

## 활성화된 단핵백혈구와 혈액투석환자에서의 염증의 관련성

고려대학교 안암병원 신장내과

김혜원 · 김형규 · 조원용 · 조상경 · 김명규 · 양하나 · 오세원

### Microinflammation in Hemodialysis (HD) is Related to Activated Monocytes : Possible Modification by On-line HDF

Hye Won Kim, Hyoungh Kyu Kim, Won Yong Jo, Sang Kyung Jo, Myung Gyu Kim, Ha Na Yang, Se Won Oh

Korea University Anam Hospital Nephrology

**Background :** Increased percentage of monocytes or proinflammatory CD14+ CD16+ monocytes subset has been reported in HD patients and this might contribute to chronic low grade inflammation that could also affect increased cardiovascular morbidity and mortality. Recently on line hemodiafiltration (HDF) is increasingly used for renal replacement therapy. Although Dialysis Outcomes and Practice Patterns (DOPPS) study demonstrated 35% lower mortality rate with high efficiency HDF compared to low flux conventional HD, the precise mechanism of beneficial effect of on line HDF is unknown. The purpose of this study was to evaluate the effect of on line HDF on monocytes and also on proinflammatory CD14+ CD16+ proinflammatory monocytes subset.

**Methods :** Thirty three and 9 stable end stage renal disease (ESRD) patients who were on maintenance HD or high efficiency on line HDF for more than 6 months were enrolled. Fourteen healthy subjects were served as control. Predialysis blood samples were drawn for flow cytometric detection of monocytes, or CD14+ CD16+ monocytes. Plasma cytokines as well as other laboratory, clinical parameters were also measured and compared between HD and HDF groups.

**Results :** By using intracellular cytokine staining, we identified intracellular TNF- $\alpha$  production in monocytes. Compared to healthy control subjects, percent monocytes or proinflammatory CD14+ CD16+ monocytes increased significantly in patients with HD (monocytes :  $3.51 \pm 3.02$  vs  $11.01 \pm 4.37\%$ ,  $p < 0.01$ , proinflammatory monocytes from total monocytes :  $8.95 \pm 3.5$  vs  $17.59 \pm 7.36\%$ ,  $p < 0.05$ ). Plasma TNF- $\alpha$  IL-6 or IL-8 also increased significantly. More importantly, percent monocytes in HD patients showed a significant positive correlation with CRP ( $r = 0.398$ ,  $p = 0.02$ ), but negative correlation with albumin ( $r = -0.363$ ,  $p = 0.04$ ). However, compared to patients with HD, percent monocytes or proinflammatory monocytes subset significantly decreased in patients with on line HDF (monocytes :  $11.01 \pm 4.37$  vs  $3.10 \pm 2.04$ ,  $p < 0.01$ , proinflammatory monocytes from total monocytes :  $17.59 \pm 7.36$  vs  $10.56 \pm 6.17$ ,  $p < 0.05$ ). In addition, patients with on line HDF showed better KT/V, performance score and lower  $\beta_2$ MG levels.

**Conclusion :** These data suggest that on line HDF might have beneficial effect by modulating chronic low grade inflammatory response.

**Key Words :** 혈액투석, 염증, 단핵백혈구  
Hemodialysis, Inflammation, Monocyte