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PROTOCOL	2020-PMC-01
TITLE:	Safety and Performance of POLYMAILLE® C vascular prosthesis
EFFECTIVE DATE:	15 January 2021

A Retrospective, Observational, Multicenter, Study to Collect Clinical Safety and Performance data on POLYMAILLE®C

- Protocol 2020-PMC-01

Version 1

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Study Product Name:	**POLYMAILLE® C vascular prosthesis**
Sponsor/manufacturer:	**PEROUSE Medical** **Route du Manoir,** **60173 Ivry-le-Temple** **France**
Participating sites:	**To be detailed in separate document**

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1. LIST OF ABBREVIATIONS

AAA	Abdominal aortic aneurysm
ADE	Adverse Device Effect
AE	Adverse Event
CER	Clinical Evaluation Report
CTO	Chronic Total Occlusion
IAA	Iliac Artery Aneurysm
IC	Intermittent Claudication
ISO	International Organization for Standardization
MEDDEV	MEDical DEVice (i.e. European Commission's official guidance for medical devices)
PMCF	Post-Market Clinical Follow-up
CLTI	Chronic Limb Threatening Ischemia

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2. SYNOPSIS

Title:	**A Retrospective, Observational, Multicentre Study to Collect Clinical Safety and Performance data on POLYMAILLE® C vascular prosthesis**
Study Population:	Subjects who did receive **POLYMAILLE® C** at least one year ago for replacement or bypass of arteries. 2 main sub-populations will be studied depending on location of surgery (abdominal and peripheral), but data will be collected for all subjects who did receive **POLYMAILLE® C**.
Study Design:	Multi-center retrospective case series
Study Type:	PMCF
Number of subjects:	Data from a minimum of 200 subjects will be evaluated. A minimum of 100 subjects will be evaluated for each main location of surgery (abdominal and peripheral).
Follow-up	At least 1 year follow-up after surgery until a maximum of 5 years.
Study Product:	POLYMAILLE® C vascular prosthesis
Intended use:	POLYMAILLE®C vascular prostheses are indicated for replacement or bypass of arteries presenting aneurysm or obliterative arterial disease. Their indication is restricted to abdominal and peripheral surgery not crossing the knee flexion crease.
Objectives:	Describe safety and performance of POLYMAILLE® C
Performance primary endpoint:	Primary patency rate at 1 year after surgery using POLYMAILLE® C
Safety primary endpoint:	Mortality rate at 30 days after surgery using POLYMAILLE® C
Performance secondary endpoints:	• Procedural success rate • Primary patency rate at 30 days and 6 months after surgery using POLYMAILLE® C • Primary assisted patency rate at 30 days, 6 months and 1 year after surgery using POLYMAILLE® C • Secondary patency rate at 30 days, 6 months and 1 year after surgery using POLYMAILLE® C • Device failure during procedure or at discharge, at 30 days, 6 months and 1 year after surgery using POLYMAILLE® C

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Safety secondary endpoints	• Mortality rate during procedure or at discharge, at 6 months and 1 year after surgery using POLYMAILLE® C • Limb salvage rate at 30 days, 6 months and 1 year after surgery using POLYMAILLE® C • Adverse event during procedure or at discharge, at 30 days, 6 months and 1 year after surgery using POLYMAILLE® C
Exploratory endpoints	- After 1 year until the end of follow-up (5 years) using POLYMAILLE® C: o Primary patency o Primary assisted patency o Secondary patency o Device failure o Mortality o Limb salvage o Adverse events - Identify possible systematic misuse or off-label use of POLYMAILLE® C, with a view to verifying that the intended clinical purpose is correct.
Inclusion criteria	Subjects who did receive POLYMAILLE® C at least one year ago for replacement or bypass of pathological arteries.
Exclusion criteria	Patients who have objected to the collect of their data
Duration of the data collect:	6 months from first site operational to collect data until data delivery

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Data to be collected (as far as available)

