

Title: Evaluation of expression of EGR2 gene in term low birth weight newborns: A Genetic Marker

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INTRODUCTION

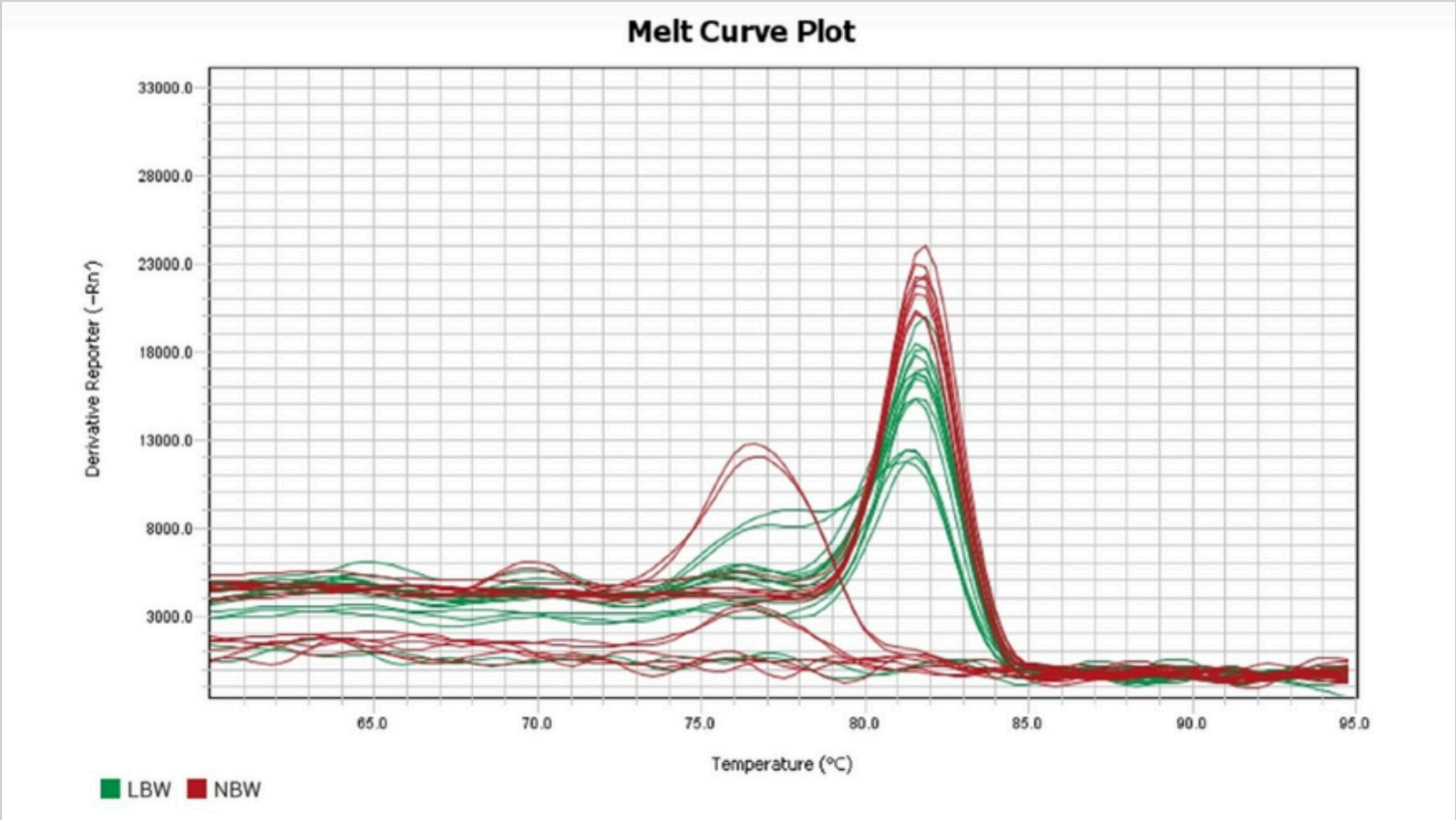
The expression of the EGR2 gene is crucial in acting as a pivotal regulator of T-cell function and immune responses, exerting significant impacts on various aspects of immune-related conditions. The versatile functions of EGR2 not only encompass the maintenance of tolerance to self-antigens but also include the orchestration of T-cell activation and proliferation, in addition to shaping the progression of autoimmune disorders. Within the realm of immune tolerance, EGR2 assumes a central role in safeguarding self-tolerance by finely tuning T-cell reactions towards self-antigens. Its regulatory mechanisms extend further to the management of T-cell activation and expansion, thereby influencing the intricate equilibrium between immune activation and regulation.

AIM OF STUDY

To evaluate the role of expression of EGR2 Gene in Term LBW Newborns and to study the various risk factor for LBW Newborns. This study, titled "Evaluation of the Expression of the EGR2 Gene in Term Low Birth Weight Newborns," was conducted as a prospective observational study. The primary objectives were to evaluate the role of the EGR2 gene in term low birth weight (LBW) newborns and to identify various risk factors associated with LBW.

RESULT

The RNA from the cord blood samples of 21 LBW and 21 NBW newborns were amplified for the egr2 gene using real-time PCR. The expression of the egr2 gene in term LBW and NBW newborns was represented as fold change ($2^{-\Delta\Delta Ct}$), where $\Delta Ct = Ct \text{ (target gene)} - Ct \text{ (beta-actin)}$ and $\Delta\Delta Ct = \Delta Ct \text{ (LBW)} - \Delta Ct \text{ (NBW)}$. β -actin, a house-keeping gene was used as an internal control. The amplification plot and melt curve were also checked for all samples. Fold change of egr2 expression was found to be statistically significant in LBW vs NBW newborns ($p = 0.0048$).



Melt curve plot represents the derivative reporter values ($-Rn'$) against temperature for evaluating the expression of the EGR2 gene in term low birth weight (LBW) newborns (green curves) and normal birth weight (NBW) newborns (red curves). The distinct peaks around 80°C indicate the melting temperatures (T_m) of the amplified products, confirming the presence of specific PCR products for EGR2 in both groups. The similarity in peak profiles between LBW and NBW groups suggests that the EGR2 gene expression produces a consistent and specific product in both sample sets. However, any subtle differences in peak heights or positions could indicate variations in the expression levels or product purity between the two groups. Overall, the melt curve analysis supports the specificity of the PCR amplification and suggests that EGR2 is expressed in both LBW and NBW newborns.

EGR2 Gene Expression: Higher EGR2 gene expression was observed in NBW newborns compared to LBW newborns, indicating a potential regulatory role of this gene in fetal growth and development.

CONCLUSION

This study underscores the importance of comprehensive prenatal and postnatal care to manage and mitigate the risks associated with low birth weight. By focusing on both genetic and environmental factors, healthcare providers can develop more effective strategies to ensure healthy outcomes for all newborns. The results were statistically significant hence this concludes that there is low expression of EGR2 gene in low-birth-weight babies which may lead to low immunity in LBW babies.