DISTRIBUTION OF INFRA-POPLITEAL PERIPHERAL VASCULAR DISEASE IN PATIENTS WITH DIABETES MELLITUS COMPARED TO PATIENTS WITHOUT

**Introduction**

Diabetes mellitus (DM) is an increasing worldwide problem. As the prevalence of DM has increased so has the complication rate including lower limb amputation. It is considered that patients with DM have a higher burden of atherosclerotic disease below the knee compared to patients without DM (NDM). Most studies have only considered the crural vessels as a whole rather than separated into their constituent vessels, there has also been limited correlation with clinical outcomes.

**Methods**

All patients who underwent lower limb angioplasty (LLA) between July 2010 and May 2015, at a large UK-based tertiary-teaching-hospital, were identified. All patients who had an indication for LLA other than peripheral vascular disease were excluded. Those with DM were matched for age, sex, ethnicity, smoking, hypertension, hypercholesterolaemia and renal status, with patients without DM. Matching was performed with IBM SPSS with the aim of only including patients who matched identically (age ± 5 years).

All angiograms were scored using an extended and modified version of the Bollinger score to assess morphological changes in 13 infra-inguinal arterial segments (Figure 1). The summed score for each crural vessel was also calculated. Zero is normal artery, 15 represents occlusion in over half of the segment (Table 1).

**Primary outcome** was difference in Bollinger score in all segments. **Secondary outcomes** were amputation free survival, major amputation and further revascularisation, assessed using survival curves.

**Results**

After matching there were 153 patients in each group. The groups were very closely matched apart from indication for procedure (54.9% of DM group presented with critical ischaemia compared to 32% in the NDM group (p<0.001)) and timing of procedure (29.4% of those with DM presented as an emergency compared to 10.5% (p<0.001)).

Patients with DM had significantly worse disease in the ATA and PTA, there was however relative sparing of the PEA (Table 2). Those with DM also had higher rates of major amputation and poorer amputation free survival, however there was no significant difference in revascularisation rates (Figure 2). On logistic regression disease in the PTA was related to major amputation (RR 1.045, 95% CI 1.01-1.08) and amputation free survival (1.026, 1.01-1.043) but not revascularisation (1.09, 0.994-1.24).

**Discussion**

These results demonstrate that overall patients with DM have a higher degree of atherosclerotic disease throughout the distal vascular tree. This difference is significant in the summed scores of the ATA and PTA. We were unable to demonstrate a significant difference in the three different segments of the vessels however there was a trend towards more severe disease distally. In both cohorts there is relative sparing of the PEA, this is particularly marked in the DM group. A higher degree of disease is associated with higher rates of amputation and mortality in the DM group however there is no impact on rates of further revascularisation. Disease in the PTA particularly appears to be related to amputation and mortality as demonstrated by the results of the logistic regression.

The matching performed accounts for major potential confounding factors allowing the impact of DM to be assessed. This does mean that the cohorts may not reflect the population as a whole. This is a weakness of the study.

**Conclusions**

This data supports the hypothesis that DM predisposes to infra-popliteal disease. In DM the PEA may be the optimal target for durable surgical revascularisation. Even after potential confounding factors have been accounted for DM remains a major risk factor for major amputation and mortality however not for further revascularisation.

**References**


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[Table 1: Bollinger scoring system]

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Adapted from Bollinger et al 1981. Each arterial segment has an additive score based on the above scoring matrix.

[Figure 1: Schematic representation of arterial segments. PTA: profunda femoris artery; SFA: superficial femoral artery; PA: popliteal artery; TP: tibial-peroneal trunk. ATA1: proximal 3rd of anterior tibial artery; ATA2: middle 3rd of anterior tibial artery; ATA3: distal 3rd of anterior tibial artery. PEA1: proximal 3rd of peroneal artery; PEA2: middle 3rd of peroneal artery; PEA3: distal 3rd of peroneal artery. PTA1: proximal 3rd of posterior tibial artery; PTA2: middle 3rd of posterior tibial artery; PTA3: distal 3rd of posterior tibial artery.]

[Figure 2: Survival curves for outcomes]