- **Identification and demographic data**
  - Patient identification
  - Indication and location of the lesion(s)
  - Patients demographics and risk factors
  - Summary of previous cardiovascular interventions
  - Relevant medications
  - Diagnosis
- **Operative data**
  - Date of procedure
  - Identification data for the prosthesis
  - Information related to the surgical procedure
  - Relevant medication
  - Assessment of prosthesis function and mode of assessment if available
  - Device failure modes and documented adverse operative events
- **Post-operative data (follow-up)**
  - Date of follow-up visits
  - Summary of vascular interventions, including minimally invasive procedures
  - Clinical evaluation
  - Relevant medications
  - Device failure modes and documented adverse events
- **Any documented adverse events data (as far as available)**
  - Type of event, date of occurrence, severity, management, outcome
  - Any Documentation of probable causative factors (e.g. caused by the prosthesis, patient factors, technical factors)

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Timepoints of interests	- During procedure and at discharge (7-14 days) - 30-days after surgery ('peri-operative') - 6, 12 months - After 1 year until the end of follow-up (5 years)

3. INTRODUCTION.

POLYMAILLE® C devices are CE-marked and were initially introduced in the international market in 2002. Since January 2004, more than 55 000 single devices have been sold across various markets worldwide.

4. STUDY DEVICE

4.1. Summary description of the device

The studied device is POLYMAILLE® C (Figure 1), which consists in uniform straight or bifurcated tubular synthetic textile coated vascular grafts.

POLYMAILLE® C vascular grafts are made by knitting of polyethylene terephthalate (PET – polyester) yarns and impregnated with collagen CXE® coating of bovine origin.

CXE® collagen impregnation of the POLYMAILLE® C vascular grafts ensure water permeability of less than 5 ml/cm2/min at a pressure of 120 mm of mercury (Hg) and allows direct implantation of the prosthesis without the need for pre-clotting.

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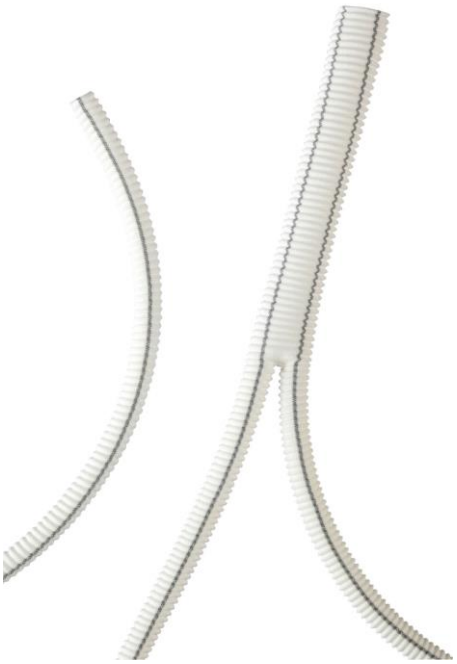

Figure 1: Uniform straight and bifurcated POLYMAILLE® C vascular grafts

POLYMAILLE® C vascular grafts are available in different configurations as summarized in the below tables:

Table 1 – POLYMAILLE® C CE-marked straight references

Reference	Nominal relaxed and pressurized inner diameter (mm)	Minimum usable length (cm)
PMC000640	6	40
PMC000660	6	60
PMC000670	6	70
PMC0006100	6	100
PMC000740	7	40
PMC000760	7	60
PMC000770	7	70
PMC0007100	7	100
PMC000840	8	40
PMC000860	8	60
PMC000870	8	70
PMC0008100	8	100
PMC001040	10	40
PMC001060	10	60
PMC001070	10	70
PMC0010100	10	100
PMC001230	12	30
PMC001240	12	40

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Reference	Nominal relaxed and pressurized inner diameter (mm)	Minimum usable length (cm)
PMC001260	12	60
PMC001270	12	70
PMC001415	14	15
PMC001430	14	30
PMC001440	14	40
PMC001460	14	60
PMC001470	14	70
PMC001615	16	15
PMC001630	16	30
PMC001640	16	40
PMC001815	18	15
PMC001830	18	30
PMC001840	18	40
PMC002015	20	15
PMC002030	20	30
PMC002040	20	40
PMC002215	22	15
PMC002230	22	30
PMC002240	22	40
PMC002415	24	15
PMC002430	24	30
PMC002440	24	40

Table 2 – POLYMAILLE® C CE-marked bifurcated references

Reference	Main tube nominal relaxed and pressurized inner diameter (mm)	Branches nominal relaxed and pressurized inner diameter (mm)	Minimum usable overall length (cm)
PMC120650	12	6	50
PMC140750	14	7	
PMC160850	16	8	
PMC180950	18	9	
PMC201050	20	10	
PMC221150	22	11	
PMC241250	24	12	

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4.2. Intended purpose and patient population

4.2.1. Intended clinical purpose

POLYMAILLE®C vascular prostheses are indicated for replacement or bypass of arteries presenting aneurysm or obliterative arterial disease. Their indication is restricted to abdominal and peripheral surgery not crossing the knee flexion crease.

