

Health technology assessment of treatment for peripheral arterial disease

Citation for published version (APA):

Petersohn, S. (2021). *Health technology assessment of treatment for peripheral arterial disease*. [Doctoral Thesis, Maastricht University]. Maastricht University. <https://doi.org/10.26481/dis.20210114sp>

Document status and date:

Published: 01/01/2021

DOI:

[10.26481/dis.20210114sp](https://doi.org/10.26481/dis.20210114sp)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

VALORISATION

The objective of the thesis was to investigate current PAD treatment patterns, measure the quality of life of patients with PAD and to estimate the costs of PAD treatment, and to assess the cost-effectiveness of new pharmacologic treatment strategies for PAD. This Chapter discusses the societal value of the results found in this thesis for three groups of stakeholders: patients with PAD and their healthcare professionals, policy makers and decision makers, and the scientific community including health economists. The efforts made to disseminate the knowledge gained from this thesis and additional actions to be taken are described.

Patients with PAD and their healthcare professionals

In Chapter 2, we developed a stratification approach for newly diagnosed patients, which differentiates between patients likely ineligible for invasive treatment due to comorbidities, and patients with a higher probability of undergoing invasive treatment, and patients at a low probability. Such a stratification is aimed at the first-line setting where PAD patients are often diagnosed, and initial treatment strategies are defined. The value of such stratification is that it may help general practitioners assess individual newly diagnosed patients, and communicate current and future treatment, follow-up and transferral needs. This may benefit patients with PAD in two distinct ways: (1) doctor-patient communication may be strengthened, and patients may increasingly participate in shared decision making, and (2) doctors may be better aware of likely future treatment needs the patient may have and be able to anticipate these, resulting in improved clinical outcomes.

In Chapter 5 of this dissertation, the cost-effectiveness of a novel drug, rivaroxaban plus aspirin, for the prevention of cardiovascular and peripheral events in patients with PAD, and of cardiovascular events in patients with CAD, was analysed. The analysis showed favourable cost-effectiveness results for rivaroxaban plus aspirin, but also highlighted substantially different cost-effectiveness results in subgroups. Subgroups in which the treatment resulted in the largest QALY gains were PAD patients who are active smokers and CAD patients aged 65 and younger. Subgroups in which the treatment was considered most cost-effective were PAD patients with reduced kidney function and CAD patients aged 65 and younger. Subgroups in which the treatment was considered least cost-effective were PAD patients with carotid artery disease and CAD patients aged 75 of age and older. The results further underlined that the treatment with this novel, and more potent preventive cardiovascular agent is associated with unintended side effects such as bleeding risks. The identification of patients who experience the benefits of the treatment at a contained risk of side effects therefore builds the cornerstone of implementing such new treatments and should guide physicians in their treatment decisions.

Policy makers

Policy makers concerned with the allocation of resources to the provision of care, and decision makers in the clinical field alike, for example the developers of clinical guidelines, need to ensure their recommendations maximize health care efficiency. To ensure this, cost-effectiveness information is used, as it combines the costs, effects and the 'value for money' derived from an intervention (22). As outlined in the previous paragraph, Chapter 5 of this thesis showed that treatment for the prevention of cardiovascular and peripheral events with novel agent rivaroxaban plus aspirin offers improved cardiovascular prevention at the cost of increased bleeding risk and increased costs. Considering the size of the cohort of patients eligible for treatment with rivaroxaban plus aspirin in the Netherlands, a targeted approach may be warranted to contain the budget impact of the implementation of rivaroxaban plus aspirin. This was confirmed by the estimated budget impact of rivaroxaban plus aspirin compared to standard of care in the Netherlands over a period of 10 years. Our findings regarding the cost-effectiveness of the treatment in CAD and PAD patients overall and in specified subgroups may be used to direct policy makers in their search for an implementation and reimbursement strategy that maximizes health care efficiency and delivers improved cardiovascular prevention to patients, potentially by focussing on subgroups with certain characteristics.

Scientific community

Finally, other researchers in the field of PAD treatment and in the field of HTA can benefit from the findings made in this thesis. The identification of strata of PAD patients in Chapter 2 underlined the feasibility and may encourage the development of a decision-support tool for physicians treating PAD patients. The quantification of quality of life of PAD patients in Chapter 3 and of the costs of PAD treatment in Chapter 4 provided much needed inputs for health economic models on PAD. The analysis also reinforced the suitability of the EQ-5D for the measurement of quality of life in PAD patients. The challenge of missing cost data indicated that despite the development of new methodologies, missingness and potentially missingness not at random remains a persistent challenge hampering the use of patient-reported data which requires further research. The economic model for PAD presented in Chapter 5 has been newly developed based on clinical input and best practice from the field of HTA of cardiovascular disease. This novel modelling approach, which was described transparently and in much detail, is one example of how PAD can be modelled comprehensively. Through the comprehensive uncertainty analysis described in Chapter 6, the importance of detailed and transparent reporting of study results was showcased and a number of methodologies were identified that can potentially be used in an attempt to improve the parameterization of uncertainty,

but which require further research and guidance in order to be accessible to a wider audience of health economists.

Dissemination of knowledge

Efforts have been made to share the findings made in this dissemination with the wider audience of health economists and stakeholders from the field of PAD treatment. To support dissemination and discussion of knowledge with researchers and policy makers, the articles presented in this dissertation have been submitted for publication in scientific journals, with the aim of making these available free of charge and open-access to anyone with an interest in the matter. To date, two articles are published in open-access, peer-reviewed journals, one article is in press and the remaining two articles have been submitted. The dissertation as a whole is available through Maastricht University.

Further to this, research performed as part of this thesis has also been presented at national and international conferences, where the results were presented among the scientific community as well as representatives of manufacturers of pharmaceutical products and other health economic stakeholders including decision makers. The results have been presented at ISPOR Europe, the Lowlands Health Economics Study Group and the Care and Public Health Research Institute (CAPHRI) Research Day.

References

1. Briggs A, Sculpher M. An Introduction to Markov Modelling for Economic Evaluation. *Pharmacoeconomics*. 1998;13(4):397-409.