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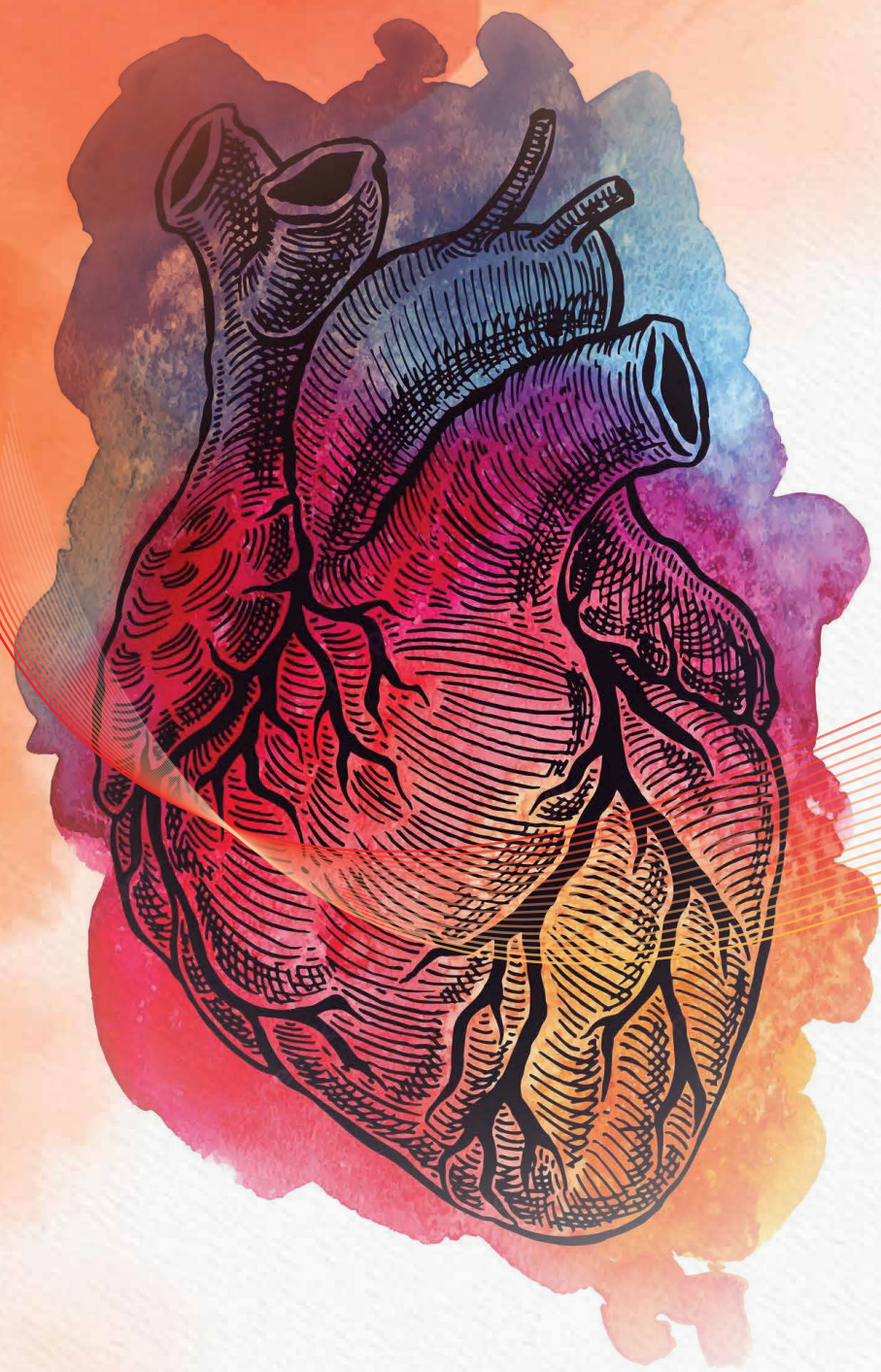

ACC ABSTRACTS

AN OVERVIEW 2023

ACC.23 TOGETHER WITH WCC

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1 AIMI-HF Trial:

Ischemia and Viability Imaging in Heart Failure: The Alternative Imaging Modalities in Ischemic Heart Failure Trial

Introduction

The AIMI-HF Trial was a prospective comparative effectiveness study that compared the effectiveness of advanced imaging techniques, such as CMR or PET, versus traditional imaging techniques, such as SPECT, on a composite endpoint of cardiac death, MI, resuscitated cardiac arrest, and cardiac re-hospitalization in patients with heart failure due to ischaemic heart disease.

The purpose of this investigation and its justification

Revascularization's role in patients with underlying ischemic heart disease who have experienced heart failure remains unclear. The STICH trial's prolonged follow-up data, which suggests decreased all-cause and cardiovascular mortality after 10 years in patients undergoing CABG, has provided the strongest evidence to date in favour of full revascularization in patients with ischemic cardiomyopathy[1]. The benefit for surgical revascularization, however, only became apparent at a long-term follow-up, and this cohort does not represent current optimal medical therapy.

