

THE NUMBER OF PATENT CALF VESSELS IN CONTRAST-ENHANCED MRA SIGNIFICANTLY IMPACTS THE PATIENT'S SURVIVAL

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Introduction:

Magnetic resonance angiography is a powerful method to determine the degree and type of peripheral arterial occlusive disease (PAOD). Most PAOD patients suffer from numerous comorbidities, which affect the course of disease. The aim of the present study is to identify how far MRA imaging findings and clinical findings influence the patient's outcome, especially the overall survival, the time to infarct and limb amputation.

Materials and Methods:

The investigated collective was composed of 124 patients with a median age of 70.6 years (73 male, 51 female), who were examined between August 22nd 2008 and July 21st 2010 and who provided a complete data set i.e. contrast-enhanced TimCT-MRA of the lower extremities as inclusion criteria. One experienced radiologist evaluated the CE-MRA with regard to the type and degree of PAOD and several additional findings. The comorbidities, the course of disease and the last outcome information of the patient was extracted from the electronic patient record. The latest follow up was at July 29th 2011. The following 15 covariates were chosen for the analysis:

MRA findings:

Cross sectional vessel occlusion, hyperemia, calf collaterales, thigh collaterales, bypass, enlarged inguinal lymph nodes, TASC status thigh, TASC status pelvis, side different flow in the calf station, number of continuous and open calf vessels.

Clinical findings:

Diabetes, PAOD status, age difference to 65 years, creatinine level difference to 1mg/dl, gender.

An anonymized data table was composed and statistically analysed by a Cox proportional hazard risk model. We studied the time to the event of the first amputation, time to the event of infarct, time to death and the time to the occurrence of any of these three events whenever the first event occurred, respectively. p-values <0.05, estimated by χ^2 -test, were considered statistically significant.

Results:

Overall survival (survival time starting with angiography)

A total of 116 patients were included in this analyses with 19 events.

A higher number of continuous and open calf vessels in the MRA was the only factor impacting the overall survival with a hazard ratio (HR) of 0.688 and a p-value of 0.0048.

Time to infarct

116 patients were included and there were 16 infarcts. The PAOD status (HR=2.300; p=0.025), the presence of a bypass (HR=6.017; p=0.0056), the creatinine level difference to the physiologic value 1mg/dl (HR=10.594; p=0.0015), the presence of thigh collaterales (HR=5.119; p=0.0138) and a hyperemia (HR=6.554; p=0.0076) had a statistically significant influence on the time to an infarct.

Time to first amputation

A total of 116 patients were included in this analyses with 20 events. In the model the following variables had an statistically significant effect on the time to amputation: PAOD status (HR=11.158; p=0.0018), the number of continuous and open calf vessels in the MRA (HR=0.431; p=0.0008), the presence of thigh collaterales (HR=4.355; p=0.0183) and side different flow (calf) (HR=2.154; p=0.0002).

Time to the first event (amputation OR infarct OR death)

116 patients were included in the analysis and there were 46 events.

The presence of diabetes (HR=1.970; p=0.0483), thigh collaterales (HR=2.721; p=0.0083), side different flow in the calf station (HR=1.531; p=0.0003), the number of continuous and open calf vessels in the MRA (HR=0.754; p=0.0047) and the PAOD status (HR=2.257; p<0.0001) had a statistically significant influence on the time to the first event.

Conclusion:

The number of continuous and open calf vessels in the MRA seems to be a strong predictive factor for overall survival. The evaluation of the degree and type of peripheral arterial occlusive disease by evaluation of MRA findings in combination with clinical findings can help to detect various factors, which influence the outcome, especially the time to the first cardiovascular event.

Factors (yellow), having significant impact on the chosen endpoints (green, red):

