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Association Between Ankle-Brachial Index and Coronary Artery Disease Severity in Adults Undergoing Coronary Angiography

Abstract

Introduction. Peripheral arterial disease (PAD) is a manifestation of systemic atherosclerosis and is frequently associated with coronary artery disease (CAD). The ankle–brachial index (ABI) is a simple, noninvasive tool used to detect PAD and may reflect the overall burden of atherosclerosis. Despite the known association between PAD and CAD, the role of ABI in predicting the presence and severity of CAD in patients undergoing coronary angiography remains unclear, especially in contemporary clinical practice. The present study aimed to evaluate the association between low ABI and the presence and angiographic severity of CAD in patients undergoing coronary angiography and to explore whether ABI may support cardiovascular risk stratification.

Methods. This cross-sectional study included 401 consecutive patients with suspected CAD who underwent elective coronary angiography during the study period. ABI was measured prior to angiography using a handheld Doppler device. A value of <0.90 was considered abnormal. Significant CAD was defined as stenosis ≥50 % in the left main coronary artery and/or ≥70 % stenosis in other major coronary arteries. The severity of CAD was classified according to the number of diseased coronary arteries. Relationships between ABI and clinical factors were analyzed using the chi-square test.

Results. Low ABI (<0.90) was detected in 155 (38.7 %) patients. Multivessel CAD was diagnosed in 198 (49.4 %) patients. A significant negative correlation between the number of affected vessels and low ABI was identified (the prevalence of low ABI in patients with 2-vessel disease, p=0.041; and with 3-vessel disease, p=0.001). Low ABI was significantly associated with age ≥65 years (p=0.043), arterial hypertension (p=0.020), diabetes mellitus (p=0.001), smoking (p=0.002), impaired renal function (p=0.037), stable angina (p=0.021), myocardial infarction (p=0.032), and previous stroke or transient ischemic attack (p=0.001).

Conclusions. Low ABI is significantly associated with both the presence and severity of CAD. It is significantly more common in patients with multivessel CAD and is associated with the overall atherosclerotic burden. Therefore, ABI testing may provide additional clinical value as a simple and noninvasive adjunct for cardiovascular risk stratification in patients undergoing coronary angiography for suspected CAD.

Keywords: *ankle-brachial index; coronary artery disease; peripheral arterial disease; atherosclerosis; coronary angiography; cardiovascular risk stratification.*

Introduction. Atherosclerosis is a major cause of morbidity and mortality worldwide and is widely recognized as a generalized systemic disease affecting the coronary, cerebral, and peripheral arteries. Among these vascular territories, coronary artery involvement is of particular clinical importance due to its close association with severe complications and high mortality rates [1]. These observations suggest that peripheral arterial disease (PAD) can be used as a surrogate marker of progressive systemic atherosclerosis and widespread vascular involvement; it is typically classified according to its clinical presentation [2].

PAD is strongly associated with systemic atherosclerosis; up to 50 % of patients have evidence of coronary artery disease (CAD) based on clinical or electrocardiographic findings [3,4]. Both CAD and cerebrovascular disease are strongly associated with a low ankle–brachial index (ABI) [5].

The resting ABI is the most widely used screening test for PAD in clinical practice. Traditionally, ABI values between 1.00 and 1.29 are considered normal; values of 0.41-0.90 indicate mild-to-moderate disease; values

≤0.40 indicate severe; values of 0.91-0.99 are considered borderline; and values greater than 1.30 suggest non-compressible arteries. More recent recommendations propose that ABI values between 1.00 and 1.40 be considered normal and values above 1.40 indicate non-compressible vessels [6].

The presence of PAD in combination with CAD and cerebrovascular disease supports the idea that PAD is not merely a localized disease but rather evidence of more severe systemic vascular involvement [7]. ABI is a noninvasive, straightforward, cost-effective method for assessing arterial perfusion of the lower extremities and identifying PAD and has become the most widely used screening test for PAD [8,9].

Despite the well-established association between PAD and CAD, the predictive value of ABI to predict CAD remains unclear. In addition, it is not well understood how ABI relates to CAD severity across different patient groups. This creates a gap in identifying high-risk patients and in improving risk stratification in clinical practice. Therefore, the present study aimed to evaluate the association between low ABI and the presence and angiographic severity of CAD in patients undergoing coronary angiography and to explore whether ABI may support cardiovascular risk stratification.

Patients and Methods

Study Design and Population

This cross-sectional study included 401 consecutive patients with suspected CAD who underwent elective coronary angiography at Ibn Al-Bitar Center of Cardiovascular Diseases between January 2022 and May 2024. All eligible patients during the study period were included. The study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Ethics Committee of the Department of Cardiovascular Surgery, College of Medicine, University of Basrah (approval number: 11, dated 14 January 2022). Written informed consent was obtained from all participants before enrollment.

Patients were referred for coronary angiography due to clinical indications, including stable angina, unstable angina, myocardial infarction, or evaluation of chest pain.