In the ISCHAEMIA trial, a subgroup analysis revealed that patients with heart failure and an EF of 35–45% had a lower rate of the composite of CV death, MI hospitalisation for unstable angina, HF, or resuscitated cardiac arrest with an invasive approach compared to a conservative approach (17.2% versus 29.3%; difference in 4-year event rate, -12.1% [95% CI, -22.6 to -1.6%]).

More recent data from REVIVED-BCIS2 demonstrated that revascularization with PCI did not decrease all-cause death or hospitalisation for heart failure in patients with significant LV impairment caused by ischemic heart disease and prescribed optimum medical treatment with demonstrable myocardial viability.2 Researchers wanted to know how CMR or PET, as opposed to SPECT, affected the composite endpoint of cardiac mortality MI, resuscitated cardiac arrest, and cardiac re-hospitalization in patients who needed further definition of ischaemia or viability in the AIMI-HF study.

Methods

Patients with NYHA Class II-IV symptoms with an EF 45% or NYHA Class I symptoms and an EF 30% were eligible for inclusion if they had known or suspected coronary artery disease, a history of MI, mild ischaemia, or scarring. Individuals who met inclusion criteria but

were not randomly assigned due to clinical management decisions but underwent imaging were included in the registry (1,110). Patients were randomly assigned to either an advanced imaging method or standard imaging (271 individuals).

- Time to a cardiac composite event, including cardiac mortality, MI, resuscitated cardiac arrest, and cardiac hospitalisation (worsening HF, ACS, and arrhythmia), was the primary outcome.
- Secondary outcomes were individual primary outcome components, composite and component event rates, and all-cause mortality.
- Secondary outcomes included CV death and the impact of the imaged approach on the incidence of revascularization and the interaction between imaging and revascularization on the primary outcome.
- Results in the ischaemia and viability cohorts were secondary outcomes.

Results

In total, 1,381 individuals received imaging as part of the trial, with 312 undergoing SPECT and 1069 advanced imaging procedures. With a median follow-up of 24.1 months, the main clinical question in 672 patients involved ischaemia and viability in 709 patients. To account for variations in study site and randomization versus registry baseline variables, propensity score matching was performed. In both groups, the majority of patients were NYHA Class II/III, and < 85% of ACEi/ARB prescriptions were made.

- Both the total population (HR 0.95, 95%CI 0.71-1.25, p=0.696) and the ischaemia cohort (HR 0.86, 95%CI 0.61-1.21, p=0.388) had the same primary composite result.
- Additionally, there was no difference in cardiac death in the randomization arm (advanced 13.7% vs. SPECT 19.8% HR 0.63 95%CI 0.34-1.18, p=0.152) or the major composite outcome (advanced 27.9% vs SPECT 29.6% HR 0.88, 95%CI 0.55-1.43, p=0.6615).
- Patients in the advanced imaging group (p<0.0001) and the viability cohort (p<0.001) had a higher likelihood of needing revascularization, with 61% getting CABG.
- Although numerically reduced with an advanced imaging strategy in both populations, early revascularization guided by imaging strategy did not significantly reduce the incidence of the primary composite endpoint in the general population (HR 0.71, 95%CI 0.37-1.38, p=0.317) or the ischaemia cohort (HR 0.52, 95%CI 0.23-1.15, p=0.107).
- With the curves splitting at 24 months in the ischaemia cohort, the advanced imaging group had a lower incidence of cardiac death (HR 0.61, 95%CI 0.38-1.0, p=0.049).

Relevance of critical reading to clinical practise

According to the study's findings, there were no differences between the advanced imaging and SPECT groups in terms of the primary composite endpoint of cardiac death, MI, resuscitated cardiac arrest, and cardiac hospitalisation in patients with decreased LV function caused by ischemic heart disease. The authors noted that although an advanced imaging method may be related with a decrease in CV death in patients screened for ischaemia, this association only just reached statistical significance and the curves started to split at 24 months. It is challenging to make firm inferences from this because of the generally low rates of device implantation and inadequate medical therapy.

This trial had a number of significant overall limitations, chief among them the small number of patients included in the randomised arm. Recruitment for the trial started in January 2011 and ended in October 2020. Only 271 patients were randomly assigned across 15 sites during this 9-year span. Propensity matching was used for patients in the registry arm, although it has intrinsic limitations and may have been biased by clinical choices to favour one imaging modality over another. With < 40% of patients receiving an MRA and no comments regarding the use of SGLT2 inhibitors or ARNIs, the medical therapy used in this trial does not correspond to current guideline-directed medical therapy. Furthermore, considering the reported mean EF, the overall rates of both ICD and CRT seem low. Patients who underwent advanced imaging experienced revascularization more frequently, however the criteria for revascularization were not changed.

The question of whether any imaging technique can help patients with LV dysfunction brought on by ischemic cardiomyopathy receive treatment and have better clinical results continues. The entire publication of the data will be interesting to read, but its applicability to the current management of patients with ischemic cardiomyopathy is constrained by major breakthroughs in the pharmacotherapy for LV dysfunction as well as probable underuse of CRTs and ICDs in this cohort.

