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ORIGINAL RESEARCH

Association of colchicine use with myocardial perfusion reserve after myocardial infarction: An ancillary analysis of the COLD-MI trial

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Abstract

Background: Colchicine reduces sympathetic denervation after acute myocardial infarction (AMI), yet the COLD-MI trial found no change in myocardial perfusion scintigraphy (MPS). MPS-detected necrotic lesions were limited by early management, and MPS may therefore have lacked the sensitivity to capture subtle colchicine-induced variations in minimal necrosis during the immediate post-stenting period. Myocardial perfusion reserve (MPR), a quantitative indicator of global microvascular function, may overcome these limitations. This ancillary analysis of the COLD-MI trial evaluated whether colchicine improves MPR six months after AMI.

Methods: Forty-five post-AMI patients randomized to colchicine for 30 days or no colchicine underwent quantitative dynamic [99mTc]Tc-tetrofosmin SPECT and [123I]-mIBG imaging at 6 months. MPR was quantified using CZT-SPECT as the stress-to-rest uptake ratio. Secondary endpoints included MPS scoring (SRS, SSS, SDS) and sympathetic innervation assessed by normalized mean segmental activity. Analyses were blinded.

Results: Colchicine-treated patients showed significantly higher MPR in remote myocardium than controls (2.37 $\pm$ 0.61 vs. 1.92 $\pm$ 0.53; $P = 0.01$). Denervated myocardial surface area in remote regions was also lower with colchicine (43% [29-50] vs. 50% [38-64]; $P = 0.04$).
In infarcted myocardium, MPR did not differ (1.79 $\pm$ 0.61 vs. 1.60 $\pm$ 0.63; $P = 0.35$). A non-significant trend toward better preserved innervation was observed (denervation: 46% [35-50] vs. 50% [45-69]; $P = 0.09$). SRS, SSS, and SDS were similar between groups.

Conclusions: Colchicine significantly increases MPR in remote myocardium six months after AMI, consistent with reduced sympathetic denervation and supporting a

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microvascular benefit of colchicine post-AMI.

Keywords: Colchicine, Myocardial infarction, Nuclear imaging, Sympathetic innervation, Myocardial perfusion reserve

ABBREVIATIONS

STEMI	ST-elevation myocardial infarction
PCI	Percutaneous coronary intervention
MPS	Myocardial perfusion scintigraphy
AMI	Acute myocardial infarction
COLD-MI	The COLD-MI trial is the princeps study evaluating the effect of colchicine on MPS and cardiac innervation.

INTRODUCTION

Long used as an anti-inflammatory drug, colchicine has recently gained attention for its potential cardioprotective effects following acute myocardial infarction (AMI), receiving a Class IIa, Level A recommendation from the latest European Society of Cardiology guidelines, reflecting probable benefit supported by high-quality evidence [1].

The effect of colchicine was recently evaluated in the COLD-MI trial [2], a prospective cohort study including 54 post-AMI patients, with 27 treated with colchicine and 27 controls. This study used [^{123}I]-metaiodobenzylguanidine ([^{123}I]-mIBG) and rest [^{99m}Tc]Tc-tetrofosmin myocardial perfusion scintigraphy (MPS) using single-photon emission computed tomography (SPECT) to assess myocardial sympathetic denervation and size of necrosis at 6-month follow-up after randomization. The COLD-MI trial showed a protective effect of colchicine treatment on sympathetic myocardial denervation in the first month following a ST-elevation myocardial infarction (STEMI). On the other hand, there was no significant difference in the size of necrosis between treated and untreated patients. The first result is consistent with previous studies in murine or human populations [3,4], but the second appears to contradict findings from a murine model of AMI [5]. Moreover, the preservation of sympathetic innervation of the myocardium implies an improvement in the perfusion of sympathetic neurons by colchicine and contrasts with the absence of observed changes in necrotic sequelae on MPS.

