

Introduction

- Diabetes mellitus increases the risk of developing cardiovascular, cerebrovascular and peripheral vascular disease.
- Diabetic foot problems are the most common reason for hospital admissions among the patients with diabetes and the most common cause of non-traumatic limb amputation in the UK.
- Non-invasive tests used to assess peripheral circulation are TBPI and US Doppler.

Aims

Two study samples were examined with following aims:

- 1.To investigate the correlation between cardiovascular (CV) risk factors and toe brachial index pressures (TBPI).
- 2.To investigate the correlation between cardiovascular (CV) risk factors and Doppler measurements.

Methods

- Forty nine subjects (Study 1) underwent TBPI measurements and 99 (Study 2) doppler examination of posterior tibialis (PT) and dorsalis pedis (DP) by an experienced podiatrist in a secondary care diabetic clinic.
- Cardiovascular risk factors were collected and 10-year CHD risk calculated using the UKPDS Risk Engine.

Results

• Study 1

- TBPI results were divided into 3 subgroups:-
- TBPI<0.3, TBPI 0.3-0.5 and TBPI>0.5, with no significant differences in demographics or medication.
- No difference was observed in CV risk factors and UKDS risk between the groups.

There was a significant correlation in the TBPI's between the two feet ($r=0.62$, $P<0.0001$) (see Table 1).

• Study 2

- Doppler results were divided into 3 subgroups: monophasic, biphasic and triphasic signals, with no significant differences in demographics or medication.
- No difference was observed in CV risk factors and UKPDS risk between the groups.
- Of those with a monophasic signal in the right foot, 69% also had a monophasic in the left foot.
- Of those with a triphasic signal in the right foot, 88% also had triphasic in the left foot.
- The correlation of doppler signals between the two feet was significant ($r=0.70$, $P<0.001$) (see Table 2).

Results continued

Table 2: Baseline characteristics of subjects grouped by TBPI (n=49 patients)

Characteristics	TBPI<0.3 (n=10)	TBPI 0.3-0.5 (n=9)	TBPI > 0.5 (n=30)	P-Value	+P-Value
Age	67.4 (11.7)	72.3 (11.3)	63.3 (11.8)	0.10	0.06
Duration of DM	6 (3.5-12)	14 (8.5-23.5)	6 (4-13.5)	0.09	0.18
SBP (mmHg)	141 (25)	136 (22)	135 (18)	0.70	0.53
DBP (mmHg)	69 (11)	70 (10)	77 (8)	0.04	0.01
Cholesterol (mmol/L)	4.3 (1.3)	4.0 (1.2)	4.1 (1.1)	0.86	0.83
LDL (mmol/L)	1.9 (1.0)	2.1 (0.8)	2.0 (0.8)	0.90	0.89
TG (mmol/L)	2.7 (1.0-4.1)	1.3 (1.2-2.3)	1.8 (1.1-2.6)	0.71	0.94
HDL (mmol/L)	1.1 (0.5)	1.2 (0.4)	1.1 (0.2)	0.98	0.90
ACR (mg/mmol)	2.2 (0.90-57.2)	4 (1.2-33.1)	1.0 (0.65-5.5)	0.06	0.02
HbA1C (%)	90.5 (13.7)	75.7 (26.5)	77.3 (12.2)	0.06	0.20
HbA1C (mmol/mol)	10.4 (1.3)	9.1 (2.4)	9.2 (1.2)	0.06	0.20
UKPDS	34.4 (17.3)	38.2 (19.1)	27.8 (17.0)	0.62	0.11
Gender Male % (n)	70 (7)	66.7 (6)	77.3 (22)	0.92	0.48
Smoking Never % (n)	44.4 (4)	44.4 (4)	17.9 (5)	0.15	0.05
Insulin treatment % (n)	60 (6)	55.6 (5)	73.3 (22)	0.52	0.21
OHA % (n)	90 (9)	55.6 (5)	90 (27)	0.04	0.13
Statin use % (n)	80 (8)	77.8 (7)	83.3 (25)	0.92	0.49
ACEi % (n)	70 (7)	55.6 (5)	66.7 (20)	0.78	0.52
Aspirin use % (n)	30 (3)	44.4 (4)	53.3 (16)	0.44	0.20

Table 2: Baseline characteristics of subjects grouped by doppler (n=99 patients)

Characteristic	Monophasic in either foot (n=23)	Biphasic (n=64)	Triphasic (n=12)	P-value	+P-Value
Age (years)	66.9 (10.7)	65.6 (10.9)	58.8 (10.2)	0.009	0.37
Duration of DM (years)	4.5 (9.5-14)	14 (7-21)	5 (4-9)	0.006	0.19
SBP (mmHg)	144 (19)	140 (22)	142 (13)	0.68	0.41
DBP (mmHg)	77 (11)	74 (10)	83 (10)	0.02	0.50
Cholesterol (mmol/L)	3.9 (0.8)	4.1 (1.0)	3.9 (0.8)	0.80	0.63
LDL (mmol/L)	2.0 (0.7)	2.0 (0.8)	2.2 (0.8)	0.73	0.57
TG (mmol/L)	1.5 (1-2.1)	1.6 (1.3-2.2)	1.2 (0.85-1.7)	0.14	0.73
HDL (mmol/L)	1.3 (0.4)	1.3 (0.3)	1.2 (0.3)	0.79	0.77
ACR (mg/mmol)	1.3 (0.8-3.5)	1.3 (0.6-4.9)	1.2 (0.45-2.4)	0.65	0.75
HbA1C (%)	74.1 (20.1)	71.5 (20.3)	80.9 (23.5)	0.35	0.83
HbA1C (mmol/mol)	8.9 (1.8)	8.7 (1.8)	9.6 (2.1)	0.35	0.83
UKPDS	25.4 (16.6)	23.6 (14.7)	18.7 (11.8)	0.49	0.50
Gender Male % (n)	56.5 (13)	42.2 (27)	75 (3)	0.08	0.30
Smoking Never % (n)	27.3 (6)	65.6 (40)	58.3 (7)	0.008	0.002
Insulin treatment % (n)	65.2 (15)	71.4 (45)	66.7 (8)	0.84	0.40
OHA % (n)	69.6 (16)	82.8 (11)	66.7 (8)	0.26	0.21
Statin use % (n)	91.3 (2)	81.3 (52)	58.3 (7)	0.06	0.12
ACEi use % (n)	60.9 (14)	65.6 (42)	50 (6)	0.58	0.51
Aspirin use % (n)	56.5 (11)	48.4 (31)	25 (3)	0.20	0.23

Conclusions

- Screening for peripheral vascular disease should be performed routinely regardless of CV risk factors.
- We observed a good correlation in TBPI and doppler signals between both feet.

References

1. NICE guidelines of diabetic foot problems 2011/050
2. J. Boulton, L. Vileikyte, G. Ragnarson-Tennvall, and J. Apelqvist (2005). The global burden of diabetic foot disease 2005