References: 1. Petrie MC, Jhund PS, She L, Adlbrecht C, Doenst T, Panza JA, et al. Ten-Year Outcomes After Coronary Artery Bypass Grafting According to Age in Patients With Heart Failure and Left Ventricular Systolic Dysfunction: An Analysis of the Extended Follow-Up of the STICH Trial (Surgical Treatment for Ischemic Heart Failure). Circulation. 2016 Nov 1;134(18):1314–24.
2. Perera D, Clayton T, O'Kane PD, Greenwood JP, Weerackody R, Ryan M, et al. Percutaneous Revascularization for Ischemic Left Ventricular Dysfunction. New England Journal of Medicine. 2022 Aug 27;0(0):null.
Source: Mielniczuk LM. Ischemia and viability imaging in heart failure: the alternative imaging modalities in ischemic heart failure trial (AIMI-HF) IMAGE-HF project 1A. Presented at: ACC/WCC 2023. March 4, 2023. New Orleans, LA.

2 On-site Computed Tomography-derived Fractional Flow Reserve (FFR-CT) to Guide the Management of Patients with Stable Coronary Artery Disease: The TARGET Randomized Trial

The TARGET Trial, which was presented as a late-breaking trial at ACC23 scientific sessions, aimed to ascertain whether a strategy of on-site machine learning (ML)-based FFR-CT would improve clinical and economic outcomes in stable patients with intermediate stenosis by cardiac computed tomographic angiography (CCTA) when compared to a stress test-based standard pathway. The standard-of-care group (Stress cardiac MRI, SPECT, exercise ECG) or on-site FFR-CT was randomly assigned to stable patients who presented with chest discomfort and a CCTA indicating stenosis of 30-90%.

The following were the primary inclusion criteria:

- Patients who experience new-onset chest pain on a consecutive basis suspicious of coronary artery disease (CAD).
- Based on the CAD consortium's basic pretest probability score, subjects with intermediate- to high pretest probabilities of CAD were chosen for recruitment.
- At least one major coronary artery with 30-90% diameter stenosis (coronary artery diameter > 2.5 mm) found during CCTA.

The following is a summary of the primary exclusion criteria:

- Acute coronary syndrome, either confirmed or suspected, necessitating hospitalisation or urgent testing
- Clinically or hemodynamically unstable state systolic blood pressure < 90 mmHg or severe ventricular or atrial arrhythmias
- Any angiographic evidence of > 50% stenosis in any major coronary artery, known CAD with a history of myocardial infarction (MI), percutaneous coronary intervention (PCI), coronary artery bypass grafting (CABG), or any combination of these.
- Patients having a significant coronary stenosis determined by CCTA to be > 90% or a left main branch stenosis > 50%
- Heart symptoms caused by a known severe congenital, valvular (moderate and above), or cardiomyopathy process (hypertrophic cardiomyopathy or reduced systolic left ventricular function < 40%)
- Unable to give informed consent in writing or take part in long-term follow-up

Invasive coronary angiography would be performed on individuals in the control group who tested positive, and on those whose FFR-CT was < 0.8. The rate of ICA without obstructive CAD

or intervention within 90 days was the main outcome. Major adverse cardiovascular events (MACE), quality of life, and medical expense within a year were the secondary endpoints.

1216 patients out of the 7683 patients that were screened satisfied the inclusion criteria, with 608 being assigned to each arm. Among those who underwent FFR-CT, 412 finished the test and had a positive result; 2 didn't finish the test; and 194 received a negative test. On ICA, 333 patients with obstructive CAD underwent 302 revascularization procedures (291 percutaneous and 11 bypass surgery) and 31 got medical treatment as per recommended guidelines. Men made up 65% of the entire cohort, with a mean age of 59. 61% of people had hyperlipidemia, 23% had diabetes, and 32% smoked.

Unfortunately, the majority of medical treatments were ineffective, with just 40–45% of patients receiving beta-blockers, 65% receiving statins, and 80–83% receiving antiplatelet medication. The majority of patients (53% and 28%, respectively) reported experiencing atypical or non-anginal chest pain. 38% were said to have class 3 angina, whereas 61% had class 2 angina. 88% of the participants in the standard care group performed an exercise stress test; only 15% underwent a SPECT scan and 9% underwent a stress echo. All three coronary artery regions were found to be ischemic, with the left anterior descending artery experiencing >50% of the ischemia. Only a limited percentage of patients (9–13%) underwent invasive FFR.

The proportion of patients having ICA with or without obstructive CAD who did not get intervention after 90 days was significantly lower in the FFR-CT group as compared to the conventional group (28.3% [119/421] vs. 46.2% [223/483], P<0.001). This was primarily caused by a decrease in the percentage of patients with no-obstructive CAD when compared to the standard group in the FFR-CT group (20.9% [88/421] vs. 38.0% [184/483]). Significant differences in major adverse cardiovascular events (MACE) were not observed in the FFR-CT group (hazard ratio, 0.88; P=0.8).

Variable	FFR-CT	Standard Care	P Value
1 event	48 (8.2)	54 (9.2)	0.55
Hospitalization for unstable angina	39 (6.6)	44 (7.5)	0.58
Revascularization after 90 days	7 (1.2)	16 (2.7)	0.06
Non-fatal MI	7 (1.2)	9 (1.5)	0.62
Cardiovascular death	2 (0.3)	1 (0.2)	0.62

For a range of anatomic coronary disorders, ML-based FFR-CT worked well overall and provided real-time results. A greater ICA rate was seen with the conventional care pathway when combined with CCTA and stress testing than with the FFR-CT approach. The therapy of intermediate-risk patients with stable chest pain can benefit greatly from an on-site FFR-CT

strategy, thus solidifying the CCTA's "gatekeeper" position. With a mean age of 59 years and the majority of patients having atypical or non-cardiac chest pain, it is likely that this was a low-risk population overall. Its use in higher-risk individuals who have clinical events or left ventricular failure is still unknown.

