STUDY PROTOCOL

Official Title: Comparison of Bidirectional Palpation Test and Transit Time Flow Measurement for LIMA-LAD Graft Patency

NCT Number: NCT06934993

Date: 11.10.2024

Sponsor Institution: Istanbul University-Cerrahpaşa, Faculty of Medicine, Department of Cardiovascular Surgery

Ethics Approval: Approved by the Istanbul University-Cerrahpaşa Clinical Research Ethics Committee (approval dated 11.10.2024; Turkish document added to the end of the file)

A. Rationale and Objective of the Study:

The aim of this study is to evaluate the correlation between the Bidirectional Palpation Test and TTFM measurements, and to assess early postoperative outcomes by examining graft patency using coronary CT angiography.

B. Main Study Form:

B.1.1. General Information:

Graft patency is one of the most critical factors determining morbidity and mortality after coronary artery bypass grafting (CABG). Revascularization of the left anterior descending (LAD) artery has been associated with improved long-term outcomes, including reduced mortality and relief of angina symptoms. The first-choice graft for LAD revascularization is the left internal mammary artery (LIMA). LIMA-LAD anastomosis is considered the gold standard due to its superior long-term patency.

Therefore, evaluating the patency of the LIMA-LAD anastomosis is crucial for both early and long-term outcomes. While various methods are used routinely, many are complex and costly. The bidirectional palpation test, developed in our clinic, is a subjective yet simple and reliable method. In this test, after completion of anastomoses, temporary weaning from cardiopulmonary bypass (CPB) is performed to establish pulsatile pressure. A segment of the LIMA with palpable pulse is identified. In the first step, a bulldog clamp is placed distal to this point; continued palpation indicates antegrade flow from the subclavian artery. In the second step, the clamp is moved proximally; continued pulse detection indicates retrograde flow through the LIMA-LAD anastomosis, indirectly confirming its patency.

Additionally, Transit Time Flow Meter (TTFM) measurements will be used as an objective method to evaluate graft patency. This study aims to assess the correlation between the bidirectional palpation test and TTFM with postoperative graft patency determined by coronary CT angiography. Within the first 30 postoperative days, coronary CTA will evaluate patency of the LIMA and other grafts, graft-native vessel calibration, graft position, sternum healing, and lung parenchyma.

B.1.2. Materials and Methods

B.1.2.1. Subjects Inclusion Criteria:

Patients planned for CABG in our clinic will be informed and consented. Those undergoing LIMA-LAD anastomosis will be included.

Exclusion Criteria:

Patients at risk for contrast nephropathy and those undergoing LAD revascularization with grafts other than LIMA will be excluded.

B.1.2.2. Methods Used in the Study

a. Laboratory and Clinical Assessment Methods:

Bidirectional palpation and TTFM measurements will be conducted intraoperatively using standard techniques, posing no additional surgical risk. Coronary CTA is selected as it is a non-invasive imaging method used to assess native coronary arteries and graft patency post-revascularization.

b. Statistical Methods:

Chi-square test, Student's t-test, Fisher's exact test, and Kaplan-Meier survival analysis for primary endpoints.

C. Protocol:

C.1. Start Date of the Study:

April 15, 2024

C.2. Duration of the Study:

6 months

C.3. Study Location:

Istanbul University - Cerrahpaşa, Cerrahpaşa Faculty of Medicine, Department of Cardiovascular Surgery

C.4. Study Investigators:

Advisors:

Prof. Dr. Suat Nail Ömeroğlu

Dr. Çiğdem Tel Üstünışık

Principal Investigator:

Dr. A. Orhun Yenigün

D. Study Outcomes, Ethics and Legal Requirements:

D.1. Outcomes:

This study is expected to reduce morbidity and mortality due to graft occlusion by allowing intraoperative assessment of graft flow and anastomosis quality. Revising the graft during surgery, if necessary, may prevent the risks and burden of reoperation. Additionally, if the bidirectional palpation test results are consistent with TTFM and early graft patency is confirmed via coronary CTA, this cost-free and easily applicable method may gain broader clinical adoption.

D.2. Ethics Committee Notification:

All necessary ethics committee notifications are planned before, during, and after the study.

D.3. Data Storage and Quality Assurance:

All records and information obtained in the study will be stored by the investigators. Personally identifiable information will not be included in statistical data sets; patients will be coded.

E. References:

1. Miguel Sousa-Uva, Franz-Josef Neumann, Anders Ahlsson, Fernando Alfonso, Adrian P Banning, Umberto Benedetto, Robert A Byrne, Jean-Philippe Collet, Volkmar Falk, Stuart J Head, Peter Jüni, Adnan Kastrati, Akos Koller, Steen D Kristensen, Josef Niebauer, Dimitrios J Richter, Petar M Seferović, Dirk Sibbing, Giulio G Stefanini, Stephan Windecker, Rashmi Yadav, Michael O Zembala, ESC Scientific Document Group , 2018 ESC/EACTS Guidelines on myocardial revascularization, *European Journal of Cardio-Thoracic Surgery*, Volume 55, Issue 1, January 2019, Pages 4–90, https://doi.org/10.1093/ejcts/ezy289

2. Boylan MJ, Lytle BW, Loop FD, Taylor PC, Borsh JA, Goormastic M, Cosgrove DM. Surgical treatment of isolated left anterior descending coronary stenosis. Comparison of left internal mammary artery and venous autograft at 18 to 20 years of follow-up. J Thorac Cardiovasc Surg. 1994 Mar;107(3):657-62. PMID: 8127094.

