

Chronic Limb-Threatening Ischaemia

Prognosis after intervention

Akademisk avhandling

som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligens försvaras i hörsal Kammaren, Vita stråket 12, Sahlgrenska universitetssjukhuset, Göteborg, fredagen den 17 maj 2019, klockan 13:00

av

Erik Baubeta Fridh

Legitimerad läkare

Fakultetsopponent:

Professor Ulf Hedin

Karolinska Institutet, Stockholm

Avhandlingen baseras på följande delarbeten:

- I. Baubeta Fridh E, Andersson M, Thuresson M, Sigvant B, Kragsterman B, Johansson S, Hasvold P, Falkenberg M, Nordanstig J.
Amputation Rates, Mortality, and Pre-operative Comorbidities in Patients Revascularised for Intermittent Claudication or Critical Limb Ischaemia: A Population Based Study.
European Journal of Vascular and Endovascular Surgery, 2017;54(4):480-486.
- II. Baubeta Fridh E, Andersson M, Thuresson M, Sigvant B, Kragsterman B, Johansson S, Hasvold P, Nordanstig J, Falkenberg M.
Impact of Comorbidity, Medication, and Gender on Amputation Rate Following Revascularisation for Chronic Limb Threatening Ischaemia.
European Journal of Vascular and Endovascular Surgery, 2018;56(5):681-688.
- III. Baubeta Fridh E, Andersson M, Thuresson M, Nordanstig J, Falkenberg M.
Impact of Preoperative Symptoms and Revascularized Arterial Segment in Patients With Chronic Limb-Threatening Ischemia.
Vascular and Endovascular Surgery, 2019 Mar 17, doi: 10.1177/1538574419834765.
- IV. Baubeta Fridh E, Ludwigs K, Svalkvist A, Andersson M, Nordanstig J, Falkenberg M, Johnsson ÅÅ.
Comparison of magnetic resonance angiography and digital subtraction angiography for assessment of infrapopliteal arterial occlusive lesions, with evaluation based on the TASC II classification and on an aggregated lesion severity score.
Manuscript.

**SAHLGRENKA AKADEMIN
INSTITUTIONEN FÖR KLINISKA VETENSKAPER**



**GÖTEBORGS
UNIVERSITET**

Chronic Limb-Threatening Ischaemia

Prognosis after intervention

Erik Baubeta Fridh

Avdelningen för radiologi, Institutionen för kliniska vetenskaper, Sahlgrenska akademien,
Göteborgs universitet, Sverige

Abstract

Introduction: Lower-extremity arterial disease (LEAD) is a major health problem worldwide. Chronic limb-threatening ischaemia (CLTI) is the most severe manifestation of LEAD. Open or endovascular recanalization is recommended for most patients with CLTI. The aim of this thesis has been to investigate the impact of comorbidities, medications, gender, preoperative symptoms, and revascularized arterial segment on outcome after revascularization in terms of amputation or death and to investigate whether it is possible to make a correct preoperative assessment of infrapopliteal lesions in CLTI patients using the TransAtlantic Inter-society Consensus (TASC) II classification on magnetic resonance angiography (MRA).

Methods: All patients who were revascularized for intermittent claudication (IC, n = 6,272) and CLTI (n = 10,617) from May 2008 to May 2013 in Sweden were assembled in a database. Patients were identified using the Swedvasc register and the data was complemented with mandatory national healthcare registers. In addition, medical records of 1,366 patients were reviewed to safeguard accuracy on ipsilateral amputation. Descriptive statistics, Cox regression models with hazard ratios (HRs), and Kaplan-Meier curves were used in Papers I–III. In Paper IV, 68 preoperative MRAs and perioperative digital subtraction angiographies (DSAs) were evaluated using the infrapopliteal TASC II criteria. Visual grading characteristics (VGC) analysis and Krippendorff's α were used for analysis of differences and agreement between modalities and observers.

Results: CLTI patients had different preoperative comorbidities than IC patients. The risk of amputation following revascularization for CLTI was particularly high during the first 6 months. Mortality was high in all revascularized LEAD patients. Renal insufficiency, diabetes, heart failure, atrial fibrillation, male gender and presence of tissue loss, were found to be independently associated with increased risk of amputation after revascularization for CLTI. Conversely, medication with low-dose acetylsalicylic acid and statins were associated with improved limb salvage and survival. No systematic difference was detected between MRA and DSA in grading of infrapopliteal lesions. Agreement between observers in preoperative assessment of infrapopliteal TASC II class was poor, mainly due to a variable choice of intended target vessel between observers. A suggested novel infrapopliteal aggregated lesion severity score (IALSS), based on evaluation of all four infrapopliteal arteries, had better inter-observer agreement.

Conclusions: CLTI and IC affects different patient populations. Mortality is substantial in both. Amputation rate is particularly high in the first 6 months following revascularization for CLTI and associated with well-defined risk factors, most markedly renal insufficiency, diabetes, and tissue loss. Statins and platelet inhibitors should be considered for all patients with LEAD. Infrapopliteal TASC II grading can be done using MRA, but the required choice of a target vessel is a concern. An alternative score, independent of intended target vessel, may provide a more reproducible tool for assessment of infrapopliteal disease severity.

Keywords: Amputation, arterial occlusive disease, atherosclerosis, comorbidity, magnetic resonance angiography, mortality, peripheral arterial disease.