Dear Sirs,

Type 1 diabetes (T1D) is a well-established risk factor for the development of premature cardiovascular disease (CVD).1,2 Because children experience cardiovascular events only rarely, surrogate markers of CVD are often used to predict future risk. One such surrogate marker is the augmentation index (AI). AI is defined as the difference between the first and second peaks of the central arterial waveform, expressed as a percentage of the pulse pressure; it measures the contribution that wave reflection makes to the arterial pressure waveform. The amplitude and timing of the reflected wave depend largely on the stiffness of the small and large arteries; thus, the AI provides a measure of systemic arterial stiffness.

We previously reported an increased AI in children with T1D, which we demonstrated using radial artery tonometry and the SphygmoCor Vx version 7.01 software (AtCor Medical, Sydney, Australia).3 Recently, an alternative software package was developed to allow calculation of the AI from fingertip arterial tonometry probes using the Endo-PAT device (Itamar Medical Ltd, Caesarea, Israel). SphygmoCor radial artery tonometry provides a surrogate marker for arterial stiffness whereas Endo-PAT fingertip tonometry can be used as a non-invasive marker of both endothelial function and arterial stiffness.

Study methodology
We sought to determine whether there was a correlation between AI values generated by radial tonometry (SphygmoCor) and those generated by fingertip tonometry (Endo-PAT). The techniques for performing radial tonometry and fingertip tonometry are described in detail elsewhere.3,4 Fifty-three children with T1D (mean age 14.8 years) had both radial tonometry and fingertip tonometry performed after an overnight fast, to generate AI values using both techniques. With the exception of one child, each subject had both studies repeated again four weeks later.

Pearson’s correlation calculations were then performed. The R value was 0.68 (p<0.00001) and the R-square value was 0.56. AI generated by radial tonometry explains 46% of the variation in peripheral tonometry-generated AI values. Using the least squares equation, Endo-PAT AI = -8.25 + 0.608 (Sphygmocor AI), the standard error of predicting fingertip tonometry AI by radial tonometry AI was 8.5.

While there is a reasonable correlation between AI generated from both techniques, the values generated by fingertip tonometry are sufficiently different from those generated by radial tonometry to require that values generated by the two techniques not be used interchangeably to estimate arterial stiffness. Nevertheless, non-invasive techniques like fingertip and radial artery tonometry may provide to clinicians who are caring for children with diabetes the additional cardiovascular risk stratification information needed to determine which patients require early initiation of drug therapy to reduce long-term risk for CVD events.

Conflict of interest
None declared.

References