Other restrictions include the diversity of stress tests in the standard group, which makes direct comparisons challenging. No additional investigation was done into the revascularization, namely whether it was complete or not. Since only China was studied, there may be regional variations in the cost and quality of life evaluations. It is not possible to extend the effectiveness and dependability of the onsite FFR-CT to other centres without any prior experience.

Conclusions

An on-site ML-based FFR-CT method is practical, safe, and successful in stable patients with intermediate (30%-90%) stenosis diagnosed by CCTA. On-site FFR-CT decreased the percentage of patients with stable CAD receiving ICA without obstructive disease or needing intervention within 90 days as compared to the usual care pathway. Although there was a trend towards lower costs, the on-site FFR-CT technique increased revascularization overall without enhancing quality of life or decreasing severe adverse cardiovascular events.

References: Yang et al., Circulation. 2023;147(18):1369-81

3 STREAM-2: Pharmaco-invasive Reperfusion Strategy with Half-dose Tenecteplase in Older ST-elevation Myocardial Infarction Patients

The purpose of the trial was to compare the safety and effectiveness of pharmaco-invasive therapy with half-dose tenecteplase (TNK) with primary percutaneous coronary intervention (PCI) among older patients with ST-segment elevation myocardial infarction (STEMI) who were unable to receive timely primary PCI within an hour.

Study design

Patients were randomised 2:1 to either primary PCI (n = 203) or a pharmaco-invasive approach with half-dose TNK followed by PCI within 6–24 hours (n = 401). If ST-segment resolution of > 50% did not occur by 90 minutes in the pharmaco-invasive arm, PCI might be performed sooner. Aspirin 150-325 mg, clopidogrel 300 mg as a bolus then 75 mg daily, and enoxaparin (no bolus if age > 75 years) were given to patients in the pharmaco-invasive arm. According to guidelines, patients in the primary PCI arm received aspirin 150–325 mg, P2Y12 antagonist therapy, and antithrombin medication. 604 patients were enrolled in total, follow-up period was 30 days, patient average age was 71 years, and 32% of patients were female.

Inclusion criteria:

- Age 60 or older
- STEMI with a > 2 mm ST elevation in > 2 contiguous leads, diagnosed in less than 3 hours after the beginning of symptoms
- Not able to complete the primary PCI in time within one hour

Exclusion criteria:

- Inability to reach the catheterization laboratory within three hours after diagnosis (qualifying ECG) or expected performance of PCI < 60 minutes from diagnosis
- Prior surgery for a coronary artery bypass graft
- Ventricular pacing or a left bundle branch block
- Cardiogenic shock patients: Killip Class IV
- Patients with a known or estimated body weight < 55 kg
- Prior to randomization, uncontrolled hypertension defined as a BP > 180/110 mm Hg (> 180 mm Hg systolic blood pressure [BP] or > 110 mm Hg diastolic blood pressure [BP]).
- Stroke history or a recent transient ischemic attack
- Current use of oral anticoagulation (e.g., warfarin or a nonvitamin K oral anticoagulant), or

recent administration of any intravenous or subcutaneous anticoagulation within the previous 12 hours, including unfractionated heparin, enoxaparin, and/or bivalirudin

- Bleeding currently or a known bleeding problem or disease

Other noteworthy qualities or characteristics: 92% Killip class I, Heart rate: 76 bpm; systolic blood pressure: 134 mm Hg, Anterior: 43%; inferior: 56% infarct location, In the pharmacoinvasive arm, 34% of patients required rescue angiography or PCI.

Principal Findings

For pharmaco-invasive therapy compared to primary PCI, the primary composite outcome at 30 days (death, heart failure, MI, shock) was 12.8% vs. 13.3% (relative risk 0.96, 95% confidence interval 0.62-1.48).

Secondary outcomes: Pharmaco-invasive therapy versus primary PCI

- Symptom onset to start of reperfusion treatment: 110 vs. 190 minutes ($p < 0.001$)
- Prior to PCI, the baseline TIMI 0/1 flow was 28.5% vs. 65.5% ($p < 0.001$).
- 87.3% vs. 87.0%: final TIMI 3 flow ($p = 0.73$).
- Mortality from all causes: 9.3% vs. 8.9% ($p > 0.05$)
- Mortality from cardiovascular causes: 7.3% vs. 8.4% ($p > 0.05$)
- Total stroke rate: 2.3% vs. 0.5% ($p > 0.05$)
- 1.5% vs. 0% for intracranial haemorrhage (ICH). At the time of rescue PCI, 2 out of 5 patients received extra unfractionated heparin (p = NS)
- Major non-intracranial bleed: 1.3% vs. 1.0% ($p > 0.05$)

Interpretation

According to the trial's findings, half-dose TNK treatment is a safe and effective alternative to primary PCI for senior STEMI patients who are unable to receive prompt primary PCI within an hour. ICH rates were significant despite the use of half-dose TNK, although overall non-intracranial haemorrhage was minimal. Overall, the incidence of major adverse cardiovascular events was approximately twice as high (30-day mortality >9.0%) as those found in STREAM-1. The older age (around 60 years in STREAM-1 vs. 71 years in STREAM-2) helps to explain this in part.