In this context, MPS-detected necrotic lesions were limited by early management, and MPS may therefore have lacked the sensitivity to detect subtle colchicine-induced changes in the extent of minimal necrosis during the immediate post-stenting period. Moreover, as MPS provides a relative estimate of myocardial perfusion (comparing one wall or segment to another), it may also fail to detect a homogeneous increase in perfusion across the entire viable left ventricle (LV). To overcome these intrinsic limitations, myocardial perfusion reserve (MPR) imaging has emerged as a quantitative approach capable of assessing global changes in myocardial perfusion rather than relative segmental differences.

Over the past ten years, the availability of gamma cameras with solid-state cadmium zinc telluride (CZT) detectors dedicated to cardiac acquisitions has made possible the dynamic acquisition of MPS and the measurement of MPR in routine clinical settings [6–8]. MPR, defined as the ratio of myocardial blood flow (MBF) during pharmacological stress to that at rest, provides a sensitive measure for detecting potential uniform increases in myocardial perfusion under treatment.

The present analysis of the COLD-MI trial investigates the effects of colchicine on MPR in patients 6 months after reperfusion for AMI. Its objective is to determine whether colchicine administration within the month following a STEMI can lead to an overall increase in MPR that is undetectable by MPS without dynamic acquisition, yet consistent with the observed improvement in myocardial sympathetic innervation.

The primary endpoint of this analysis is the assessment of MPR in both infarcted and remote (ie, non-infarcted) myocardium in patients treated with or without colchicine.

Secondary endpoints include MPS and sympathetic innervation assessed by [^{123}I]-mIBG, both evaluated in infarcted and remote myocardium in patients treated with or without colchicine. In addition, the relationship between MPS, sympathetic innervation, and MPR will be evaluated.

MATERIALS AND METHODS

Study population

The COLD-MI trial was a single-center, open-label, randomized controlled study, with the protocol data provided in another source [9]. Adult

patients experiencing a first episode of chest pain lasting less than 12 hours, with a confirmed diagnosis of STEMI and evidence of coronary occlusion on initial angiography, were prospectively and consecutively enrolled. Participants were then randomized into two groups: one group received a 1-mg colchicine tablet daily for 30 days, starting within 48 hours after revascularization, while the other group did not receive colchicine (1:1 allocation ratio).

Scintigraphic acquisitions

Scintigraphic acquisitions were performed 6 months after randomization. All patients first underwent MPS after intravenous injection of 950 MBq of [^{99m}Tc]Tc-tetrofosmin. All patients refrained from caffeine and methylxanthine-containing substances and drugs for at least 24 hours before their MPS. After a mean interval of eight days, they returned to the nuclear medicine department to receive 400 mg of oral potassium perchlorate, administered 1 hour before intravenous injection of 185 MBq of [^{123}I]-mIBG. [^{123}I]-mIBG imaging was performed 4 hours after tracer injection.

List-mode [^{99m}Tc]Tc-tetrofosmin dynamic SPECT was performed with patients in the prone position and arms raised above the head, using a CZT-dedicated cardiac camera (Discovery NM530c, GE Healthcare, Tirat Carmel, Israel). List-mode data acquired from one minute after radiotracer administration was summed and reconstructed to produce standard stress and rest slices. In cases of suspected attenuation (irreversible hypofixation at stress and rest with systolic thickening not abolished), an additional stress [^{99m}Tc]Tc-tetrofosmin SPECT-CT was performed in the supine position using a dual-head gamma camera (NM 870 SPECT-CT, GE Healthcare, Tirat Carmel, Israel) equipped with low-energy high-resolution (LEHR) parallel-hole collimators to provide attenuation-corrected stress perfusion data.

[^{123}I]-mIBG SPECT-CT was performed with patients in the supine position, also with arms raised, using a dual-head gamma camera (NM 870 SPECT-CT, GE Healthcare, Tirat Carmel, Israel) equipped with LEHR parallel-hole collimators. At the end of the [^{123}I]-mIBG SPECT-CT acquisition, an additional planar acquisition was performed using the same camera and collimators to calculate the late heart-to-mediastinum (H/M) ratio [10].

