

Intra-cardiac infections, coronary interventions and mechanical circulatory support

Citation for published version (APA):

van den Brink, F. S. (2021). *Intra-cardiac infections, coronary interventions and mechanical circulatory support*. [Doctoral Thesis, Maastricht University]. Ridderprint. <https://doi.org/10.26481/dis.20211020fb>

Document status and date:

Published: 01/01/2021

DOI:

[10.26481/dis.20211020fb](https://doi.org/10.26481/dis.20211020fb)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

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CHAPTER 11

IMPACT PARAGRAPH

In this section the impact of the research describe in this thesis will be discussed. It will also include a summary of its main findings for the non-medical reader, the implications for patients and medical professionals and the contribution of this thesis to the scientific field.

SUMMARY OF THE FINDINGS FOR THE NON-MEDICAL READER

Infective endocarditis is a disease where part of the inner side of the heart is infected with bacteria. This can be a native structure (like a heart valve) but it can also be prosthetic material (like a pacemaker lead or a prosthetic heart valve). It is a dangerous disease with high mortality, as demonstrated in this thesis. One of the ways infective endocarditis can be prevented is by administering antibiotics prior to certain procedures (like dental procedures) when you have an abnormal heart valve. In 2009 the indication for this prophylaxis was changed. The result was that less patients were eligible for this prophylaxis. Since that time there has been an increase in infective endocarditis above the expected historical trend.

It is possible for patients to not have a heart rhythm of their own. If this is the case they need a pacemaker. This pacemaker is usually placed in the venous system on the right side of the heart. A possible complication of having a pacemaker is that it gets infected with a bacteria. In that case the pacemaker will have to be removed. However, if a patient has no underlying heart rhythm they cannot live without a pacemaker. If you place a pacemaker on the outside of the heart and the remove the infected pacemaker you will ensure pacing of the heart. This technique is safe and feasible.

Infective endocarditis can also affect prosthetic heart valves that have been implanted via a catheter through the arteries in the groin. This is a rare complication and it is rarer than endocarditis of a surgically implanted heart valve. Yet when you do attract it, outcome is poor.

Patient who contract endocarditis can be very sick. They can be so sick that their heart is no longer possible to keep them alive. A possible treatment for this is veno-arterial extra corporeal membrane oxygenation (VA-ECMO). This is a kind

of heart lung machine for prolonged use. It can be used in patients with infective endocarditis, however, outcome is poor.

The same VA-ECMO technique can be used in patients who suffer from an acute heart attack. These patients can develop acute heart failure due to occlusion of one of the arteries of the heart. They can even develop cardiac arrest. VA-ECMO can improve survival in these patients and ensure adequate blood flow to the organs when the heart is no longer able to do so.

If patients need to undergo an elective procedure in which a stent is placed in one of the arteries of the heart and they have poor contractility of the heart muscle they can develop acute heart failure during the procedure. The use of VA-ECMO prior to this procedure in a prophylactic fashion is safe and can be effectively used to prevent acute heart failure and ensure organ perfusion during these procedures. Finally we demonstrate that the combined use of VA-ECMO and the intra-aortic balloon pump improves survival in acute myocardial infarction when compared to the use of VA-ECMO alone.

SCIENTIFIC IMPACT AND IMPACT FOR PATIENTS

This thesis has made it clear that mortality from infective endocarditis is high and that early referral may improve survival. It also demonstrates that there may be need to expand the indication for chemoprophylaxis in preventing infective endocarditis. Patients who are pacemaker dependent and have an infected device now have a safe extraction and re-implantation strategy which ensures permanent pacing. Patients who have undergone a trans catheter aortic valve implantation are now assured that the risk of infective endocarditis is low. However, if they do contract it outcome is poor.

Patients who are in cardiogenic shock, especially when suffering from ST-elevation myocardial infarction can be safely treated with VA-ECMO. This can improve survival and could be considered by interventional cardiologists when encountering these patients in clinical practice. They could also consider using VA-ECMO when they perform high risk percutaneous interventions in order to prevent cardiogenic shock. However, if prolonged use of VA-ECMO is indicated in patients who have developed cardiogenic shock due to ST-elevation myocardial infarction afterload reduction with the intra-aortic balloon pump as an afterload device is advisable.

DISSEMINATION OF KNOWLEDGE.

In order to share our knowledge presented in this thesis we have published all research in this thesis in peer reviewed national and international scientific journals. In addition to these scientific publications we have presented all original studies at national and international congresses including the European Society of Cardiology congress, American Heart Association/American College of Cardiologists scientific sessions, Cardiovascular Research Foundation Trans Catheter Therapeutics, EuroPCR congress and Euro-Extra Corporeal Life Support Organization congress as well as during the congress of the Nederlandse Vereniging voor Cardiologie.