Abdominal vascular surgery includes abdominal aorto-aortic and/or aorto-iliac and/or aorto-femoral vascular repair, i.e. graft implantation with proximal anastomosis to abdominal aorta (supra and/or infra-renal).

Peripheral vascular surgery includes peripheral arteries repair, i.e. graft implantation with no aortic anastomosis, and/or extra-anatomic vascular repair such as axillo-femoral and/or crossover bypass (femoro-femoral and/or ilio-femoral).

4.2.2. Patient population characteristics

Patient population conditions that may indicate abdominal and/or peripheral vascular open surgical repair with implantation of a vascular graft include:

- Peripheral arterial diseases (PAD), characterized by reduced blood flow to the lower extremities, which may be categorized as:
  - Intermittent claudication (IC)
  - Chronic limb-threatening ischemia (CLTI)
  - Acute limb ischemia (ALI)
  - Chronic total occlusion (CTO)
- Arterial aneurysms, characterized by a permanent localized (i.e., focal) dilatation having at least a 50% increase in diameter, which may be categorized by location:
  - Abdominal aortic aneurysms (AAA)
  - Peripheral arterial aneurysms
    - Ilia arterial aneurysms (IAA)
    - Femoral arterial aneurysms (FAA)
    - Popliteal arterial aneurysms (PAA)

4.2.2.1. Peripheral arterial diseases (PAD)

Reported PAD risks factors are:

- History of cardiovascular disease
- Smoking
- Diabetes mellitus
- Hypertension

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- Dyslipidemia
- Obesity
- Age

Age is the strongest risk factor for PAD. The disease is rare in individuals younger than 40 years, rises in prevalence in the sixth to eighth decades, and may affect 25% or more of individuals 80 years and older.

4.2.2.2. Arterial aneurysms

Reported arterial aneurysms risks factors are:

- advanced age,
- gender,
- smoking,
- family history,
- obesity,
- co-morbidities such as coronary heart disease, diabetes, atherosclerosis.

Prevalence of abdominal aortic aneurysms (AAA) 4 cm or larger is approximately 1% of men between the ages of 55 and 64 years and increases with advancing age by 2% to 4% by decade. Emergence of AAAs rises sharply in individuals aged ≥60 years old. It has also been consistently demonstrated that AAAs occur with greater frequency in men, smokers, and those with a family history of aortic aneurysm.

Data on prevalence of AAA varies between 1.3% and 12.5% in males, and between 0.0% and 5.2% in females. Overall prevalence varies from 4 to 8%.

Iliac artery aneurysms (IAAs) commonly occur concurrently with other more proximal arterial aneurysms. In contrast to generalized aorto-iliac aneurysms, isolated iliac aneurysms are prevalent in ≤ 2% of the general population.

Femoral artery true aneurysms are found predominantly in older men (70 years or older) and are associated with smoking and hypertension.

Popliteal artery aneurysms are rare in the general populations, although they are the most common peripheral artery aneurysms (70% of them). PAAs are exclusively found in men. A prevalence of around 1% in men has been reported in UK between 65 and 85 years.

4.3. Contra-indications

POLYMAILLE®C vascular prostheses are contraindicated for surgery of the thoracic aorta, coronary bypass, arteriovenous access, extracorporeal circulation and crossing the knee flexion crease.

POLYMAILLE®C vascular prostheses are contraindicated in patients with an immune reaction or hypersensitivity, known or suspected, to collagen of bovine origin.

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5. STUDY DESIGN

POLYMAILLE® C is a retrospective, observational, multicentre, descriptive study which examine short and long-term outcomes of using POLYMAILLE® C. This study will be done on all comers Real World Data to collect clinical safety and performance data on the device.