Source: Armstrong P. Pharmaco-invasive reperfusion with half-dose tenecteplase or primary PCI in older patients with STEMI. Presented at: ACC/WCC 2023. March 5, 2023. New Orleans, LA

4 A Novel Breakthrough in Wrist-Worn Transdermal Troponin-I-Sensor Assessment for Acute Myocardial Infarction

Aim

Implementing time-sensitive therapies and maximising outcomes depend on the clinical differentiation of acute myocardial infarction (MI) from unstable angina and other presentations mimicking acute coronary syndromes (ACS). However, the diagnostic procedures are reliant on blood tests and the turnaround times in the laboratory.

We evaluated the performance of a machine learning algorithm for detecting elevated high-sensitivity cardiac troponin-I (hs-cTnI) levels in patients with ACS who were being treated in a hospital setting. We also tested the clinical viability of a wrist-worn transdermal infrared spectrophotometric sensor (transdermal-ISS) in real-world clinical settings.

Methods and Results

At five sites, we enrolled 238 ACS hospital patients. Electrocardiography (ECG), cardiac troponin (cTn) testing, echocardiogram (regional wall motion abnormality), and coronary angiography were all used to determine the definitive diagnosis of MI (with or without ST elevation) and unstable angina. Three sites were used to train a deep learning model that was developed from the transdermal ISS, echocardiography and angiography (two sites), and hs-cTnI (one site) were used for external validation.

With areas under the receiver operator characteristics of 0.90 (95% confidence interval (CI), 0.84-0.94, sensitivity, 0.86, and specificity, 0.82] and 0.92 (95% CI, 0.80-0.98, sensitivity, 0.94, and specificity, 0.64), for internal and external validation cohorts, respectively, the transdermal-ISS model predicted elevated hs-cTnI levels. Additionally, the model's predictions were linked to substantial coronary stenosis (OR, 4.69; CI, 1.27-17.26; P = 0.019) and regional wall motion abnormalities (OR, 3.37; 1.02-11.15; P = 0.046).

Conclusion

Clinically viability is likely with a wrist-worn transdermal-ISS for the quick, bloodless prediction of increased hs-cTnI levels in real-world settings. It may have a role in establishing a point-of-care biomarker diagnosis of MI and impact triaging patients with suspected ACS.

Reference: Sengupta et al., European Heart Journal - Digital Health. 2023;ztad015

5 Vigorous Exercise in Individuals with Hypertrophic Cardiomyopathy (HCM): Primary Results of the Prospective, Multinational Lifestyle and Exercise in HCM (LIVE-HCM) Study

According to research from the LIVE-HCM trial, which was presented at ACC.23/WCC, patients with hypertrophic cardiomyopathy (HCM) who exercised vigorously did not have a higher incidence of serious cardiac events during three years of follow-up compared to patients who exercised moderately or were inactive.

Researchers enrolled 126 people with a genetic variation for HCM but no left ventricular hypertrophy and 1,534 patients with HCM (40% female) between the ages of 8 and 60 (20% younger than 25) in five different countries. Every six months for three years, surveys were given to all participants on their exercise routines and symptoms. Participants were categorised as exercising aggressively (42%), moderately (43%) or inactively (16%).

77 participants experienced the study's primary endpoint, a composite of total mortality, cardiac arrest, ventricular arrhythmia treated with an ICD, or fainting likely caused by arrhythmia, with 44 events occurring in people who were categorised as not exercising vigorously and 33 events occurring in people who exercise vigorously (hazard ratio [HR], 1.01, 90% CI, 0.68-1.48; p=0.98).

Secondary analyses examined the incidence of the composite endpoint between the vigorous and sedentary groups, the moderate and sedentary groups, and the vigorous and moderate groups (HR, 1.12; 90% CI, 0.73-1.71; p=0.66). Participants who had overt HCM experienced all of the episodes, whereas those who merely had the genetic variation did not.

The participants were self-selected, and a higher proportion of them engaged in strenuous exercise than was predicted, according to the researchers. Additionally, the majority of individuals received care at HCM centres with significant patient volumes.

This data does not support restriction of vigorous exercise for individuals with HCM in a shared decision-making framework that involves being seen by an experienced HCM physician. Exercise is healthy and a vital component of many people's lives and individuals with HCM may be able to gain the longer-term advantages of exercise if perspectives on exercise practises change.

Source: Lambert M, Ackerman MJ, Marino BS, et al. Vigorous exercise in individuals with hypertrophic cardiomyopathy: primary results from the prospective, multinational lifestyle and exercise in HCM (LIVE-HCM) study. Presented at: ACC/WCC 2023. March 6, 2023. New Orleans, LA

6 Anticoagulation Strategies in Non-critically ill Hospitalized COVID-19 Patients: Principal Outcomes of the Freedom COVID Anticoagulation Trial

The trial's objective was to examine therapeutic and prophylactic anticoagulation in non-critically ill patients hospitalised with coronavirus illness 2019 (COVID-19).

