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CIRCULATING CELL FREE DNA AND MITOCHONDRIAL DNA IN THE PATIENTS ON HEMODIALYSIS AND MEDICAL STAFFS DURING ISOLATION BY MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS IN KOREA

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INTRODUCTION AND AIMS: The plasma level of cell free DNA(cfDNA) and mitochondrial DNA(mtDNA) is known to be elevated under inflammatory or stress condition. At the outbreak of the Middle East Respiratory syndrome coronavirus(MERS-Cov) in 2015, hemodialysis(HD) patients and medical staffs in our center were exposed to one patient infected by MERS-Cov and isolated during 2 weeks. This study was performed to investigate clinical meaning of circulating cfDNA and mtDNA in HD patients and medical staffs during isolating period.

METHODS: Total 85 HD patients and 12 staffs were enrolled. The plasma cfDNA and mtDNA at predialysis for HD patients and morning time for medical staffs were measured by quantitative real-time PCR at 2 week, 4 week, and 16 week after isolation. Hemoglobin (Hb) and dialysis efficacy (Kt/V) of HD patients were analyzed, too.

RESULTS: The log levels of plasma cfDNA in HD patients at 2week, 4week and 16week were 2.40 ± 0.81 , 1.40 ± 0.71 , and 0.98 ± 0.51 copies/ μ L, and those of medical staffs were 2.1 ± 0.22 , 0.91 ± 0.46 , and 0.86 ± 0.40 copies/ μ L. The level of cfDNA in HD patients was recovered slowly than that of medical staffs, therefore cfDNA in HD patients was significantly higher than that of medical staffs at 4week (p value <0.05). The log levels of plasma mtDNA in HD patients at 2week, 4 week, and 16week were 4.54 ± 0.70 , 4.45 ± 0.51 , and 3.38 ± 0.55 copies/ μ L, and those of medical staffs were 4.70 ± 0.32 , 4.19 ± 0.33 , and 3.57 ± 0.32 copies/ μ L. Also, mtDNA decreased slower in HD patients, therefore mtDNA of staffs at 4week was significantly decreased compared with that at 2week, but maintained similar level in HD patients (log of mtDNA of HD patients: 2w 4.54 ± 0.70 vs. 4w 4.45 ± 0.51 , $p > 0.05$; that of Staffs: 2w 4.7 ± 0.32 vs. 4w 4.19 ± 0.33 , $p < 0.01$). The patients receiving adequate care of anemia ($Hb \geq 10g/dL$) and dialysis ($Kt/V \geq 1.2$) were 59.1% and 95.3% at 2week after isolation, however the percentage was elevated to 87.8% and 100% at 16 week.

CONCLUSIONS: Elevated circulating cfDNA and mtDNA in HD patients and medical staffs reflects extremely physical and emotional stress during isolation. However, the level of cfDNA and mtDNA was recovered late in the HD patients compared with that of medical staffs. It suggests that HD patients have been undermanaged during MERS isolation and also they have fundamentally chronic inflammation.