5.1. Summary of relevant Clinical data

Prospective randomized clinical trial

El-Barbary (2014) conducted on its own initiative, a prospective randomized clinical trial with the aim to compare expanded polytetrafluoroethylene (ePTFE; 6-mm LifeSpan®) prosthesis and collagen-impregnated knitted polyester (Dacron; 6-mm POLYMAILLE® C) for above-knee (AK) femoro-popliteal bypass grafts in chronic ischemia patients. Between March 2010 and September 2012, 44 AK femoro-popliteal bypass grafts were randomly allocated to either an ePTFE (n=22) or a Dacron (n=22) vascular graft (6 mm in diameter). The median age was 62 (35-76) years for ePTFE group and 62 (39-69) years for Dacron group. The primary end point of the study was the primary patency at 6, 12 and 24 months. Secondary patency, amputation rate and complications were chosen as secondary endpoints.

Primary patency at 6, 12 and 24 months was 95%, 91% and 76% for PTFE and 95%, 95% and 86% for Dacron, respectively (p = 0.47). Secondary patency at 6, 12 and 24 months was 95%, 95% and 86% for PTFE and 95%, 95% and 91% for Dacron, respectively (p = 0.77).

Regarding safety, no deaths occurred within 30 days of surgery. Thirty-days complications occurred equally frequent in both groups. The following complications were reported in the Dacron group: 2 deaths (at 2 years), 1 deep wound infection, 1 major limb amputation, 3 minor amputations on toes or forefoot, 1 case of 30-day cardiac complications (myocardial infarction or arrhythmia). There was no significant difference in amputation, overall morbidity, or mortality rates between the two surgical graft populations, and the rate of limb salvage was not significantly different for the two graft materials. Results has also shown that the most significant predictors of early graft failure were diabetes mellitus and critical limb ischaemia.

This study showed that Dacron grafts may be at least as durable as ePTFE for above-knee bypass procedures, and might even be superior.

This study supports the use of knitted prosthetic grafts (POLYMAILLE® C) for the replacement of peripheral arteries during peripheral atherosclerotic arterial disease and collects the performance of vascular grafts (primary patency) up to 2 years of follow-up. This study also provides safety information.

Clinical survey (unpublished)

PEROUSE MEDICAL conducted a multicentre, non-prospective, non-comparative post-marking evaluation using evaluation questionnaires where the POLYMAILLE® C vascular graft was evaluated (NPCI 2009, Manufacturer's own report). The aim of this investigation was to evaluate the characteristics of the POLYMAILLE® C vascular graft by surgeons, in terms of comfort and ease of use

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(suppleness, conformability, clean and safe cutting with scissors, ideal suturability, optimal circumferential stability).

From May 2008 to February 2009, 88 implanted POLYMAILLE® C vascular grafts have been included in this clinical survey. No inclusion or exclusion criteria were imposed. This clinical survey was conducted in 4 countries: Italia, Austria, Czech Republic and Belgium. There were no follow-up visits of implanted patients, as the aim of this survey was the assessment of the peri-operative prosthesis characteristics (before implantation, during implantation and after blood flow restoration).

As results from the questionnaire, it was concluded that: main interventions were elective (75%) with conventional surgery; interventions were conducted in the abdominal site or peripheral site (no thoracic use); bifurcated prosthesis was preferred (85.7%) for the abdominal site, while straight prosthesis was preferred (91.7%) for the peripheral site. This survey did not mention patient's data, therefore indication of prosthesis (aneurysmal or obliterative arteries) is not reported.

Surgeons considered the sensation (touch) of POLYMAILLE® C graft as excellent or good (97.7%), similarly to the suppleness (93.2%) and the ease of cutting (97.7%).

During the implantation, 94.3% considered the anastomotic conformability as excellent or good, similarly to the suturability (95.4%). Proximal anastomosis (both terminal and lateral) was easily performed as rated by 98.9% of the surgeons. Similarly, the distal anastomosis was considered easy to perform by 96.6% of the surgeons. The most frequent needles used in suture were round in both proximal and distal anastomosis (86.4% and 76.1% respectively). Comfort of POLYMAILLE® C vascular grafts was considered as excellent or good by 84.1% of surgeons (against 7.9% who considered the comfort as average or insufficient).