Study design

- Block randomization
- Parallel
- Open-label

Patients with COVID-19 who were not in critical condition were randomly assigned to receive prophylactic enoxaparin (n = 141), therapeutic enoxaparin (n = 1,136), or therapeutic apixaban (n = 1,121).

Enoxaparin was administered prophylactically at a dose of 40 mg subcutaneously each day. Therapeutic enoxaparin was administered twice daily at a dose of 1 mg/kg subcutaneously. 5 mg of therapeutic apixaban was administered orally twice daily.

3,398 patients are enrolled in total. Follow-up period was 30 days. Patient average age was 53 years. 40% of patients were female and 22% of patients had diabetes.

Inclusion criteria:

- Hospitalised COVID-19 patients that were not critical
- Temperature > 38 °C
- ≤ 94% oxygen saturation on room air
- A minimum of one of the following lab tests: D-dimer > 1.0 ng/mL, C-reactive protein > 2 mg/L, ferritin > 300 ng/mL, or lymphopenia < 1500 cells/m^3

Exclusion criteria:

- Care at the intensive care unit (ICU) level
- Expected hospital stay of < 72 hours
- Anticoagulation therapy administered within the past 7 days
- Active bleeding or an anticoagulant contraindication
- End Stage Renal Disease

Primary Outcomes and Findings

13.2% of the prophylactic enoxaparin group experienced the primary endpoint, all-cause death, ICU care, systemic thromboembolism, or ischemic stroke, compared to 11.3% of the combined therapeutic groups (p = 0.11); however, this difference was not statistically significant.

Secondary Outcomes and Findings

- 7.0% of the prophylactic enoxaparin group experienced all-cause mortality compared to 4.9% for the combined therapeutic groups (p = 0.01).
- 8.4% of the prophylactic enoxaparin group underwent intubation compared to 6.4% of the combined therapeutic groups (p = 0.03).
- 0.1% of the prophylactic enoxaparin group experienced major bleeding (Bleeding Academic Research Consortium [BARC] classifications 3 or 5) compared to 0.4% of the combined treatment groups (p = 0.18).

Interpretation

Therapeutic anticoagulation, as opposed to prophylactic anticoagulation, was linked with a decrease in all-cause mortality and intubation among non-critically ill COVID-19 hospitalised patients. Therapeutic anticoagulation did not, however, diminish a 30-day composite endpoint. Bleeding was minimal and consistent across treatment groups.

The FREEDOM COVID trial was unable to demonstrate that therapeutic vs. prophylactic anticoagulation reduced 30-day composite events, although it did reveal a decrease in the number of patients assigned to a therapeutic anticoagulation diet or needing intubation.

Reference: Stone et al., J Am Coll Cardiol. 2023;81(18):1747–62

7 Masters@ Heart: Lifelong Endurance Exercise and Its Relationship with Coronary Atherosclerosis.

Quick Takes

- Lifelong athletics was linked to more coronary plaques, including more noncalcified plaques in proximal coronary segments, in a prospective, observational cohort study of healthy, active males who weren't athletes, late-onset athletes, and lifelong endurance athletes.
- The study did not examine clinical atherosclerotic coronary events and was restricted to males who rode bicycles primarily.

Study question

Does long-term endurance sport involvement and leading a healthy lifestyle have an effect on the extent and/or composition of coronary atherosclerosis plaques?

Method

The Master@Heart study is a prospective, observational cohort study that consists of 176 healthy nonathletes, 191 lifelong master endurance athletes, and 191 late-onset athletes (endurance sports started after the age of 30); all participants are male and have a low cardiovascular risk profile. To measure fitness, peak oxygen uptake (VO2peak) was used. The composition of the plaque, its location, and its severity were determined using computed tomography (CT) and CT angiography (CTA). Calcified regions were characterised as having a density more than 130 HU. The prevalence of coronary plaques (calcified, noncalcified, and mixed) on CT/CTA was the primary endpoint. Multiple cardiovascular risk variables were adjusted for in the analyses.

Results

- In all groups, the median age was 55 years old (interquartile range [IQR], 50-60).
- Higher % predicted VO2 peaks were seen in lifelong and late-onset athletes than nonathletes (159 [IQR, 143-177] vs. 155 [IQR, 138-169] vs. 122 [IQR, 108-138], $p < 0.001$).
- Compared to participants with a healthy and active but nonathletic lifestyle, lifelong endurance sports was associated with having:

Variable	Odds Ratio [OR]	95% confidence interval [CI]
≥1 coronary plaque	1.86	1.17-2.94
≥1 proximal plaque	1.96	1.24-3.11
≥1 calcified plaque	1.58	1.01-2.49
≥1 calcified proximal plaque	2.07	1.28-3.35
≥1 noncalcified plaque	1.95	1.12-3.40
≥1 noncalcified proximal plaque	2.80	1.39-5.65
≥1 mixed plaque	1.78	1.06-2.99

Conclusions

Participating in lifelong endurance sports was not linked to a healthier coronary plaque composition versus a healthy but non-athletic lifestyle. Long-term endurance athletes exhibited more coronary plaques than fit, healthy adults with a comparable low cardiovascular risk profile, including more noncalcified plaques in the proximal segments. In order to reconcile these results with the risk of cardiovascular events at the higher end of the endurance exercise range, the authors come to the conclusion that longitudinal studies are required.