All acquisitions were reconstructed on a Xeleris workstation (GE Healthcare, Chalfont St. Giles, UK). Following the manufacturer's specifications, attenuation-corrected SPECT-CT slices (for [^{99m}Tc]Tc-tetrofosmin and [^{123}I]-mIBG) were reconstructed using an ordered subset expectation maximization algorithm (64 $\times$ 64 matrix, pixel size 6.8 mm, 2 iterations, 10 subsets), followed by a 3D Butterworth filter (cut-off frequency: 0.4; order: 5). A maximum a posteriori expectation maximization algorithm (30 iterations, $\alpha = \beta = 0.4$), with a Butterworth post-processing filter (cut-off frequency: 0.4; order: 10), without attenuation, was used to reconstruct dynamic list-mode data.

Infarcted and remote myocardium were defined based on the culprit coronary artery identified on coronary angiography. The infarcted territory was determined as follows: segments 1, 2, 7, 8, 13, 14, and 17 for the left anterior descending artery (LAD); segments 3, 4, 9, 10, and 15 for the right coronary artery (RCA); and segments 5, 6, 11, 12, and 16 for the left circumflex artery (LCx) [11]. Segments not assigned to the culprit artery were considered remote myocardium.

All data were analyzed by the same experienced nuclear physician, blinded to treatment allocation.

Sympathetic innervation quantification

Attenuation-corrected [^{123}I]-mIBG and rest [^{99m}Tc]Tc-tetrofosmin bull's eye images were divided into 17 segmental regions [12]. In each segment, resting perfusion or sympathetic innervation is typically quantified as a percentage by the ratio of the mean segmental activity (MSA) in a segment to the maximum activity measured in the left myocardium (MSA%). As none of the patients included in the study showed a major, generalized decrease in myocardial perfusion, the region of maximum activity in the left myocardium can be considered normally perfused. Therefore, the percentage of necrotic myocardial surface area was estimated by counting the number of segments with MSA% $<$ 50%, multiplied by the average surface area represented by one segment (ie, 100/17%). Quantifying the denervated area is more complex due to the high variability in the H/M ratio observed in our population (range: 1.16-1.98). This requires a metric that accounts for a global reduction in [^{123}I]-mIBG uptake across the entire LV. To account for both this global mIBG uptake and the physiological decline of [^{123}I]-mIBG H/M ratios with age, a normalization factor (F) was calculated from the 4-hour H/M ratios measured in our patients and from a reference population of 113 individuals without cardiac disease, aged from 1 to 88 years and grouped by decade (according to the nuclear medicine department's standards), as follows:

$F = \left(\frac{H}{M}\right)_{patient} \frac{-1}{} \left(\frac{H}{M}\right)_{normal} - 1$ where $\left(\frac{H}{M}\right)_{normal}$ is the mean H/M ratio observed in a population of patients without cardiac disease in the same decade. In the study population, this coefficient ranged from F = 0.2 in a patient with a severely altered H/M ratio to F = 1,20 for the only patient whose H/M ratio was above normal for the patient's age.

For each segment, the [^{123}I]-mIBG MSA% was multiplied by the normalization coefficient F to obtain a normalized mean segmental activity (MSAn%) that reflects both regional and global tracer uptake. The percentage of denervated myocardial surface area was then estimated by counting the number of segments with MSAn% < 50%, multiplied by the average surface area represented by one segment (100/17%).

MPR quantification: dynamic SPECT with [^{99m}Tc]Tc-tetrofosmin

Dynamic perfusion SPECT was performed at rest and during peak vasodilator stress using [^{99m}Tc]Tc-tetrofosmin. To ensure accurate heart positioning within the field of view, a low-test dose of [^{99m}Tc]Tc-tetrofosmin (50 MBq) was first injected at rest, followed by a 60-s prescan.

Once the heart was properly centered, a 5-min list-mode acquisition was initiated concomitantly with the intravenous bolus injection of 200 MBq of [^{99m}Tc]Tc-tetrofosmin.

With the patient remaining in position, pharmacological stress was then induced by intravenous infusion of dipyridamole (0.75 mg/kg over 4 minutes). At peak vasodilation, 700 MBq of [^{99m}Tc]Tc-tetrofosmin was injected, and list-mode data were acquired for an additional 5 minutes starting at the time of injection.