Difficulties during implantation were reported from one centre: leakage of graft beneath bifurcation, twisted markings of the graft, torsion of the graft in the canal of Hunter, bleeding of the graft.

After blood flow restoration: the general appearance was considered as excellent or good in 98.8% of cases; the limited circumferential dilatation and the longitudinal elongation were assessed as excellent or good (95.4% in both cases). Despite some cases of leakage of graft beneath bifurcation, torsion of the prosthesis in the canal of Hunter and bleeding of the graft, it was reported that the blood tightness of the graft was excellent or good in 95.5% of cases, and similar results were recorded for the blood tightness of the anastomoses (93.1%).

Regarding safety, among the 88 implanted patients, only 3 complications (3.4%) were reported during the intervention (1 bleeding, 1 cardiorespiratory failure leading to patient's death the day after, 1 operative re-anastomosis from external iliac to common femoral artery).

Following this NPCI evaluation questionnaire, it was concluded that POLYMAILLE® C was associated with high level of comfort and ease of use during conventional surgery. This clinical survey also supports the use of knitted prosthetic grafts for the replacement of abdominal and peripheral arteries. This clinical survey may be adapted to procedural success, however, it does not support long-term performance and safety of the prosthesis, as only peri-operative data were available.

This study supports the use of knitted prosthetic grafts (POLYMAILLE® C) for the replacement of abdominal and peripheral arteries and confirms the performance of vascular grafts (procedural success) in peri-operative period. This study also provides peri-operative safety information.

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Vigilance data

An ad hoc analysis of sales and complaints was obtained for the sixteen-year time period since January 2004. During that period more than 55 000 POLYMAILLE® C devices were sold. During the same time period a total of 37 complaints were reported yielding an overall complaint rate of 0.066% of POLYMAILLE® C (Manufacturer's data).

5.2. Rationale for PMCF study

Available evidence confirms acceptability of performance and side effects related to POLYMAILLE® C; however intended claims on clinical safety and performance are not sufficiently supported with existing clinical evidence, especially for long term assessment and for abdominal surgical locations. In order to keep POLYMAILLE® C in European market, a post-market clinical follow-up (PMCF) study is needed.

5.3. Subjects

The participating hospitals will screen all potential subjects and will select those who are appropriate for study inclusion, i.e. subjects implanted with POLYMAILLE® C for at least one year, or with complete data to death. As the study explores real world data, there is no exclusion criteria for subjects and all subjects with POLYMAILLE® C implanted for at least one year and up to 5 years will be included in the study.

All data will be retrieved from medical charts for each patient from time of surgery (considered as index date) until a maximum of 5 years after surgery.

Data from a minimum of 200 from 3 to 8 different sites in France will be evaluated. A minimum of 100 subjects will be evaluated for each main location of surgery (peripheral and abdominal).

Not more than 50% of study total enrolled subjects shall pertain to one unique centre.

5.3.1. Inclusion criteria

Patients must meet all the following inclusion criteria in order to be eligible for inclusion in the study:

- Patient has a minimum of 1-year post-operative follow-up data available, or complete data to death

5.3.2. Exclusion criteria

Patients who have objected to the collect of their data.

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6. RISKS AND BENEFITS OF THE DEVICE

6.1. Anticipated clinical benefits

There is no clinical benefit expected from the study as the evaluated device is already commercially available and used in routine, and as there will be no extra procedure for subjects who have been already implanted and followed. The study will only analyze already collected data.

There is no anticipated additional clinical benefit expected from the use of POLYMAILLE® C devices rather than other commercially available similar devices with same indications for use.

Anticipated clinical benefits of the device are thus equivalent to anticipated clinical benefits of open surgical vascular repair of abdominal and peripheral arteries.

Replacement or bypass of arteries presenting obliterative arterial disease (PAD) is required to restore the function of the artery: restore the blood flow to distal tissues. Anticipated clinical benefits may consist in patient's symptoms relief, improved quality of life and reduced tissular ischemia, amputation and mortality risks.

Replacement or bypass of arteries presenting aneurysmal disease is required to exclude the aneurysmal part without compromising the blood flow to distal tissues. Anticipated clinical benefits may consist in reduced risks of aneurysm associated thrombotic complications and reduced risk of aneurysm rupture and mortality.

