia, Journal of Iranian Dental Association., 31:169 (2019)
28. R. Monirifard, M. Abolhasani, B. Tahani, A. Fathi, A. Choobdaran., Journal of Iranian Dental Association., 31:182 (2019)
29. M. Abolhasani, P. Givehchian, A. Fathi, S. Goudarzi., Journal of Iranian Dental Association., 33:17 (2021)

How to Cite This Article

Bahman Naghipour, Solmaz Fakhari, **"Evaluation of the relationship between maternal hemoglobin and umbilical cord hemoglobin level in term neonates after spinal anesthesia",** International Journal of New Chemistry., 2022; DOI: 10.22034/ijnc.2022.4.5.