

INTRACELLULAR ACIDIFICATION INDUCES NEUTROPHIL ACTIVATION IN HEMODIALYSIS PATIENTS

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BACKGROUND/AIMS: The effect of intracellular pH (pHi) on neutrophil function has not been clearly defined.

METHODS: In the current work, we used neutrophils from pre-dialysis for three groups of hemodialysis (HD) patients which were identified based on three consecutive monthly predialysis plasma bicarbonate concentrations (P_{HCO_3}) and pH values (Group A, B, and C had a predialysis P_{HCO_3} that were consistently ≤ 21 , between 21 and 26 and ≥ 26 mmol/L, respectively.) and from age-, sex-matched healthy controls to determine pHi, apoptosis, phagocytosis, oxidative burst reaction and expressions of CD11b, CD18, CD14 and toll-like receptor (TLR) 2 and 4 in vivo. We also investigated the effect of intracellular acidification on neutrophils by in vitro methods.

RESULTS: We found that HD patients in Group A have lower pHi compared with patients in Group B and C. In addition, significantly delayed apoptosis, enhanced phagocytosis, increased oxidative burst reaction for and expression of CD11b/CD18 on neutrophils were found in Group A when compared with those for Group B and C. Moreover, in vitro studies demonstrated that pHi correlates positively with apoptosis, whereas it correlates negatively with phagocytosis, oxidative burst reaction for and expression of CD11b/CD18 on neutrophils.

DISCUSSION/CONCLUSIONS: In conclusion, HD patients having lower P_{HCO_3} had lower pHi and this intracellular acidification may contribute to the delayed neutrophil apoptosis, enhanced phagocytosis, increased oxidative burst reaction for and expression of CD11b/CD18 on neutrophils when compared with those with normal pHi (~ 7.25).

Key words: apoptosis, hemodialysis, intracellular pH, neutrophil, phagocytosis