6.2. Anticipated risks

There is no risk either associated to the study, as there is no procedure performed in the scope of the study. The risks listed below are those related to revascularization surgery and use of grafts and will be the ones monitored.

The type and rate of anticipated risks may differ according to indication and location of the surgical procedure, and may result in:

- Medically important event or reaction
- Persistent or significant incapacity or substantial disruption of the ability to conduct normal life functions
- Re-intervention and re-hospitalization or prolongation of existing hospitalization
- Life-threatening event, reaction up to death.

Early (peri-operative) and late adverse events of abdominal aortic and peripheral arteries open vascular repair with POLYMAILLE® C devices include:

- Bleeding
- Hematoma
- Adherence to surrounding tissues
- Allergic reaction

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- Inflammatory reaction / oedema
- Seroma / lymphorrea formation
- Wound complications: infection (superficial or deep), revision
- Graft infection
- Graft dilatation
- Pseudo aneurysm / false aneurysm (para-anastomotic aneurysm; non-anastomotic aneurysm)
- Graft stenosis / occlusion
- Limb occlusion
- Amputation (major or minor)
- Secondary aorto-enteric fistula
- Renal dysfunction
- Neurologic deficit
- Pericardial effusion
- Pulmonary complication (pneumonia, perioperative acute pulmonary oedema)
- Cardiac complications (myocardial infarction or arrhythmia, ischemic heart disease, atrial fibrillation)

7. OBJECTIVES AND ENDPOINTS

The principal objective of the POLYMAILLE® C study is to describe safety and performance of POLYMAILLE® C.

Identification and analysis of potential emergent risks will be performed according to the availability of the collected adverse events.

Identification of possible systematic misuse or off-label use of POLYMAILLE® C, with a view to verifying that the intended purpose is correct, will also be performed according to the availability of the data.

The following table summarizes the performance and safety endpoints and timeframe after surgery.

		Time period following surgery			
Study endpoints	**At surgery**	**30 days**	**6 months**	**1 year**	**>1 year until 5 years of follow-up**
Performance endpoints					
Primary patency rate*	---	X	X	**X***	X
Primary assisted patency rate	---	X	X	X	X
Secondary patency rate	---	X	X	X	X
Device Failure	X	X	X	X	X
Procedural success rate	X	---	---	---	---
Safety endpoints					
Mortality rate*	X	**X***	X	X	X
Limb salvage rate	---	X	X	X	X
Adverse events **	X	X	X	X	X

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** Primary endpoint*
***Listed in section 6.2*

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7.1. Performance endpoints

- Primary performance endpoint is **primary patency rate at 1 year** after surgery using POLYMAILLE® C.
- The others performance endpoints are:
    - Procedural success rate, *defined as:*
        - *Ability to use with no need for replacement by another device and,*
        - *Effective vascular flow restoration after procedure and,*
        - *In case of aneurysm, exclusion of aneurysmal portion after procedure.*
    - Primary patency rate, *defined as rate of patent grafts without any procedure or intervention of the conduit itself*
    - Primary assisted patency rate, *defined as rate of patent grafts, with or without procedure or intervention of the conduit itself after device implantation, such as endovascular balloon angioplasty or anastomotic revision, however with graft never thrombosed (graft occlusion)*
    - Secondary patency rate, *defined as rate of patent grafts, with or without procedure or intervention of the conduit itself after device implantation, such as endovascular balloon angioplasty or anastomotic revision, lysis and/or thrombectomy*.
    - Device Failure, *defined as:*
        - *Uncontrolled blood leakage from device*
        - *Loss of structural integrity, e.g. rupture and/or exaggerated dilation (> 50 %)*
        - *Occlusion of the device*
        - *Total or partial replacement of the device required*

7.2. Safety endpoints

- Primary safety endpoint is **mortality rate at 30 days** after surgery using POLYMAILLE® C.
- Others study safety endpoints are:
    - Mortality rate, *defined as freedom % from death*
    - Limb salvage rate, *defined as freedom % from target limb amputation*
    - Adverse events, *defined as any documented adverse events, including anticipated (as listed in section 6.2) and non-anticipated adverse events.*

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8. STATISTICAL CONSIDERATIONS

8.1. Statistical design, method and analytical procedures

All the patients participating in the study who met the eligibility criteria will be included in the study population.

