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Topic: Atopic dermatitis/ Eczema

Antimicrobial Peptides as Biomarkers for Predicting Treatment Response in Moderate to Severe Atopic Dermatitis: A Prospective Cohort Study

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Introduction
Identifying biomarkers in atopic dermatitis (AD) is crucial for advancing personalized medicine. Antimicrobial peptides (AMPs) represent first line of defense against pathogens in the skin, and both innate and adaptive immune system influences their expression in the host. This study evaluates whether certain change in AMP expressions can be used as a predictor of therapeutic response in patients with moderate to severe AD.

To assess the potential of dermcidin, human β-defensin-2 (HBD-2), and human β-defensin-3 (HBD-3) obtained non-invasively from tape strips as prognostic biomarkers for treatment response in AD.

Materials and Methods
Tape strips were collected from lesional and non-lesional skin at baseline and after 16 weeks of treatment in patients with moderate to severe AD receiving targeted treatment to IL-4-receptor antagonist (dupilumab), IL-13 inhibition (tralokinumab) and JAK inhibitor upadacitinib. For additional comparison, samples were obtained also from healthy controls. Levels of dermcidin, HBD-2 and HBD-3 were quantified using ELISA. Clinical scores (SCORAD, EASI, POEM, RECAP) were recorded at both time points and correlated with AMP concentrations. Paired t-tests, Pearsons or Spearmans correlation and binominal logistic regression were used for statistical analysis. A p-value <0.05 was considered statistically significant. Treatment response is defined as EASI-75 (≥75% improvement of baseline EASI score).

Results
A total of 25 AD patients and 18 healthy controls were included in the prospective cohort study, with 48.0% and 61.1% female, 52.0% and 39.9% male participants, respectively. The mean age was 39.4 in AD patients and 41.1 years in healthy controls. After 16 weeks, all clinical scores significantly improved in AD patients. AMP levels were significantly higher in lesional versus non-lesional skin and elevated in AD patients compared to healthy controls. 16 weeks of targeted treatment with dupilumab), Tralokinumab or upadacitinib led to a significant reduction in HBD-2 and dermcidin levels, with dermcidin reaching levels comparable to healthy controls, while HBD-3 remained unchanged. No consistent correlation was observed between these AMP concentrations and clinical scores. AMP levels were not significantly associated with therapy response (EASI-75) in binomial logistic regression analyses.

Conclusions
These results indicate that tape strip-derived dermcidin, HBD-2, and HBD-3 may be useful for monitoring disease progression therapeutic response. However, they do not reliably correlate with objective or subjective disease activity and did not demonstrate prognostic value for predicting treatment response in moderate to severe AD.