3. Sabik JF 3rd, Blackstone EH, Gillinov AM, Banbury MK, Smedira NG, Lytle BW. Influence of patient characteristics and arterial grafts on freedom from coronary reoperation. J Thorac Cardiovasc Surg. 2006 Jan;131(1):90-8. doi: 10.1016/j.jtcvs.2005.05.024. Epub 2005 Dec 5. PMID: 16399299.

4. Schmitto JD, Rajab TK, Cohn LH. Prevalence and variability of internal mammary graft use in contemporary multivessel coronary artery bypass graft. Curr Opin Cardiol. 2010 Nov;25(6):609-12. doi: 10.1097/HCO.0b013e32833f0498. PMID: 20881486.

5. Mujanović E, Kabil E, Bergsland J. Transit time flowmetry in coronary surgery--an important tool in graft verification. Bosn J Basic Med Sci. 2007 Aug;7(3):275-8. doi: 10.17305/bjbms.2007.3059. PMID: 17848157; PMCID: PMC5736123.

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7. Lehnert P, Møller CH, Damgaard S, Gerds TA, Steinbrüchel DA. Transit-time flow measurement as a predictor of coronary bypass graft failure at one year angiographic follow-up. J Card Surg. 2015 Jan;30(1):47-52. doi: 10.1111/jocs.12471. Epub 2014 Nov 3. PMID: 25363805.

8. Niclauss L. Techniques and standards in intraoperative graft verification by transit time flow measurement after coronary artery bypass graft surgery: a critical review. Eur J Cardiothorac Surg. 2017 Jan;51(1):26-33. doi: 10.1093/ejcts/ezw203. Epub 2016 Jun 13. PMID: 27298393.

9. Kieser TM, Rose S, Kowalewski R, Belenkie I. Transit-time flow predicts outcomes in coronary artery bypass graft patients: a series of 1000 consecutive arterial grafts. Eur J Cardiothorac Surg. 2010 Aug;38(2):155-62. doi:

10.1016/j.ejcts.2010.01.026. Epub 2010 Feb 21. PMID: 20176493.

İÜC Tarih ve Sayı: 12.06.2024-1014609

T.C.
İSTANBUL ÜNİVERSİTESİ-CERRAHPAŞA
REKTÖRLÜĞÜ
Klinik Araştırmalar Etik Kurulu

Sayı : E-83045809-604.01-1014609 12.06.2024
Konu : Araş.Gör.Dr.Abdullah Orhun YENİGÜN
etik kurul kararı

KALP VE DAMAR CERRAHİSİ ANABİLİM DALI
BAŞKANLIĞINA

İlgi : 11.10.2024 tarihli 806763 sayılı yazınıza istinaden

Anabilim Dalınızda görevli Araş.Gör.Dr.Abdullah Orhun YENİGÜN'ün yürütücülüğünde, Öğr.Gör.Dr.Çiğdem Tel ÜSTÜNIŞIK, Prof.Dr.Suat Nail ÖMEROĞLU'nun danışmanlığında yapılacak olan "**LIMA-LAD Greft Açıklığının Çift Yönlü Palpasyon Testi, Transit Time Flow Meter (TTFM) ve Koroner BT Anjiyografi İle Karşılaştırılması**" başlıklı çalışma 11.06.2024 tarihli etik kurulumuzca müzakere edilmiş olup, etik açıdan uygun görülmüştür

Bilgilerinize rica ederim

Prof. Dr. Mehmet Sarper ERDOĞAN
Başkan

Ek:01 Adet karar fiziki olarak teslim alınacaktır

Bu belge, güvenli elektronik imza ile imzalanmıştır.

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Ethics Committee Approval (English Translation)

REPUBLIC OF TURKIYE

ISTANBUL UNIVERSITY-CERRAHPASA

RECTORATE

Clinical Research Ethics Committee

Ref No: E-83045809-604.01-1014609 Date:

12.06.2024

Subject: Research Assistant Dr. Abdullah Orhun YENIGUN Ethics Committee

Decision

To: Department of Cardiovascular Surgery Chairmanship

Reference: Your letter dated 11.10.2024, numbered 806763

Upon review of the study titled "Comparison of LIMA-LAD Graft Patency via Bidirectional Palpation Test, Transit Time Flow Meter (TTFM), and Coronary CT Angiography", to be conducted under the supervision of Research Assistant Dr. Abdullah Orhun YENIGUN, with the consultancy of Lecturer Dr. Cigdem Tel USTUNISIK and Prof. Dr. Suat Nail OMEROGLU, from your department, the project was discussed in our ethics committee meeting dated 11.06.2024 and was deemed ethically appropriate.

Kindly be informed.

Prof. Dr. Mehmet Sarper ERDOGAN

Chairman

Ethics Committee Approval (English Translation)

Attachment: 1 hard copy of the decision will be delivered in person.

This document has been signed with a secure electronic signature.

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