Perspective

The connection between long-term endurance exercise and the risk of coronary heart disease is a topic of ongoing discussion. This prospective, observational study indicated that lifelong endurance athletes had more coronary plaques, including more noncalcified plaques and more noncalcified proximal plaques, than healthy, active nonathletes; however, it did not address atherosclerotic coronary clinical events. Since there were only male athletes in this study and cyclists or combined cyclist/runners made up 77% of the participants, extrapolating the findings to other demographics may be difficult. Furthermore, the overall plaque burden was relatively modest even though the prevalence of plaques was higher among athletes compared to healthy and active nonathletes. Exercise is known to prolong life expectancy, lower the risk of diabetes and myocardial infarction, and improve blood pressure control and lipid profiles. Despite the fact that this study raises a warning regarding the relationship between endurance sports and the presence of coronary plaque, leading an active lifestyle and following guidelines for exercise should still be promoted.

Reference: De Bosscher et al., Eur Heart J. 2023:ehad152

8 The LODESTAR Trial: Comparison Between Targeted Low-Density Lipoprotein Cholesterol Level Based Versus High-Intensity Statin Therapy in Patients with Coronary Artery Disease

Essentials	
Question	In individuals with coronary artery disease, is treatment to a target low-density lipoprotein cholesterol (LDL-C) level between 50 and 70 mg/dL noninferior to a plan using high-intensity statin therapy?
Findings	The rate of the 3-year composite of all-cause death, myocardial infarction, stroke, or any coronary revascularization in this randomised noninferiority trial, which included 4400 patients with coronary artery disease, was 8.1% in the treat-to-target strategy group compared with 8.7% in the high-intensity statin therapy group, a difference that met the prespecified noninferiority margin of 3.0 percentage points.
Meaning	For significant clinical outcomes in individuals with coronary artery disease, the treat-to-target LDL-C method was noninferior to the high-intensity statin strategy.

Abstract

Importance

Some guidelines advise using high-intensity statins as the first line of treatment for individuals with coronary artery disease in order to reduce low-density lipoprotein cholesterol (LDL-C) by at least 50%. Starting with moderate-intensity statins and titrating to a specific LDL-C target is an alternative strategy. In a clinical trial involving individuals with known coronary artery disease, these approaches have not been directly compared with one another.

Objective

To determine whether a treat-to-target strategy is noninferior to a strategy of high-intensity statins for long-term clinical outcomes in individuals with coronary artery disease.

Design, Setting, and Participants

A noninferiority trial that was randomised, multicentric, and open to patients from 12 South Korean centers who had been diagnosed with coronary disease (enrollment from September 9, 2016, through November 27, 2019, with the ultimate follow-up on October 26, 2022).

Interventions

Patients were randomised to receive either the high-intensity statin treatment, which included rosuvastatin, 20 mg, or atorvastatin, 40 mg, or the LDL-C target strategy, with an LDL-C level between 50 and 70 mg/dL as the target.

Main Outcomes and Measures

The primary endpoint had a noninferiority margin of 3.0 percentage points and was a 3-year composite of mortality, myocardial infarction, stroke, or coronary revascularization.

Results

4400 individuals were enrolled in the trial, and 4341 (98.7%) of them completed the trial (mean [SD] age: 65.1 [9.9] years; females: 1228 [27.9%]). Moderate-intensity and high-intensity doses were employed in 43% and 54%, respectively, of the treat-to-target group (n = 2200), which had 6449 person-years of follow-up.

In the treat-to-target group, the mean (SD) LDL-C level for 3 years was 69.1 (17.8) mg/dL, but in the high-intensity statin group (n = 2200), it was 68.4 (20.1) mg/dL (P =.21, compared to the treat-to-target group).

190 patients (8.7%) in the high-intensity statin group and 177 patients (8.1%) in the treat-to-target group experienced the primary end point, respectively (absolute difference, -0.6 percentage points [upper boundary of the 1-sided 97.5% CI, 1.1 percentage points]; P < .001 for noninferiority).

Conclusions and Relevance

A high-intensity statin therapy was not superior to a treat-to-target LDL-C strategy for patients with coronary artery disease for the 3-year composite of mortality, myocardial infarction, stroke, or coronary revascularization. These findings offer more proof that a treat-to-target method is appropriate and may enable a personalised approach that takes into account individual variability in medication response to statin therapy.

Reference: Hong et al., JAMA. 2023;329(13):1078-87

9 Safety and Efficacy of Virtual Care Team Guided Therapeutic Optimization During Hospitalization in Patients with HFrEF: The IMPLEMENT-HF Study

According to a multicenter implementation trial presented at ACC.23/WCC and simultaneously published in JACC, a virtual care team-guided approach to guideline-directed medical therapy (GDMT) optimisation was found to be secure and enhance treatment among patients hospitalised with heart failure with reduced ejection fraction (HFrEF).