A descriptive analysis with clinical characteristics of all patients included in the study will be performed at the index date.

Exploratory analyses will be conducted globally and by the 2 sub-populations. Results will be stratified according to 2 main surgical locations:

- Abdominal surgical location:
    - Aorto-aortic and/or aorto-iliac and/or aorto-femoral repair
- Peripheral surgical location:
    - Peripheral artery repair and extra anatomic bypasses

Since no hypotheses will be tested, study objectives will be addressed using descriptive statistics only. Given the real-world nature of the data, the use of multiple imputation methods for missing data would introduce bias as missing data cannot be considered completely at random (MCAR) or at random (MAR). Variables will not be imputed, with the exception of dates in which the exact day is missing: the missing day will be replaced by the middle day of the month.

Continuous variables will be described with number of patients with valid / missing observations, mean and its 95% confidence interval (95%CI), standard deviation (SD), median, 25 and 75 percentiles (P25 and P75, respectively), minimum and maximum. For non-normally distributed continuous variables geometric mean and its 95%CI will be reported too.

For categorical variables counts and percentages per category will be presented. Missing observations (including invalid observations) will be tabulated as a separate category. If the % of missing data does not exceed 10 %, the calculation of proportions will not include the missing/invalid category in the denominators.

P-values will be presented in the summary tables, in association with the descriptive statistics. In addition, 95% confidence intervals (95%CI) will be presented when considered convenient or relevant. Results will be graphically represented when appropriate to make interpretation easier.

The two-sided level of significance will be set at 0.05 for all the statistical tests performed.

Statistical calculations will be carried out by using R software. More details on the statistical analysis will be provided in the Statistical Analysis Plan.

8.2. Sample size justification

Data from a minimum of 200 subjects will be evaluated. A minimum of 100 subjects will be evaluated for each main location of surgery (abdominal and peripheral).

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The number of patients has been chosen in accordance with the realistic number of operated patients in the involved hospitals.

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9. DATA MANAGEMENT

9.1. Data sources

Real World Data sources used to generate Real World Evidence are:

- Data derived from Electronic health Record
- Medical claims and/or billing data
- Product and/or disease registry data

9.2. Data to collect

As mentioned previously considering study is retrospective and considering that every site can have different ways to follow their patients after surgery, data will be collected as much as possible in order to determine the clinical safety and effectiveness.

The following data will be collected, when available according to participating site available data.

- **Identification and demographic data**
    - Patient identification
    - Indication and location of the treatment
    - Location of the surgery
    - Patients demographics
        - Date of birth
        - Sex
        - Mass
    - Identification of implanting physician
    - Name of the institution
- **Pre-operative data**
    - Risks factors, such as hypertension, diabetes, coronary artery disease, hyperlipidemia, tobacco use, obesity, anaesthesia risk and any cardiovascular risk factor.
    - Summary of previous vascular interventions at the same or other relevant vascular sites, including non-surgical interventions and previously implanted vascular devices (e.g. stents, endovascular prostheses, surgically placed vascular grafts)
    - Relevant medications
    - Diagnostic criteria
        - Clinical assessment (e.g. non-invasive hemodynamic assessment);

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        - Objective assessment (e.g. C.T. scanning, magnetic resonance imaging, ultrasonography, arteriography, duplex Doppler)

- **Operative data**
    - Date of procedure
    - Identification data for the vascular prosthesis including configuration (e.g. straight uniform or bifurcated) and diameter
    - Information regarding the procedure:
        - Identity of native vessel treated
        - Details of anastomoses (e.g. type (end-to-end), location
        - Length of prosthesis implanted (if available)
        - Adjunctive vascular procedures
    - Relevant medication (e.g. heparin, other anticoagulants)
    - Assessment of prosthesis function and mode of assessment if available (e.g. intraoperative angiography, intraoperative Doppler)
    - Failure modes and adverse operative events
- **Post-operative data**
    - Interval of follow-up (e.g. discharge or 7 d to 14 d after surgery, 30 days, 6 and 12 months after surgery, up to 5 years for exploratory time points)
    - Date of follow-up visits
    - Summary of vascular interventions, including minimally invasive procedures
    - Clinical evaluation:
        - Clinical assessment (e.g. non-invasive hemodynamic assessment)
        - Objective assessment of prosthesis (e.g. C.T. scanning, magnetic resonance imaging, ultrasonography, arteriography, duplex Doppler)
    - Relevant medications (e.g. anticoagulants or antiplatelets)
    - Any documented adverse events including the events listed in section 6.2 anticipated risks and any events that lead to the patient's death

