

Infants of Diabetic Mothers: A Contraindication for Delayed Cord Clamping?  
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**Abstract**

*Background:* Delayed cord clamping (DCC) greater than thirty seconds is a widely recommended practice that increases hemoglobin and iron levels, assists in the postnatal transition, and improves immunologic status in all infants. In addition, preterm infants have a reduced need for transfusion and a decrease in morbidity and mortality. Polycythemia and hyperbilirubinemia from the breakdown of these red blood cells is a risk in all infants after DCC due to the transfusion of more red blood cells. It is thought to be a greater risk in infants of diabetic mothers because of an increase in the differentiation of hematopoietic stem cells to erythroid progenitor cells within the cord blood.

*Materials and Methods:* A literature review was performed using PubMed, CINAHL, and Scopus databases. Studies were included if they involved term or preterm infants of mothers with type 1, type 2, or gestational diabetes and if they assessed outcomes related to DCC greater than thirty seconds. Six articles met the inclusion criteria: three randomized control trials, two retrospective studies, and one mixed-methods study. Due to a limited number of studies from the past five years that included implications of DCC on hyperbilirubinemia, the search window was expanded from the past five years to the past ten years. Outdated hyperbilirubinemia guideline use, different international guidelines for hyperbilirubinemia management, and inconsistencies in maternal diabetes diagnosis and management were some of the limitations of this review.

*Results:* Three of the six studies described an increase in hyperbilirubinemia with DCC, however all of these studies discussed the ability to control this increase in hyperbilirubinemia with phototherapy. No study demonstrated a statistically significant increase in adverse outcomes of hyperbilirubinemia such as kernicterus or the need for an exchange transfusion. DCC in infants of diabetic mothers was associated with several benefits, including decreased risk of hypoglycemia, reduced NICU admissions, and improved respiratory outcomes, especially in preterm infants. These findings suggest that the benefits of DCC in infants of diabetic mothers may outweigh the risks when careful monitoring is implemented.

*Conclusions:* While DCC may increase the risk of hyperbilirubinemia in infants of diabetic mothers, the condition is typically manageable with early detection and treatment using phototherapy. Nurses and nurse practitioners in delivery centers play a critical role in discussions of DCC plans, monitoring infant status at birth to determine whether early cord clamping is necessary, and to advocate for timely bilirubin screening. Given the numerous benefits of DCC, especially in preterm infants, it should not be universally contraindicated in infants of diabetic mothers. Instead, individualized risk assessment, observation, and proactive education on signs of jaundice and follow-up care are essential to safe implementation.

*Keywords:* Delayed cord clamping, infants of diabetic mothers, hyperbilirubinemia, phototherapy, bilirubin monitoring, neonatal nursing care, infant delivery room care