This study protocol makes it possible to perform both a standard rest/stress [^{99m}Tc]Tc-tetrofosmin SPECT by summing the data acquired after the first minute after radiotracer administration (used in clinical practice and in the COLD-MI trial) and the acquisition of dynamic data. These data enable the quantification of MPR following the method described by Ben Bouallègue et al. [13]. Here, the paradigm is the same, but the calculations were performed using PMOD version 4.2 (PMOD Technologies, Zurich, Switzerland). Any hemodynamic adverse event (bradycardia, tachycardia, or hypotension) occurring during pharmacological stress was systematically recorded in the study case report form.

Statistical analysis

Group comparisons were performed between colchicine-treated and untreated patients. Analyses were conducted on the total myocardium and subsequently by infarcted or not infarcted territories. The LV was previously divided into three distinct anatomical regions, corresponding to the territories irrigated by the three main coronary arteries (RCA, LAD, and LCx). The region used for analyzing the infarcted part of LV corresponded to the territory of the occluded artery. Conversely, for the MPR in non-infarcted myocardium, only the territories supplied by the non-occluded coronary arteries were considered. Continuous variables were summarized as mean ± standard deviation if normally distributed (Shapiro–Wilk test), or as median [interquartile range] otherwise, and compared between groups using Welch's *t*-test or the Mann–Whitney *U* test, respectively. Categorical variables were expressed as counts and percentages and compared using the χ^2 test or Fisher's exact test, as appropriate. We used a two-sided

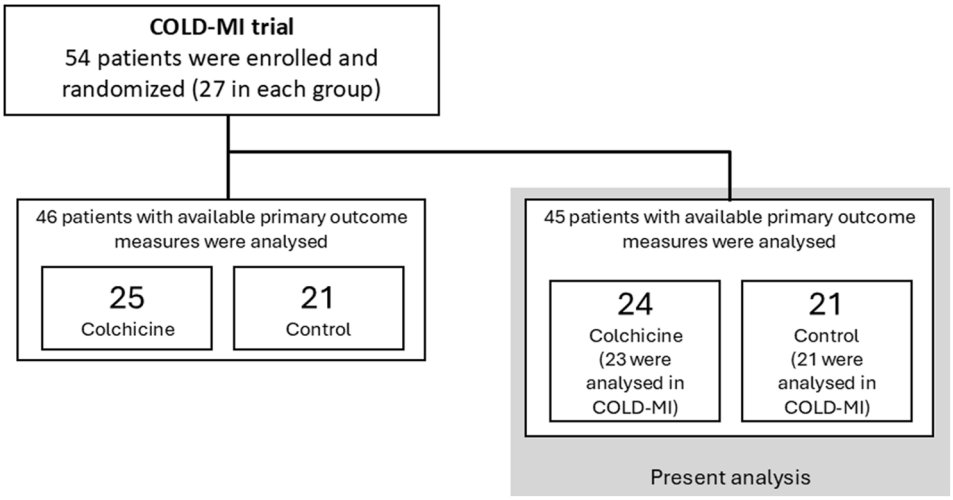

Figure 1. Flow chart of patient inclusion.

significance level of $\alpha = 0.05$; *P*-value (P) < 0.05 was considered statistically significant. Statistical analyses were performed using Python 3.12.8.

RESULTS

Population

In the randomized controlled COLD-MI trial (2,9), 54 patients were enrolled and randomized (27 in each group). Of these, 46 patients with available primary outcome measures were analyzed in the main publication (25 in the colchicine group and 21 in the control group). In the present analysis, we included 45 patients selected from the 54 randomized participants rather than from those analyzed in the primary study. As a result, some patients included here were not part of the original publication. The corresponding flowchart is presented in Figure 1.

The clinico-demographic variables distribution and other cardiovascular risk factors remained balanced between the two groups and are summarized in Table 1.

Regarding medical therapy, treatment data collected at the 6-month follow-up visit prior to nuclear medicine imaging have also been included. The distribution of therapies between the colchicine and control groups did not differ significantly, and the detailed breakdown is presented in Table 2.