- **Any documented adverse events data**

  As far as available the following data will be collected per adverse event:
    - Type of event, date of occurrence, severity, management (e.g. none, medical treatment, endovascular procedure, open surgery), outcome (e.g. continuing, resolved, unknown, death)

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- Any Documentation of prosthesis involvement
- Any Documentation of probable causative factors (e.g. caused by the prosthesis, patient factors, technical factors)
- Explant data:
  - Date
  - Whether the subject is living or deceased
  - Reason for explant, if applicable
  - Relevant observations (e.g. device integrity, device positioning, tissue incorporation, vascular tissue erosion), if available

A separate document with all available data to collect will be produced in a second time to add further details depending on the level of details available.

9.3. Data consistency

Data consistency will be verified for each variable. Harmonization of units (conversion), categorical variables consistency and ranges of numerical variables will be also verified. This step will be proceeded before database freezing and analyses. If inconsistencies are noticed, monitoring and checks will be asked from the sites.

9.4. Missing data

Some endpoints can be missing for some subjects. Endpoints proportions will be calculated on the number of non-missing observations. No imputation method is planned.

9.5. Database structuration

After data consistency step, databases will be compiled to one database frozen for analyses. Variables might be created for the analyses.

10.ADVERSE EVENTS DEFINITIONS

An Adverse Event (AE) is any untoward medical occurrence, unintended disease or injury, or untoward clinical signs (including abnormal laboratory findings) in subjects, users or other persons, whether or not related to the studied medical device.

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11.SAFETY REPORTING PROCEDURES

Considering the nature of this PMCF study (retrospective study), only Vigilance reporting applies. Any event that meets the vigilance criteria as per MEDDEV 2.12-1 and that would not have already been reported to the Authorities will be reported in accordance to manufacturer and hospital/manufacturer standard procedures.

12.REGULATORY CONSIDERATIONS

This PMCF study will be conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki and any regional or national regulations applicable in France.

This PMCF study will be conducted in compliance with GDPR and by following the Methodology of Reference MR-004 developed by CNIL (French Data Protection Agency).

The principals set forth in the ISO14155:2011 will be followed as far as possible considering the nature of this PMCF study (retrospective collect of data).

13.INFORMED CONSENT PROCESS

An information letter explaining the purpose of this PMCF study will be sent to patients who meet the inclusion criteria. In accordance with the MR-004, the collection of data of patients who have not objected this collect will be initiated.

The completion of this process will be recorded in study documentation.

14.MONITORING OF THE STUDY

The conduct of this retrospective study will be monitored by the sponsor to ensure that it is conducted, recorded and reported in accordance with the CIP and the applicable regulatory requirements. A centralized visit (phone call) will be performed at the start of the study, during the study to oversee its progress and at the end of the study.

15.CONFIDENTIALITY OF THE STUDY

Subjects will be identified by a study number and subject identification code. Subject ID log will be maintained in a secure storage facility and archived for at least 2 years after study completion or for a longer period as required by the local regulations. Study records will not be destroyed without authorisation from the Sponsor.

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16.PUBLICATION POLICY

16.1. Multicentre Publication

The sponsor may invite the participating hospitals to take part to a multicenter publication of the study results, in which case it will be ensured that the documents submitted for publication comply with the publisher's requirements for authors and contributors. Also, the sponsor will select a publisher based on mutual agreement with the participating hospitals, who are invited to participate in the publication.

16.2. Publication

The participating hospitals may publish his/her own data subject to the following restrictions:

- the multicenter manuscript must be published prior to each participating hospital publishing their own data;
- the manuscript shall be submitted to the Sponsor for review prior to submitting the manuscript for publication;
- the manuscript must reference the study multicenter manuscript.

17.CLINICAL STUDY REPORT

The Sponsor will prepare a Clinical Study Report that will comprehensively describe study findings. Before finalization, a draft will be circulated to the participating hospital physician for review and endorsement.

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