Use of mechaNical left ventricuLar unlOADing in Complex Higher-risk Indicated Procedures

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The primary objective of the UNLOAD-CHIP is to investigate the combined clinical endpoint (as described in primary and secundary endpoints).

Ethical review	Approved WMO
Status	Recruiting
Health condition type	Coronary artery disorders
Study type	Interventional

Summary

ID

NL-OMON53381

Source
ToetsingOnline

Brief title
UNLOAD CHIP

Condition

- Coronary artery disorders

Synonym
Coronairy artery disease, stenotic vessels

Research involving
Human

Sponsors and support

Primary sponsor: Amsterdam UMC
Source(s) of monetary or material Support: Pulsecath

Intervention

Keyword: Cardiogenic shock, High-risk, PCI, Unloading

Outcome measures

Primary outcome

Combined endpoint 30 days:

- All-cause death

- SCAI stage C-E

- Renal replacement therapy

- Mechanical ventilation

- -Peri or -postprocedural ventricular arrhythmias leading to loss of cardiac output

Secondary outcome

Efficacy endpoints: - PCWP (Δ max) (Time Frame: periprocedural) - LVEDP (Δ max) (Time Frame: periprocedural) - CO / CI / CPO (Δ max) (Time Frame: periprocedural) - SvO2 (Time Frame: periprocedural) - Drop in SBP (SBP <90) or mean arterial pressure (MAP <60) for >10 minutes (Time Frame: periprocedural) - Highest Vasoactive Inotropic Score (Time Frame: hospitalisation) - Protected procedural sucess of Pulsecath iVAC2L [time Frame: Periprocedural] - Procedural success of Pulecath iVAC2L [time frame: <6 hours post PCI] - Rescue pVAD implantation (Time Frame: hospitalisation) - Length of hospital stay (Time frame: hospitalisation) - Cardiovascular death (Time frame: 30-day) - Major adverse cardiovascular cerebral events (MACCE) (Time frame:30-day) - Stroke (Time frame: 30-day) -PCI related myocardial infarction (time frame: 48 hours) Myocardial infarction (Time frame: 30-day) - Re-hospitalization or urgent

hospital visit for heart failure (time frame 30-day) Safety endpoints: - Major vascular events (Time Frame: 30-day) - Limb ischemia (Time Frame: 30-day) - Bleeding events (BARC 3 and 5) (Time Frame: 30-day) - Aortic valve injury (Time Frame: 30-day)

Study description

Background summary

During the last three to four decades percutaneous coronary intervention (PCI) tools and techniques have improved immensely (1). Currently, PCI is the most widely used approach for myocardial revascularization. In general, elective PCI is considered a safe and relatively low-risk procedure(2).
However, patients with left main or complex coronary lesions or impaired left ventricular function remain at high risk of peri-procedural and post-procedural hemodynamic instability and death (3, 4).
Mechanical circulatory support (MCS) devices, such as intra-aortic balloon pump (IABP) and Impella (Impella 2.5 and CP), have emerged as potential tools to avoid hemodynamic instability during these CHIP coronary interventions. These devices have shown to improve hemodynamics / cardiac output during complex PCI procedures, although the benefit of mechanical circulatory support in CHIP PCI remains debated and no clear benefit on patient outcomes has been shown (5-7). Although a recent large scale analysis favoured Impella as opposed to IABP (9). The use of these devices, especially Impella, is associated with increased risk for complications such as bleeding (6, 11). The use of MCS, and therefore better peri-procedural hemodynamic support, needs to be balanced out against the potential risk for MCS related complications.

Recently the PulseCath iVAC 2L was introduced. This is a pulsatile pump, placed in the left ventricle, that ejects blood into the ascending aorta at a flow up to 2L/min (12). Theoretically, pulsatility maintains the physiological vascular responses and endothelial function at the level of the -systemic and -micro circulation and might offer benefit when compared with continues flow devices such as Impella (13). In contrast, IABP (which also offers pulsatile support), lacks the possibility of active unloading. Therefore, the combination of those features in the PulseCath iVAC2L is unique.

Recent studies performed with the PulseCath iVAC2L in the setting of CHIP PCI demonstrated hemodynamic advantages with reductions in afterload, increases in stroke volume and cardiac output. Also, the device was deemed safe in terms of complications (13, 14). Samol et al. showed in a prospective cohort study that

IVAC2L was comparable to Impella in terms of feasibility and safety and to ensure stable hemodynamic conditions, also if complications occur. (15) Other advantages of the IVAC2L are its relatively simple use, and lower costs compared to other mechanical circulatory support like the Impella family. Given the fact that the IVAC2L is connected to an IABP console, the possibility of widespread use adds an even greater advantage.