Table 1. Population characteristics between randomized groups

	Control N = 21	Colchicine N = 24	P-value
Sex			0.3[a]
Female	*3 (14%)*	*7 (29%)*	
Male	*18 (86%)*	*17 (71%)*	
Age (year)	56.5 (9.2)	57.7 (9.1)	0.6[b]
BMI (kg/m^2)	26.5 [23.9-29.1]	26.8 [23.5-31.1]	1[c]
Smoking status			0.2[d]
Nonsmoker	*3 (14%)*	*7 (29%)*	
Active smoker	*14 (67%)*	*10 (42%)*	
Weaned	*4 (19%)*	*7 (29%)*	
History of hypertension or ongoing antihypertensive treatment	10 (48%)	7 (29%)	0.2[a]
Heart rate (bpm)	73 [67-85]	77.5 [69-85]	0.4[a]
Blood pressure (mmHg)			
Systolic	*115.3 (17.7)*	*115.0 (17.1)*	1[b]
Diastolic	70 [63-78]	71 [65-77]	0.8[c]
Dyslipidemia	11 (52%)	12 (50%)	1[a]
Diabetes	3 (14%)	4 (17%)	1[a]
Stented culprit artery			0.6[d]
Left anterior descending artery	9 (43%)	7 (29%)	
Right coronary artery	10 (48%)	14 (58%)	
Circumflex artery	2 (9%)	3 (13%)	
Number of cardiovascular risk factors			0.3[d]
1	*3 (14%)*	*1 (4%)*	
2	*8 (38%)*	*7 (29%)*	
3	*5 (24%)*	*10 (42%)*	
4	*4 (19%)*	*2 (8%)*	
5	*1 (5%)*	*4 (17%)*	

[a] For Fisher test.
[b] For Welch's *t*-test.
[c] For Wilcoxon test.
[d] For chi2 test, bpm stands for beats per minute.

Effect of colchicine on MPR

MPR did not differ significantly between groups in infarcted territories (1.79 ± 0.61 vs. 1.60 ± 0.63, $P = 0.35$). However, in non-infarcted regions, MPR was significantly higher in the colchicine group than in controls (2.37 ± 0.61 vs. 1.92 ± 0.53, $P = 0.01$).

These findings are illustrated in Figure 2 and detailed in Table 3. The results are expressed as a unitless ratio of MBF during stress and rest, reflecting the variation in tracer transfer from the plasma compartment to the tissue compartment. Absolute MBF values (mL/min/g) at rest or stress were considered unreliable due to the lack of attenuation correction in the dynamic SPECT acquisitions; consequently, MPR was used as the primary endpoint. No hemodynamic adverse events were recorded during the protocol.

MPS, sympathetic innervation and other parameters

SPECT-derived perfusion and innervation measures are summarized in Table 3. In infarcted regions, no significant differences were observed between the colchicine and control groups for summed rest score (SRS), summed stress score (SSS), or summed different score (SDS). Similarly, no significant difference in these perfusion scores were found in non-infarcted territories.

For sympathetic innervation, the denervated myocardial surface area was smaller in colchicine-treated patients within infarcted regions (46% [35-50] vs. 50% [45-69], $P = 0.09$), although this difference did not reach statistical significance. In non-infarcted myocardium, the colchicine group showed a significantly reduced denervated surface area compared with controls (43% [29-50] vs. 50% [38-64], $P = 0.04$).

Isotopic left ventricular ejection fraction was $48.8 \pm 13.2\%$ in the control group and $50.9 \pm 15.5\%$ in the colchicine group ($P = 0.65$).

Table 2. Comparison of treatments between the two study groups after 6 months of follow-up

Class of medication	Control (%)	Colchicine (%)
Calcium channel blocker (amlodipine)	1 (4.8%)	0 (0.0%)
Mineralocorticoid receptor antagonist	3 (14.3%)	3 (12.5%)
Antiplatelet agent	21 (100.0%)	23 (95.8%)
Anticoagulant	1 (4.8%)	2 (8.3%)
Oral antidiabetic	5 (23.8%)	4 (16.7%)
Corticosteroid anti-inflammatory	0 (0.0%)	1 (4.2%)
Angiotensin II receptor blocker	1 (4.8%)	2 (8.3%)
Bronchodilator	1 (4.8%)	1 (4.2%)
Angiotensin-converting enzyme inhibitor	16 (76.2%)	14 (58.3%)
Insulin	2 (9.5%)	1 (4.2%)
HMG-CoA reductase inhibitors	19 (90.5%)	22 (91.7%)
Sympathomimetic	1 (4.8%)	2 (8.3%)
Beta blockers	17 (81%)	18 (75%)

