Intracellular acidification enhances neutrophil phagocytosis in chronic haemodialysis patients: possible role of CD11b/CD18

許永和

Lin CS

摘要

Abstract

Background. We have demonstrated that uraemic neutrophils that exhibit a low intracellular pH (pHi) display enhanced phagocytosis. However, the underlying cellular mechanism is unclear. Methods. We used neutrophils from three groups of haemodialysis (HD) patients before dialysis (Groups A, B and C) and also from age- and sex-matched healthy individuals to determine pHi, phagocytosis and expression of CD11b, CD18, CD14 and toll-like receptors (TLR)-2 and TLR-4. The patients were categorized based on three consecutive monthly pre-dialysis plasma bicarbonate concentrations(PHCO3) and pH values; Groups A, B and C had a constant pre-dialysis PHCO3 of ≤21, 21-26 and ≥26 mmol/L (mEq/L), respectively. We also studied the effects induced by the correction of metabolic acidosis and monoclonal antibodies (mAbs) against CD11b/CD18 on neutrophils in Group A. Furthermore, we investigated the effect of intracellular acidification on uraemic neutrophils ex vivo. Results. We observed that the neutrophils in Group A exhibited significantly increased phagocytosis and expression of CD11b/CD18 compared with those in Groups B and C. Additionally, our ex vivo studies demonstrated that the mAbs against CD 11b/CD18 partially blocked the enhancement of neutrophil phagocytosis in Group A. Moreover, the pHi of uraemic neutrophils is inversely correlated with phagocytosis and expression of CD11b/CD18. Conclusions. HD patients with a low PHCO3 exhibited low neutrophil pHi that in turn increased the expression of CDllb/CD18 compared with neutrophils with a normal or high pHi. This increased expression of CD11b/CD18 on the uraemic neutrophils may contribute to the pHi-mediated phagocytosis

.