So far, MCS facilitated CHIP has not been proven beneficial compared to a conservative (non-supported) high-risk procedure. Although high-risk criteria parameters: coronary anatomy (location and complexity), co-morbid conditions, and concomitant cardiac disease (structural or valvular disease, left ventricular dysfunction) are well known, no intrinsic value of each of the components is determined. The recent PULSE trial shed some light on this vacuum by showing additional hemodynamic benefit for patients with mitral regurgitation, for patients who presented with an acute coronary syndrome (ACS) and who had higher filling pressures at baseline (13). Therefore, MCS-facilitated high-risk PCI might be beneficial if used in (left-sided) congested patients with low hemodynamic tolerance. However, due to the low number of patients enrolled and non-randomized nature of this study, conclusions should be drawn with caution. To this day, no randomized controlled trials have been executed with the PulseCath iVAC2L in this subset of CHIP patients who are thought to benefit from an MCS-facilitated PCI. Its place in the setting of CHIP PCI remains to be elucidated.

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Study objective

The primary objective of the UNLOAD-CHIP is to investigate the combined clinical endpoint (as described in primary and secundary endpoints).

Study design

The current study is an investigator initiated, randomized, open label, multi-center clinical trial.
All patients assigned to have a complex higher-risk indicated procedure (CHIP) based on a formal local heart team decision will be screened for potential inclusion in the study.
Patients will be eligible for inclusion in the randomized study after consideration of in- and exclusion criteria. Subsequently patients will be approached for study participation by their cardiologist. The patient

information folder (PIF) and consent form will be provided to the patient by a study team member. Patients will have at least 24 hours to consider participation. An independent physician will be available for extra information, if desired. After this period of consideration, written informed consent is obtained and patients will be planned for CHIP PCI according to standard practice in adherence to international guidelines. Patients will also be randomized and stratified based on severe mitral regurgitation. At baseline, all patients underwent transthoracic echocardiography (TTE) and pre-procedural CT angio¬graphy or Doppler of the femoral arteries to determine the quality of the access vessel. A common femoral artery minimum diameter of 6 mm is required to accommodate the iVAC2L. On the cathlab the pulmonary artery catheter (PAC) is placed and pulmonary capillary wedge pressure (PCWP), right arterial pressure (RAP), pulmonal artery pressure (PAP), cardiac index (CI), - output (CO) and left ventricular end diastolic pressure (LVEDP) will be determined - pre -peri and -post procedural together with blood pressure and heart rate.
In subjects randomized to the treatment arm, ultrasound-guided access to the common femoral artery is obtained. The 17 Fr PulseCath iVAC 2L catheter is introduced into the left venticle. After this PCI was routinely perfomed by radial artery access.
After the procedure a vascular preclosure technique is used (two Perclose ProGlide®). Post-PCI, patients underwent echocardiography to investigate aortic valve injury or increase in aortic regurgitation. Patients were followed up by phone after 30 days to assess outcomes. After this visit the study ends for the participant.

Intervention

Use of the pulsecath iVAC2L during high risk PCI

Study burden and risks

Percutaneous insertion of the Pulsecath iVAC2L has the following risks:
-Acces site bleeding/haematoma 1-30%
-Vascular damage, possibily requiring surgery 1-5%
-Local infection (1%)
-Limb ischemia.(2%)
-Stroke (2%)
-Hemolysis (2-20%)

Extensive blood loss can lead to need for blood transfusion.

However, if the protocol is closely followed, adverse effects are predictiable.
There exist protocols how to insert and remove the device.
De adverse effect are reversible, except stroke.

De pump will be placed by the femoral artery. It will happen using local

anesthesia, and this can give temporary pain/unease. The same applies to the PAC placement that is placed in the femoral vein. The patiënt will have to lay down still, but this will be nessecary during the normal procedure aswell.
In case of adverse effects this can be mentally difficult, however the disease will probaly be even more demanding.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

- Age 18 or older - Multidisciplinary heart team consensus for MCS facilitated PCI AND - SCAI A-B AND - LVEF <30% AND - Complex left main disease (requiring debulking techniques, 2-stent etc, left dominant) OR equivalent (ostial LAD and RCX) OR last remaining vessel (native) with likely prolonged procedural

ischemia

Exclusion criteria

- Contraindications for Pulsecath IVAC2L: a. Severe aortic regurgitation b. known presence of an LV thrombus (contrast echo/MRI) c. mechanical aortic valve prosthesis d. severe aortic valve stenosis e. peripheral arterial disease that would preclude placement of the PulseCath iVAC2L device - Cardiogenic shock defined as either SCAI CSWG stage C-E - Patient is intubated and mechanically ventilated - Stroke <3 months - Major bleeding event <3 months - History of bleeding diathesis or known coagulopathy (including heparin-induced thrombo-cytopenia), any recent GU or GI bleed, or will refuse blood transfusions. - Dialysis. - Pregnancy, or suspected thereof. - BMI > 35

Study design

Design

Study phase:	4
Study type:	Interventional
Intervention model:	Parallel
Allocation:	Randomized controlled trial
Masking:	Open (masking not used)

Primary purpose: Treatment

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	26-01-2024
Enrollment:	98
Type:	Actual

Medical products/devices used

Generic name:	iVAC2L
Registration:	Yes - CE intended use

Ethics review

Approved WMO Date:	02-08-2023
Application type:	First submission
Review commission:	METC Amsterdam UMC
Approved WMO Date:	01-03-2024
Application type:	Amendment
Review commission:	METC Amsterdam UMC
Approved WMO Date:	14-10-2024
Application type:	Amendment
Review commission:	METC Amsterdam UMC

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL83524.018.23