Table 3. Comparison of perfusion metrics (SRS, SSS, SDS), percentage of denervated myocardial surface area (Denerv) and myocardial perfusion reserve (MPR) between the Colchicine and Control groups in infarcted and non-infarcted regions. Values are presented as median [interquartile range]. * Stands for statistically significative differences

	LV area	Control	Colchicine	P-value
SRS	Infarcted	5 [0-15]	8 [0-15]	0.79
	Non-infarcted	2 [0-3]	1 [0-3]	0.50
SSS	Infarcted	14 [0-20]	12 [0-20]	0.97
	Non-infarcted	3 [0-5]	3 [0-5]	0.17
SDS	Infarcted	0 [0-5]	2 [0-6]	0.91
	Non-infarcted	0 [0-0]	0 [0-0]	0.26
Denerv (%)	Infarcted	50 [45-69]	46 [35-50]	0.09
	Non-infarcted	50 [38-64]	43 [29-50]	**0.04** *
MPR	Infarcted	1.6 (0.63)	1.79 (0.61)	0.35
	Non-infarcted	1.92 (0.53)	2.37 (0.61)	**0.01***

DISCUSSION

Relationship between MPR and cardiac denervation

We obtained results consistent with the original COLD-MI study, showing an improvement in [^{123}I]-mIBG uptake in the remote myocardium without a corresponding improvement in MPS scores, despite a slightly different study population. However, assessment of MPR revealed a significant increase, suggesting that this parameter is more sensitive to subtle changes in perfusion.

The increase in MPR observed, primarily in the remote myocardium, may provide a potential explanation for the reduction in denervation in the peri-infarcted zone. When MPR was analyzed across the entire LV, there was a trend toward improvement, although statistical significance was not reached, most likely due to limited statistical power.

In parallel, the COLD-MI study demonstrated a positive effect of colchicine in reducing cardiac denervation in remote areas after AMI, while no change in myocardial perfusion was detected using MPS. Since sympathetic denervation in the post-AMI setting is most likely of ischemic origin, these findings may initially appear discordant; however, the MPR results provide a plausible mechanistic explanation.

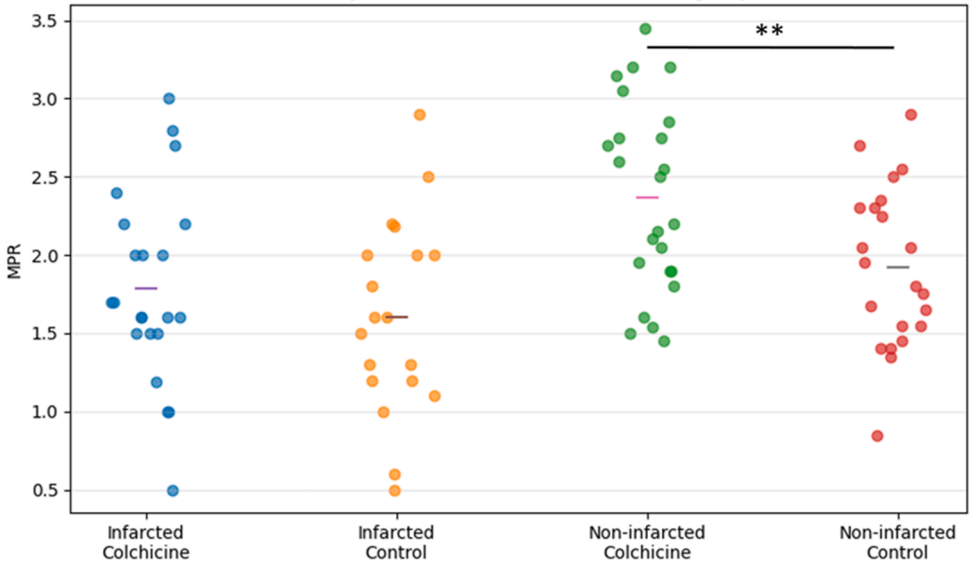

Figure 2. Myocardial perfusion reserve (MPR) by infarcted status and treatment group. ** stands for P-value ≤0.01.