## References

- Abdelmaksoud, S. R., Abdelraziq, H. E., khashaba, R. A., & Diab, A. M. (2021). Delayed cord clamping in infants of diabetic mothers: Laboratory and clinical outcomes. *Journal of Child Science*, 11(01).  
<https://doi.org/10.1055/s-0041-1726460>
- Bennett, C., Munoz, J. L., Yao, M., & Singh, K. (2021). Effects of delayed cord clamping on neonatal hyperbilirubinemia in pre-gestational diabetes at term. *The Journal of Maternal-Fetal & Neonatal Medicine*, 35(25), 7267–7275. <https://doi.org/10.1080/14767058.2021.1946785>
- Brown, B. E., Shah, P. S., Afifi, J. K., Sherlock, R. L., Adie, M. A., Monterrosa, L. A., Crane, J. M., Ye, X. Y., El-Naggar, W. I., Canadian Neonatal Network, & Canadian Preterm Birth Network Investigators (2022). Delayed cord clamping in small for gestational age preterm infants. *American Journal of Obstetrics and Gynecology*, 226(2), 247.e1–247.e10. <https://doi.org/10.1016/j.ajog.2021.08.003>
- Bruckner, M., Katheria, A. C., & Schmölzer, G. M. (2021). Delayed cord clamping in healthy term infants: More harm or good?. *Seminars in Fetal & Neonatal Medicine*, 26(2), 101221.  
<https://doi.org/10.1016/j.siny.2021.101221>
- Enyinna, K. P., Eleje, G. U., Odugu, B. U., Nevo, C. O., Ofor, I. J., Mbachu, I. I., Eze, C. C., Okoh, D. S., Ikwuka, D. C., Awkadiwe, F. I., Okafor, C. C., Malachy, D. E., Ortuanya, K. E., Eze, H. T., Okoro, C. C., & Okafor, C. G. (2024). Impact of early versus delayed umbilical cord clamping on term neonates' haemoglobin levels: a randomized controlled trial. *The Journal of International Medical Research*, 52(6), 3000605241255836. <https://doi.org/10.1177/03000605241255836>
- Korkut, S., Oğuz, Y., Bozkaya, D., Türkmen, G. G., Kara, Ö., Uygur, D., & Oğuz, Ş. S. (2019). Evaluation of the effects of delayed cord clamping in infants of diabetic mothers. *American Journal of Perinatology*, 38(03), 242–247. <https://doi.org/10.1055/s-0039-1695799>
- Kotzen, M., Dhudasia, M., Mukhopadhyay, S., Flannery, D., Durnwald, C., & Dolin, C. D. (2021). 898 delayed cord clamping does not increase need for phototherapy in infants of women with diabetes. *American Journal of Obstetrics and Gynecology*, 224(2). <https://doi.org/10.1016/j.ajog.2020.12.921>
- Liyanage, S. K., Ninan, K., & McDonald, S. D. (2020). Guidelines on Deferred Cord Clamping and Cord Milking: A Systematic Review. *Pediatrics*, 146(5), e20201429. <https://doi.org/10.1542/peds.2020-1429>

- Mascola, M. A., Porter, T. F., & Chao, T. T.-M. (2020). Delayed umbilical cord clamping after birth, committee opinion. *Obstetrics & Gynecology*, 136(6). <https://doi.org/10.1097/aog.0000000000004167>
- Padilla-Sánchez, C., Baixauli-Alacreu, S., Cañada-Martínez, A. J., Solaz-García, Á., Alemany-Anchel, M. J., & Vento, M. (2020). Delayed vs immediate cord clamping changes oxygen saturation and heart rate patterns in the first minutes after birth. *The Journal of Pediatrics*, 227, 149–156.e1. <https://doi.org/10.1016/j.jpeds.2020.07.045>
- Pan, S., Lu, Q., Lan, Y., Peng, L., Yu, X., & Hua, Y. (2022). Differential effects of later cord clamping on bilirubin levels in normal and diabetic pregnancies. *European Journal of Pediatrics*. <https://doi.org/10.21203/rs.3.rs-1329606/v1>
- Quinn, M. K., Katheria, A., Bennett, M., Lu, T., & Lee, H. (2024). Delayed cord clamping uptake and outcomes for infants born very preterm in California. *American Journal of Perinatology*, 41(S 01), e981–e987. <https://doi.org/10.1055/a-1975-4607>
- Shao, H., Qian, Y., Gao, S., Dai, D., & Hua, Y. (2021). Effect of delayed cord clamping on jaundice and hypoglycemia in the neonates of mothers with gestational diabetes mellitus. *International Journal of Gynecology & Obstetrics*, 156(1), 77–81. <https://doi.org/10.1002/ijgo.13615>
- Zhang, L., Zhang, Y., Wei, L., Tian, D., Zhao, D., & Yang, L. (2024). Gestational diabetes mellitus affects the differentiation of hematopoietic stem cells in neonatal umbilical cord blood. *Archives of Gynecology and Obstetrics*, 310(2), 1109–1119. <https://doi.org/10.1007/s00404-024-07513-2>