Patients with a left ventricular EF < 40% were divided into two groups: those receiving conventional treatment (145 encounters among 115 patients) or those receiving a virtual care team-guided method (107 encounters among 83 patients). Three centres in an integrated health care delivery system provided the patients' care. Their average age was 69, 34% of them were female, 14% were Black, and 17% were Hispanic.

Clinicians in the virtual care team group could obtain advice from a doctor-pharmacist team up to once each day for improving GDMT. Improved early therapy of four important medication classes (beta-blockers, ACE inhibitors/ARB/ARNI, mineralocorticoid receptor antagonists, and SGLT2i) was the main objective.

An independent clinical events committee examined in-hospital safety outcomes, and effectiveness was determined by the in-hospital change in the optimisation score (+2 initiations, +1 dose uptitrations, -1 downtitrations, and -2 discontinuations combined across classes).

The virtual care team technique outperformed standard care in terms of GDM optimization scores, (adjusted difference +1.2; 95% CI, 0.7-1.8; p<0.001). There were greater rates of new GDMT initiation (44% vs. 23%; p=0.001) and intensifications of one or more GDMT (50 vs. 28%; p=0.001) in these groups, respectively. This meant that five encounters would be required to intervene in order to get the best possible GDMT during hospitalisation.

The intervention and control groups, which had 21% and 28% of adjudicated major adverse events, respectively, respectively, had one or more safety events (p=0.30), with comparable rates of acute renal damage, bradycardia, hypotension, and hyperkalemia.

The advantages of the tested platform being entirely virtual were emphasised by the study's authors. They claimed that "This strategy represents a potentially highly effective, scalable intervention that can lead to accelerated implementation of guideline concordant HFrEF care."

Reference: Bhatt et al., J Am Coll Cardiol. 2023;81(17):1680-1693

10 Comparison of 3-month Versus 12-month Dual Antiplatelet Therapy After Coronary Intervention Using the Contemporary Drug-Eluting Stents with Ultrathin Struts and Advanced Polymer Technology: The HOST-IDEA Randomized Clinical Trial.

Quick Takes

- 3-6 months of DAPT was noninferior to 12 months of DAPT with respect to NACE (composed of cardiac mortality, target vessel myocardial infarction, clinically driven target lesion revascularization, stent thrombosis, or significant bleeding) among a group of South Korean patients, who were primarily male.
- No matter how the condition was presented (NSTE-ACS vs. stable ischemic heart disease), the findings persisted.

Study Question

Is a shorter course (3-6 months) of dual antiplatelet treatment (DAPT) noninferior to a 12-month strategy after drug-eluting stent (DES) implantation using ultrathin struts and advanced polymer technology?

Method

Patients receiving percutaneous coronary intervention (PCI) at 37 centres in South Korea were randomised in an open-label fashion between the Coroflex ISAR polymer-free SES and the Orsiro biodegradable-polymer sirolimus-eluting stents (SES). ST-segment elevation myocardial infarction (STEMI) patients were not included.

After PCI, patients were randomly assigned to receive either 3-6 months of DAPT or 12 months of DAPT. The doctor was free to decide which antiplatelet drugs to prescribe. The primary outcome was a net adverse clinical event (NACE), defined as a Bleeding Academic Research Consortium type 3 or 5 at 12 months, which was a composite of cardiac death, target vessel myocardial infarction (TVMI), clinically driven target lesion revascularization (CD-TLR), stent thrombosis, or major bleeding. Target lesion failure (TLF), a composite of cardiac mortality, TVMI, CD-TLR, and severe bleeding, were the major secondary outcomes.

Results

A total of 2,013 patients were randomly assigned to either 3-6 months of DAPT (n = 1,002) or 12 months of DAPT (n = 1,011). Their mean age was 65.7 +/- 10.5 years, 1,487 were males [73.9%], and 1,110 [55.1%] presented with acute coronary syndrome [ACS].

In the 3-6 month DAPT group, 37 patients (3.7%) and 41 patients (4.1%) in the 12-month DAPT group experienced the primary outcome. The noninferiority of the 3-6 month DAPT group to the 12-month DAPT group was met (absolute risk difference, -0.4%; 1-sided 95% confidence interval (CI), - % to 1.1%; p < 0.001 for noninferiority).

TLF (hazard ratio [HR], 0.98; 95% CI, 0.56-1.71; p = 0.94) and serious bleeding (HR, 0.82; 95% CI, 0.41-1.61; p = 0.56) did not differ significantly between the two groups. The therapeutic benefit of 3-6 months of DAPT for NACE was consistent across various subgroups.

Conclusions

For NACE, 3-6 months of DAPT was noninferior to 12 months of DAPT among patients undergoing PCI with third-generation DES. Additional investigation is required to discover the best DAPT regimen for 3-6 months and to generalise this finding to other populations.

Perspective

The third-generation DES (ultrathin struts with advanced polymer technology) used by South Korean patients having DES PCI are the subject of the authors' findings on antiplatelet therapy duration. With regard to NACE (composed of cardiac mortality, TVMI, CD-TLR, stent thrombosis, or significant bleeding), 3-6 months of DAPT were noninferior to 12 months of DAPT in this patient group, which was primarily made up of men. Whether the condition was NSTE-ACS or stable ischemic heart disease, these findings were true.

Reference: Han et al., Circulation. 2023;147(18):1358-68

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