Proceedings of the Nutrition Society (2011), **70 (OCE4)**, E226 doi:10.1017/S0029665111002771

Summer Meeting, 4–6 July 2011, 70th Anniversary: From plough through practice to policy

Are dietary fatty acid intakes associated with arterial stiffness and blood pressure?

M. Weech[1], K. Vafeiadou[1], R. Mihaylova[1], E. Hobby[1], P. Yaqoob[1,2], S. Todd[3], K. G. Jackson[1,2] and J. A. Lovegrove[1,2]

[1]*Department of Food and Nutritional Sciences, University of Reading, Reading, RG6 6AP, UK,* [2]*Institute of Cardiovascular and Metabolic Research (ICMR), University of Reading, Reading, RG6 6AP, UK and* [3]*Department of Mathematics and Statistics, University of Reading, Reading, RG6 6AP, UK*

CVD is the major cause of death in Western societies. Arterial stiffness is a key factor in cardiovascular physiology, reflecting the alterations to the mechanical properties of the blood vessels[(1)]. It can be measured using non-invasive techniques, including pulse wave velocity (PWV), pulse wave analysis (PWA) and digital volume pulse (DVP), and is influenced by age and hypertension. Arterial stiffness and hypertension have been shown to be positively associated with CVD events[(2,3)]. Dietary fat intake contributes to the development and progression of CVD in addition to arterial stiffness. To date only limited data is available on arterial stiffness, with reports of high-dietary intakes of SFA associated with increased stiffness, in contrast with high-dietary intakes of PUFA associated with reductions in arterial stiffness[(4)]. The aim of this study was to determine the relationships between dietary fatty acid intake and arterial stiffness and blood pressure in a group at increased risk of CVD.

Men (n 18) and women (n 37) at increased CVD risk with a mean (SD) age of 42.7 (9.7) years and BMI of 26.8 (4.6) kg/m^2 were recruited. Their habitual dietary intake was assessed by completion of 4-d weighed food diaries that were analysed using Dietplan 6 (Forestfield, Horsham). Ambulatory blood pressure monitors recorded systolic blood pressure (SBP), diastolic blood pressure and heart rate for a 24 h period. After an overnight fast, arterial stiffness (PWV, PWA and DVP) was measured. Both PWV (between the carotid and femoral arteries) and PWA (radial artery) were performed using a SphygmoCor Mx Arterial Tonometry system. For DVP, a Pulse Trace PCA2 attached to the index finger of the left hand produced the stiffness index. Bivariate correlations were determined using Spearman's correlation coefficient and a two-tailed test of significance using SPSS version 14.

Neither the intake of total fat nor the different classes of fatty acids were associated with measures of arterial stiffness or heart rate. However, there were significant negative associations between 24 h SBP and total dietary %E PUFA ($r = -0.337$, $P = 0.012$), %E $n-3$ PUFA ($r = -0.304$, $P = 0.024$) and %E $n-6$ PUFA ($r = -0.282$, $P = 0.037$). Daytime SBP was negatively related to total %E PUFA ($r = -0.281$, $P = 0.038$). Total fat, SFA and MUFA were not associated with blood pressure. In conclusion, total %E PUFA, %E $n-3$ PUFA and %E $n-6$ PUFA were associated with lower SBP in a population with an increased risk of CVD. However, randomised, controlled trials including larger sample numbers are warranted to confirm these relationships.

This work was supported by the UK Food Standards Agency (N02044).

1. Hamilton PK, Lockhart CJ, Quinn CE *et al.* (2007) *Clin Sci* **113**, 157–170.
2. Laurent S, Cockcroft J, Van Bortel L *et al.* (2006) *Eur Heart J* **27**, 2588–2605.
3. He J, Gu D, Chen J *et al.* (2009) *Lancet* **374**, 1765–1772.
4. Hall W (2009) *Nutr Res Rev* **22**, 18–38.