MPR is a quantitative measure of coronary vasodilator capacity that can be obtained using widely available tracers and imaging equipment, in contrast to absolute MBF at rest and stress, which is typically assessed with rubidium-82 positron emission tomography (PET). Importantly, MPR can be measured in any nuclear medicine department equipped with a dedicated CZT gamma camera. This approach provides a reliable estimation of coronary flow reserve without the need for PET, even in the absence of attenuation correction, as MPR reflects the relative change between stress and rest under identical attenuation conditions.

In the present study, MPR measured with a CZT gamma camera showed improved perfusion in the remote myocardium of patients treated with colchicine, consistent with the improved sympathetic innervation reported in the COLD-MI trial. This suggests that MPR may be a more sensitive and suitable tool for monitoring perfusion changes in remote myocardial territories.

Our MPR values in infarcted (1.60 $\pm$ 0.63) and remote (1.92 $\pm$ 0.50) myocardium were comparable to those reported by Zavadovsky et al. [14] using a SPECT CZT technique, with median values of 1.43 (IQR 0.94-2.24) in infarcted regions and 1.64 (IQR 1.24-2.00) in remote myocardium. Furthermore, in our study, patients treated with colchicine demonstrated higher MPR values in the remote myocardium compared with controls. This observation is consistent with experimental evidence showing that colchicine reduces microvascular obstruction and preserves microvascular integrity after ischemia–reperfusion injury through its anti-inflammatory effects and inhibition of neutrophil activation [15].

Limitations

The first limitation of our study is the small sample size. Additionally, not all baseline parameters from the original protocol were available for every patient, as some examinations were not performed. While Table 1 provides a comprehensive overview of demographic, clinical, and angiographic characteristics for each study arm, detailed data on the severity of coronary artery disease from coronary angiography—particularly regarding arteries not identified as the culprit for the acute coronary syndrome—were not consistently available. Consequently, we cannot fully exclude the potential influence of baseline differences on the response to colchicine or on SPECT-derived MPS. Furthermore, baseline MPS and MPR measurements could not be obtained at inclusion due to the acute infarct setting, preventing any before-and-after comparison to assess temporal changes within the same patients.

NEW KNOWLEDGE GAINED AND CLINICAL IMPLICATIONS

What is new?

- This ancillary analysis of the COLD-MI trial shows that colchicine increases myocardial perfusion reserve (MPR) six months after acute myocardial infarction in remote myocardium.What are the clinical implications?
- Colchicine may provide a microvascular benefit after myocardial infarction beyond its anti-inflammatory effects.
- Measurement of MPR with dynamic CZT-SPECT could help identify treatment-related perfusion improvements not visible with standard perfusion scores.

FUNDING AND SUPPORT

The work was carried out at Montpellier University Hospital, University of Montpellier.

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PRE-REGISTERED CLINICAL TRIAL NUMBER

The pre-registered clinical trial number for primary COLD-MI study is NCT04420624.

ETHICAL APPROVAL

The primary COLD-MI study, from which the present analysis is derived, was approved by the Ile-de-France VI Ethics Committee and the French National Agency for Medicines and Health Products Safety (ANSM).

REFERENCES

[1] Vrints C, Andreotti F, Koskinas KC, Rossello X, Adamo M, Ainslie J, et al. 2024 ESC guidelines for the management of chronic coronary syndromes. Eur Heart J 2024 Sept 29;45:3415–537.

[2] Huet F, Mariano-Goulart D, Aguilhon S, Delbaere Q, Lacampagne A, Fauconnier J, et al. Colchicine to prevent sympathetic denervation after acute myocardial infarction: the COLD-MI trial. Eur Heart J 2024 Jan;30:ehae042.

