

Current challenges in the treatment of chronic limb threatening ischaemia

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Chapter 8

Summary and conclusion

More and more patients are suffering from Chronic Limb Threatening Ischaemia (CLTI) with high risk of major amputation and mortality and several crucial aspects regarding the optimal management of these patients are unclear. Numerous revascularization techniques have been developed in the last decades. An impressive variability in primary treatment choices for patients with CLTI can be found in the literature, underlining the lack of knowledge and treatment uniformity. Understanding CLTI and its treatment strategies is however essential to be able to provide the best medical care for affected patients.¹⁻⁴ To overcome two of the shortcomings of the existing literature this thesis focuses on the effectiveness of revascularization in octogenarians with CLTI (**Part I**) and on the management of surgical site infections (SSIs) as complication after revascularization (**Part II**).

Revascularization in octogenarians (Part I)

Revascularization is the cornerstone of the treatment of patients with CLTI. In octogenarians however, the clinical benefits of a revascularization approach might be limited. Advanced age is a well-known risk factor in cardiovascular diseases and it was expected that it would influence the outcomes of revascularization. However, considering the fact that randomised clinical trials will never be ethically justifiable, we attempted to ensure methodological valid verification of a generally believed expectation with a meta-analysis with large sample size. **Chapter 2** describes the outcomes of this systematic review and meta-analysis on the effectiveness of revascularization in octogenarians. We were able to include more than 17000 patients with CLTI and found an important 1-year mortality rate of 32% in octogenarians after revascularization, which was significantly higher than in non-octogenarians (17%). Amputation rates were not significantly different, whereas AFS was significantly lower in the octogenarian's group as well. These outcomes were confirmed in our retrospective cohort study of 329 patients with CLTI as described in **Chapter 3**. A 1-year mortality rate of 44% in octogenarians and 18% in patients younger than 80 years were found, while amputation rates were comparable. In this study, age ≥ 80 years, dialysis, Rutherford category 5/6 and heart failure were predictors of mortality in Cox-regression analysis, resulting in a 1-year mortality rate of 58% in case all four risk factors were present. These outcomes are of major importance for clinical practice to inform patients

and colleagues adequately during the decision-making process on any intervention in this fragile patient group. As a consequence, appropriate patient selection is essential and our predictive factors may help in the decision-making whether patients will benefit from revascularization or not. Conservative treatment could be considered in certain patients as well, since there is growing evidence that selected patients may be appropriately treated with primary amputation or conservative treatment.^{5,6} In our retrospective cohort, the mortality rate of conservatively treated octogenarians was also relevant, but no major amputations were performed in the conservatively treated group. An individual therapeutic approach should be initiated, focused on the quality of life of these patients.

Surgical site infections after revascularization (Part II)

Surgical site infection (SSI) can be a serious complication following revascularization that may lead to graft infection with increased risk of subsequent amputation and mortality. Both treatment and prevention strategies were investigated in this thesis. The management of severe groin wound complications remains challenging for vascular surgeons, although there is growing evidence that support the benefits of muscle flap coverage as effective treatment approach in a challenging patient population with otherwise a poor prognosis. **Chapter 4** describes the outcomes of our systematic review on the effectiveness of two muscle flap coverage techniques for deep groin infection (rectus femoris muscle flap (RFF) versus sartorius muscle flap (SMF)). Superiority of either muscle flap on amputation or mortality rates was not demonstrated, but we were able to demonstrate that muscle flap coverage in general was effective in the management of complex groin wounds. Graft loss rates were lower after RFF reconstruction, but these conclusions were based on low- quality evidence.

These outcomes were confirmed in two retrospective cohort studies. As described in **Chapter 5**, low rates of limb loss, graft loss and mortality were demonstrated in a cohort of 88 patients undergoing 96 RFFs. This study presents the largest worldwide series of RFFs and the results demonstrate that the RFF technique is an effective way to manage deep groin defects resulting from debridement for infection. **Chapter 6** compares our own outcomes of RFFs and SMFs and equal results on amputation, mortality and graft loss rates were found with both techniques.

Therefore, it can be concluded that local muscle flap reconstruction using both techniques is effective in the treatment of infected groin wounds, achieving good results regarding limb salvage and graft salvage in a challenging patient population. Therefore, we would recommend performing the type of muscle flap coverage according to the specific preference and experience of the surgical team as well as anatomical and patient characteristics, the latter were not assessed in this thesis. The RFF could be used preferentially to cover large tissue defects, whereas the SMF could be preferred to cover smaller defects in the groin.

Finally, **Chapter 7** describes our prospective randomized controlled trial, aiming to prevent femoral SSIs in the first place, using gentamicin implants following vascular surgery via inguinal incision. In this multicentre trial, 288 patients were randomized to either receive a gentamicin-implant or not. Interestingly, the effect of gentamicin implants on SSI rate differed significantly between study sites. Gentamicin implants significantly reduced the incidence of SSIs in high-risk centres (>10% infections in the control group), but had no effect in low-risk centres. Therefore, preventive use of gentamycin-implants in the groin after vascular surgery cannot be routinely advised based on current evidence, but the use of gentamicin implants may be a valuable adjunct to improve outcomes in vascular centres with a high incidence of wound infections.

Conclusion

The research performed in this thesis adds to the debate about the optimal management of patients with CLTI and important steps were made towards a better understanding of CLTI and its treatment strategies. Two current challenges in the management of patients with CLTI were assessed and three main conclusions can be made:

1. Revascularization in octogenarians with CLTI is associated with a substantial high mortality rate. Appropriate patient selection is of major importance and an individual therapeutic approach should be initiated, focused on the quality of life of these patients.

2. Deep groin infections after revascularization can be effectively managed using muscle flap coverage in addition to debridement. Anatomical and patient characteristics are critical in the decision-making process which muscle flap reconstruction is the best treatment option for an individual patient.

3. Preventive use of gentamycin-implants after femoral vascular surgery cannot be routinely advised, but should be considered in vascular centres with a high incidence of wound infections in the groin.

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