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OXIDATIVE DNA DAMAGE IS ELEVATED IN RENAL PATIENTS UNDERGOING HAEMODIALYSIS

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End stage renal disease (ESRD) is associated with an increase in oxidative stress, cardiovascular disease and cancer. The main treatment for ESRD, haemodialysis (HD), itself induces repetitive bouts of oxidative stress through membrane biocompatibility and endotoxin challenge. The resulting higher levels of reactive oxygen species in turn produce increased levels of oxidative DNA damage leading to genomic instability. We measured levels of oxidative DNA damage in thirty eight patients receiving HD in the Western Health and Social Services Trust (WHSCT), and 8 age and gender matched control volunteers. Volunteers gave informed consent and non-fasting morning blood samples were taken and assessed for DNA damage using the Modified Comet to identify oxidative specific damage by introduceing an enzymatic step with the bacterial enzymes endonuclease III (Endo III, recognise pyrimidine-pyrimidine breaks) and formamidepyrimidine DNA glycosilase (FPG, recognise purine-purine breaks.

The HD patients had significantly elevated levels of alkaline DNA damage (19.46 ± 8.35 vs 3.86 ± 0.99 % tail DNA, $p<0.05$) and oxidative DNA damage formamidepyrimidine DNA glycosilase (5.81 ± 6.63 vs 1.23 ± 0.39 % tail DNA, $p<0.0$) and endonuclease III (6.04 ± 6.11 vs 1.98 ± 0.85% tail DNA, $p<0.01$) compared to controls, respectively. A positive correlation was observed between the duration on dialysis (months) and levels of Endo III specific damage ($p=0.041$). We conclude, the significant increase in oxidative DNA damage and the positive correlation with duration of HD treatment and Endo III damage may contribute to the increased cancer risk observed in this patient group.

Biography

Hannon-Fletcher graduated with a 1st Class Honors from Ulster University in Biomedical Scientist (1995) with the specialties in Cellular Pathology, Haematology and Biochemistry. In 2000 she obtained a PhD from Ulster in Biomedical Sciences, with speclaisms in Oxidative Damage and Cytochrome p450 Metabolism. Mary worked in Ulster as a Researcher, Lecturer, Senior Lecturer and now Head of School in Health Sciences. She obtained her Post Graduate Certificate in Higher Education Practice in 2003 and Fellowship of the HEA 2004. Mary is a Fellow of the Institute of Biomedical Sciences (FIBMS), a Chartered Scientist, and a Registered Biomedical Scientist, HCPC.

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