PREDICTORS OF ARTERIAL HYPERTENSION IN WOMEN OF REPRODUCTIVE AGE

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Introduction. Arterial hypertension (AH) continues to be one of the most pressing health concerns worldwide and is particularly significant among women of reproductive age[8]. In this population, the interaction between hormonal status, metabolic disturbances, and endothelial function plays a central role in disease development and progression [2,5]. Despite advances in research, the contribution of endothelin-1 (ET-1)—a potent vasoconstrictor peptide—to the onset of hypertension in this group has not been sufficiently explored. Endothelial dysfunction, characterized by an imbalance between vasodilators and vasoconstrictors, contributes to persistent increases in vascular tone. Reduced nitric oxide (NO) activity, combined with elevated ET-1 levels, may accelerate these changes and predispose women to early cardiovascular complications [4,9].

The aim of this study was to evaluate the role of ET-1, together with selected metabolic parameters such as glucose, cholesterol, and body mass index (BMI), in the development of hypertension in women of reproductive age, and to determine their potential use as predictive markers of vascular risk [1].

Materials and Methods.Study Population:

This cross-sectional study involved **172 women of reproductive age (20–49 years)** who attended outpatient clinics in the Bukhara region. Participants were divided into five age groups to facilitate comparative analysis:

- 20–29 years (n = 16)
- 30–34 years (n = 20)
- 35–39 years (n = 26)
- 40–44 years (n = 48)
- 45–49 years (n = 62)

Clinical and Laboratory Assessment: Each participant underwent a standardized clinical examination, including blood pressure measurement using validated automated devices, anthropometric evaluation (height, weight, BMI), and resting electrocardiography. Blood samples were collected after overnight fasting to assess plasma glucose, total cholesterol, and ET-1 levels. Glucose and cholesterol concentrations were determined by enzymatic colorimetric assays, while ET-1 was quantified using enzyme-linked immunosorbent assay (ELISA).

Statistical Analysis: Data processing was carried out using SPSS software. Descriptive statistics were applied to summarize demographic and clinical variables. ANOVA with post-hoc testing was used to compare biochemical parameters across age groups. Pearson correlation coefficients were calculated to evaluate associations between ET-1 and blood pressure. Multiple regression analysis identified independent predictors of hypertension, while the predictive capacity of ET-1 was tested using receiver operating characteristic (ROC) curve analysis. Statistical significance was set at $p < 0.05$.

Results.Age-related patterns:

The study demonstrated distinct age-related changes in vascular and metabolic parameters.**Endothelin-1 (ET-1):** Concentrations rose steadily with age, increasing from **4.2 pg/mL in the 20–29 age group** to **5.8 pg/mL in the 45–49 group** ($p < 0.001$).

Glucose: Mean fasting glucose showed a parallel rise, ranging from **5.1 mmol/L in the youngest group** to **6.9 mmol/L in the oldest** ($p < 0.001$).

Cholesterol: No significant variation was observed between groups, with mean levels fluctuating slightly between 6.2 and 6.4 mmol/L.

BMI: BMI values tended to be higher in older women, though their independent contribution to hypertension risk was limited.

Correlation and predictive modeling: Correlation analysis revealed a strong positive association between ET-1 and both systolic and diastolic blood pressure ($r = 0.56$, $p < 0.001$). Regression modeling confirmed ET-1 as the most influential predictor of hypertension ($\beta = +7.45$, $p < 0.001$). BMI contributed modestly ($\beta = +0.71$, $p = 0.04$), while glucose and cholesterol did not retain independent significance ($p > 0.05$). ROC analysis demonstrated high discriminative accuracy for ET-1, with an AUC of 0.95, indicating its strong potential as a diagnostic marker.

Discussion. The results emphasize that ET-1 is not only elevated with advancing age in women of reproductive age but also serves as a reliable indicator of increased blood pressure. Unlike cholesterol and glucose, which exhibited weak or no predictive value, ET-1 demonstrated both strong correlations and high diagnostic accuracy. These findings are consistent with global evidence on the role of endothelial dysfunction in the pathogenesis of cardiovascular diseases.

Monitoring ET-1 levels could allow clinicians to identify women at high risk of developing hypertension before the condition becomes clinically apparent. Early detection would enable targeted preventive measures, including lifestyle

interventions such as dietary modification, increased physical activity, and weight control, along with pharmacological approaches aimed at improving endothelial function.

The data also underscore the need for further investigation into the molecular mechanisms regulating ET-1 production and activity. Exploring therapeutic strategies that directly modulate ET-1 may open new opportunities for the prevention and management of hypertension in women during their reproductive years.

Conclusion.ET-1 plays a central role in the pathophysiology of hypertension among women of reproductive age. Its consistent rise with age, strong correlation with blood pressure, and excellent predictive accuracy highlight its potential as a biomarker for early diagnosis and risk stratification. Incorporating ET-1 monitoring into routine clinical practice, alongside metabolic evaluation and lifestyle management, may significantly improve preventive strategies and reduce long-term cardiovascular risks in this vulnerable population.

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