[3] Huet F, Fauconnier J, Legall M, Sicard P, Lozza C, Lacampagne A, et al. Low-dose colchicine prevents sympathetic denervation after myocardial ischemia-reperfusion: a new potential protective mechanism. Future Sci OA 2020 Nov 23;7:FSO656.

[4] Tardif JC, Kouz S, Waters DD, Bertrand OF, Diaz R, Maggioni AP, et al. Efficacy and safety of low-dose colchicine after myocardial infarction. N Engl J Med 2019 Dec 26;381:2497–505.

[5] Akodad M, Fauconnier J, Sicard P, Huet F, Blandel F, Bourret A, et al. Interest of colchicine in the treatment of acute myocardial infarct responsible for heart failure in a mouse model. Int J Cardiol 2017 Aug 1;240:347–53.

[6] Agostini D, Roule V, Nganoa C, Roth N, Baavour R, Parienti JJ, et al. First validation of myocardial flow reserve assessed by dynamic 99mTc-sestamibi CZT-SPECT camera: head to head comparison with 15O-water PET and fractional flow reserve in patients with suspected coronary artery disease. The WATERDAY study. Eur J Nucl Med Mol Imag 2018 July;45:1079–90.

[7] Yamamoto A, Nagao M, Ando K, Nakao R, Matsuo Y, Sakai A, et al. First validation of myocardial flow reserve derived from dynamic 99mTc-Sestamibi CZT-SPECT camera compared with 13N-Ammonia PET. Int Heart J 2022;63:202–9.

[8] Acampa W, Assante R, Mannarino T, Zampella E, D'Antonio A, Buongiorno P, et al. Low-dose dynamic myocardial perfusion imaging by CZT-SPECT in the identification of obstructive coronary artery disease. Eur J Nucl Med Mol Imag 2020 July 1;47:1705–12.

[9] Huet F, Delbaere Q, Aguilhon S, Dupasquier V, Delseny D, Gervasoni R, et al. Colchicine to prevent sympathetic denervation after an acute myocardial infarction: the COLD-MI trial protocol. Medicina (Mex) 2021 Sept 30;57:1047.

[10] Flotats A, Carrió I, Agostini D, Le Guludec D, Marcassa C, Schäfers M, et al. Proposal for standardization of 123I-metaiodobenzylguanidine (MIBG) cardiac sympathetic imaging by the EANM cardiovascular committee and the European council of nuclear cardiology. Eur J Nucl Med Mol Imag 2010 Aug;37:1802–12.

[11] Cerqueira MD, Weissman NJ, Dilsizian V, Jacobs AK, Kaul S, Laskey WK, et al. Standardized myocardial segmentation and nomenclature for tomographic imaging of the heart. A statement for healthcare professionals from the cardiac imaging committee of the council on clinical cardiology of the American Heart Association. Circulation 2002 Jan 29;105:539–42.

[12] Vauchot F, Ben Bouallègue F, Hedon C, Piot C, Roubille F, Mariano-Goulart D. Assessment of the area at risk after acute myocardial infarction using 123I-MIBG SPECT: comparison with the angiographic APPROACH-Score. J Nucl Cardiol Off Publ Am Soc Nucl Cardiol 2018 Apr;25:572–80.

[13] Bouallègue FB, Roubille F, Lattuca B, Cung TT, Macia JC, Gervasoni R, et al. SPECT myocardial perfusion reserve in patients with multivessel coronary disease: correlation with angiographic findings and invasive fractional flow reserve measurements. J Nucl Med 2015 Nov 1;56:1712–7.

[14] Zavadovsky KV, Vorobyeva DA, Mochula OV, Mochula AV, Maltseva AN, Bayev AE, et al. Myocardial blood flow and flow reserve in patients with acute myocardial infarction and obstructive and non-obstructive coronary arteries: CZT SPECT study. Front Nucl Med 2022;2:935539.

[15] Tan Y, Bao X, Li Y, Song G, Lu H, Sun X, et al. Colchicine attenuates microvascular obstruction after myocardial ischemia-reperfusion injury by inhibiting the proliferation of neutrophil in bone marrow. Cardiovasc Drugs Ther 2025 Apr 1;39:259–73.