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# Potential Role of Asymmetric Dimethylarginine as a Diagnostic Biomarker in Low-Birth-Weight Infants: A Systemic Review

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**ABSTRACT**

**Introduction:** Asymmetric dimethylarginine (ADMA) inhibits nitric oxide synthase (NOS), causing vessel constriction and endothelial dysfunction. Increased ADMA levels in preeclampsia impair nitric oxide production, resulting in restricted fetal growth and lower birth weights (LBW). Conversely, reduced ADMA levels in small-for-gestational-age (SGA) pregnancies indicate compromised placental blood flow. This review underscores the importance of ADMA in LBW infants, supporting the potential for early diagnosis and management strategies.

**Search Strategy:** According to the PRISMA guideline, in this systematic review, a comprehensive search of PubMed, Scopus, Web of Science, and Google Scholar was conducted using the keywords "dimethylarginine", "asymmetric dimethylarginine", "low birth weight", "nitric oxide", and their related words without time limitation. The inclusion criteria covered observational studies examining ADMA serum levels to diagnose LBW and premature infants in pregnant women with preeclampsia and other complications compared to healthy pregnancies. Exclusion criteria included review articles, cell/animal studies, conference papers, and editor letters. Screening and data extraction were independently performed by two authors, with discrepancies resolved by a third author. The Newcastle-Ottawa scale assessed study bias, and the final data were presented in a results table.

**Results:** Among 2,200 initial studies, 1,991 were excluded due to duplication and lack of relevance, leaving only nine studies, including one each of case-control, experimental, and laboratory studies and two each of cohorts, cross-sectional study, and data analysis. The results showed that elevated ADMA levels play a crucial role in preeclampsia and are associated with LBW and adverse short-term outcomes, highlighting the significance of ADMA in neonatal health. In preeclampsia, maternal plasma ADMA concentrations were significantly higher, suggesting its potential as a biomarker. Conversely, lower ADMA levels in SGA pregnancies were observed, possibly linked to impaired placental blood flow and restricted fetal growth.

**Conclusion and Discussion:** This review explores the relationship between ADMA levels and LBW in preterm infants, proposing ADMA as a potential diagnostic biomarker for at-risk infants. High ADMA levels in preeclampsia disrupt nitric oxide production, leading to endothelial dysfunction and decreased fetal growth. On the other hand, reduced ADMA levels in SGA pregnancies suggest compromised placental blood flow, resulting in limited fetal growth. Further research is needed to examine the role of monitoring ADMA levels in aiding the early prediction and management of preeclampsia and impaired placental blood flow.

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