Toe blood flow rate - a better way of controlling peripheral circulation in your diabetes patients.

Purpose: Usually peripheral circulation in patients with diabetes is estimated by measuring distal blood pressure. However distal blood pressure does not express an increased resistance in the peripheral vessels, and therefore not the full truth of the vascular conditions. Consequently it was decided to measured absolute blood flow rate (BFR) in the pulp of the first toe and compare the results to toe blood pressure. Absolute BFR measured by heat-washout has previously been correlated to the only other existing method for measuring absolute skin BFR i.e. the ^{133}Xe-washout method, and a correlations coefficient of 0.986 was found. Therefore the heat-washout was considered a useful method for measuring toe BFR in patients with diabetes as well.

Materials and Methods: Heat-washout is performed with a probe especially constructed with a thermostatically controlled cap that eliminates heat loss to the surroundings. The probed is placed on the skin, heated to a few degrees above normal skin temperature for at few minutes, then the heating is turned off, and the temperature under the probe is registered until the same baseline temperature as before heating is obtained. BFR is calculated using the formula of Kety, f = k 100 ml(100g min)$^{-1}$. BFR was measured in the pulp of the first toe in 17 patients with diabetes for more than two years, (6 with IDDM), ten men, mean age 79 years (71-86). The measurements were performed with the patient in recumbent position and with the foot placed at heart level, 50 cm above heart level, and 50 cm below heart level. The results obtained at heart level were compared to toe blood pressure.

Results: A correlation coefficient between the two methods of only 0.33 was found. Two of the patients had one or both legs amputated shortly after the examinations. In these cases blood pressure was very high or normal whereas BFR measured by the heat-washout method showed a BFR as low as previously seen in patients with critical ischaemia and severe claudication.

Conclusion: The heat-washout method is considered a better way of controlling peripheral circulation because distal pressure per see does not say anything about the resistance in small

vessels, and that is a problem especially in patients with diabetes that may have atherosclerosis in tunica media in the small arteries. A bigger study with more patients included is required though to elucidate this further.