

BRIEF REPORT

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Correlation Between Waist:Height Ratio and Serum Nitric Oxide Level in Children with Atopic Dermatitis

Abstract: Atopic dermatitis (AD) is the most common chronic inflammatory disease of early childhood. This study shows that nitric oxide levels positively correlate with the clinical severity of AD, waist:height ratio, and weight.

The pathogenesis of atopic dermatitis (AD) is multifactorial and has been attributed to the interaction between the environment, host susceptibility genes, altered skin barrier function, the immune system, and pruritus. Some evidence indicates that oxidative stress may also mediate it. The aim of the present study was to determine the possible correlation between central obesity, nitric oxide (NO) level, and the clinical severity of AD in children (as expressed according

to the SCORing Atopic Dermatitis [SCORAD] index). This study was conducted on 60 children, ages 2 to 18 years, divided into two groups: 40 patients with AD (group I) and 20 age- and sex-matched healthy controls (group II). Clinical examinations were performed, serum NO levels were estimated using enzyme-linked immunosorbent assay, and anthropometric measurements (waist:height ratio [WtHR], weight, and central obesity) were made. Bivariate analysis showed that serum NO levels were significantly higher in individuals with AD than in controls (Fig. 1). There was also a significant positive correlation between NO levels and the clinical severity of AD. A moderate direct correlation between NO and both WtHR (Fig. 2) and weight were found. There were statistically significant differences between the groups in weight and WHtR. A logistic regression model was developed to determine the independent predictors of AD. Only NO significantly contributed to the model. WtHR was not significantly associated with AD if NO levels were controlled for.

DISCUSSION

In the current study, high NO levels in individuals with AD indicate that NO plays a major role in the

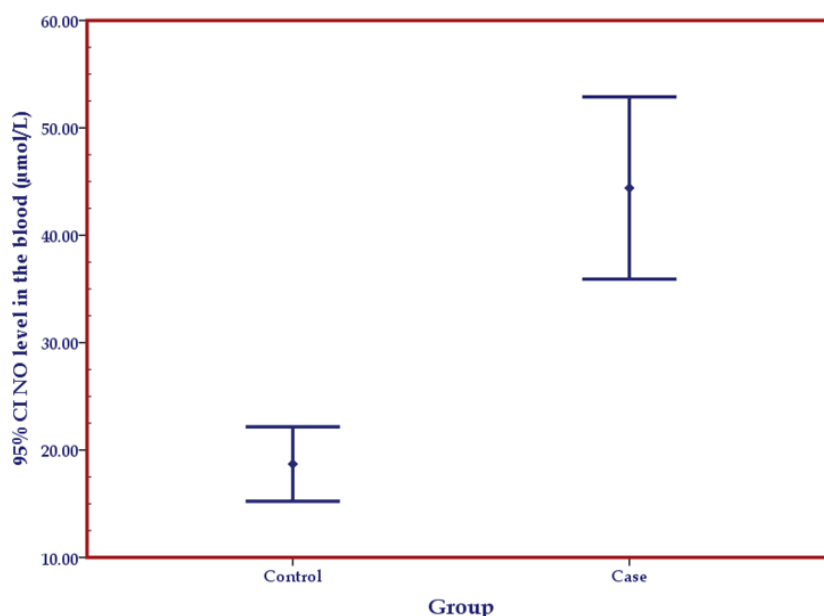


Figure 1. Error bar compares nitric oxide (NO) levels in the blood ($\mu\text{mol/L}$) between the two studied groups.

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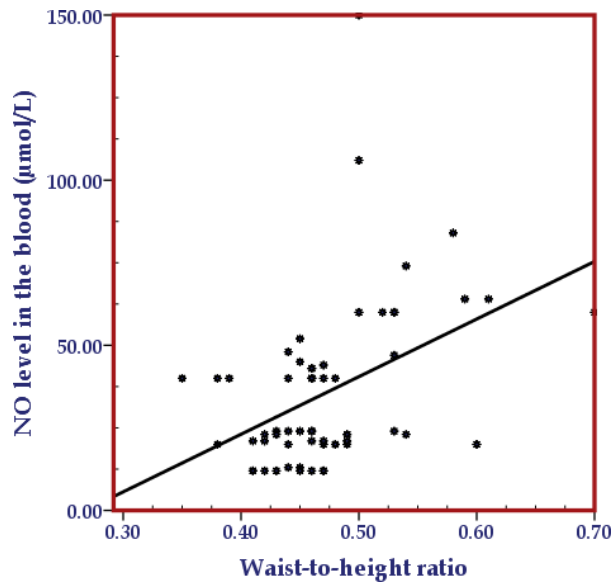


Figure 2. Scatter plot shows the correlation between waist:height ratio and nitric oxide levels in the blood ($\mu\text{mol/L}$) in the patient group.

pathophysiology of AD. It can also be used as a marker of disease severity and nitrosative damage in AD. Researchers have suggested multiple sources for excess NO in individuals with AD. Some scientists have focused on the intense infiltration of lymphocytes, monocytes, and eosinophils, which release pro-inflammatory cytokines, reactive oxygen species, and peroxynitrite upon stimulation. Others have proposed impaired homeostasis of oxygen and nitrogen radicals in individuals with AD (1). In the present study, serum NO levels were positively correlated with WtHR and weight status category. This may be due to oxidative stress that accompanies infiltration of adipose tissue by immune cells as well as the effect of inflammatory adipokines, tumor necrosis factor α and interleukin 6, both of which are implicated in obesity-related disorders (2). Every unit increase in blood NO level was associated with a significant

increase in the odds of AD (adjusted odds ratio 1.16, 95% confidence interval 1.06, 1.27). A high WtHR was not significantly associated with AD if the NO level was controlled for, which indicates that NO is an independent risk factor for AD, whereas central obesity is not, although there was a moderate direct correlation between NO and WtHR as well as between NO and weight status category. Hence central obesity might affect AD indirectly through mediating oxidative stress-derived inflammation in which NO, one of the proinflammatory mediators, can play a role.

CONCLUSIONS

High WtHR is an important risk factor for AD, most probably through high NO levels. Early intervention with weight loss might decrease the risk of oxidative stress and subsequently that of AD in children.

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