Inclusion criteria: adult patients undergoing elective coronary angiography for suspected CAD.

Exclusion criteria: patients referred for coronary angiography for indications other than CAD (e.g., congenital or valvular heart disease); those with a history of coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI); individuals unwilling to participate; and patients with an ABI >1.3 were excluded.

Baseline cardiovascular risk factors, including hypertension, diabetes mellitus, smoking status, body mass index (BMI), hyperlipidemia, and renal impairment, were assessed prior to the procedure using a structured questionnaire according to current guidelines [10].

Coronary Angiography and Definition of CAD

All subjects underwent coronary angiography, and the results were documented. Severe CAD was defined as stenosis of at least 50 % in the left main coronary artery or of at least 70 % in any other epicardial coronary artery.

CAD was classified according to the number of diseased vessels as follows: no disease, one-vessel disease, two-vessel disease, three-vessel disease, or multivessel disease.

Measurement of ABI

ABI was measured using a portable vascular Doppler device (8-MHz probe) and an aneroid sphygmomanometer with appropriately sized cuffs according to international guidelines.

Systolic blood pressure was measured in the brachial, posterior tibial, and dorsalis pedis arteries after the patient had rested in the supine position for at least 5 minutes. Measurements were taken sequentially from the right arm, left arm, left leg, and right leg.

ABI was calculated by dividing the highest systolic ankle pressure by the highest systolic brachial pressure. The lower ABI value of the two legs was used for analysis.

A pathological ABI was defined as <0.90. PAD severity was classified as follows: severe (≤0.50), moderate (0.51-0.70), mild (0.71-0.90), and normal (≥0.90), according to guideline recommendations [10].

Other definitions used in the study

Renal impairment was defined as eGFR <60 mL/min/1.73 m^2 or the presence of clinical evidence of chronic kidney disease.

Hypertension was defined as systolic BP ≥140 mmHg, diastolic BP ≥90 mmHg, or current use of antihypertensive drugs.

Diabetes mellitus was defined as fasting plasma glucose ≥126 mg/dL, HbA1c ≥6.5 %, or current use of antidiabetic drugs.

Current and former smokers were considered smokers in this study.

Hyperlipidemia was defined as total cholesterol ≥200 mg/dL, LDL ≥130 mg/dL, or current use of lipid-lowering drugs.

Chest pain evaluation was defined as patients undergoing coronary angiography for diagnostic assessment of suspected ischaemic symptoms without confirmed acute coronary syndrome.

Statistical Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 22 (IBM Corp., Armonk, NY, USA). Data were presented as frequencies and percentages for categorical variables, while age was expressed as mean ± standard deviation (M ± SD). Comparisons between categorical variables were performed using the χ^2 (chi-square) test. Associations between ABI categories and clinical variables, including age groups, sex, cardiovascular risk factors, and CAD severity, were evaluated using the chi-square test.

A p-value of <0.05 was considered statistically significant.

Results. The mean age of the study population was 56.3±9.69 years (range 27-89). A total of 276 (68.8 %) participants were male, and 125 (31.2 %) were female.

Hypertension was present in 209 (52.1 %) patients, diabetes mellitus in 158 (39.4 %), and 181 (45.1 %) were current or former smokers.

Regarding clinical presentation, 115 (28.5 %) patients had stable angina, 106 (26.2 %) had unstable angina, 87 (22.2 %) had myocardial infarction, and 93 (23.1 %) were referred for evaluation of chest pain. Renal impairment was present in 59 (14.7 %) patients. The ankle–brachial index (ABI) was <0.90 in 155 (38.7 %) patients. All the patient characteristics are presented in Table 1.

Table 1

Characteristics of the study population (n=401)

Variable	n	%
ABI <0.90	155	38.7
ABI ⩾0.90	246	61.3
Male	276	68.8
Female	125	31.2
Hypertension	209	52.1
Diabetes mellitus	158	39.4
Smoking (current/former)	181	45.1
BMI ⩾25 kg/m²	180	44.9
Hyperlipidemia	238	59.4
Renal impairment	59	14.7
Stroke/TIA history	24	6.0
Stable angina	115	28.5
Unstable angina	106	26.2
Myocardial infarction	87	22.2
Chest pain evaluation	93	23.1

Note: ABI, ankle-brachial index; BMI, body mass index; TIA, transient ischemic attack.

Coronary angiography results showed that 104 (24.9 %) patients had normal coronary arteries, while 99 (24.7 %), 139 (34.7 %), and 59 (15.7 %) had single-vessel, two-vessel, and three-vessel disease, respectively.

The presence of multivessel disease was associated with a higher frequency of low ABI. This association was significant in patients with two-vessel disease (p=0.041) and in patients with three-vessel disease or more (p=0.001) (Table 2).

Table 2

The association between ABI and coronary artery involvement

Number of diseased vessels	ABI <0.90 n (%)	ABI ⩾0.90 n (%)	p-value
No lesion	17 (16.3)	87 (83.7)	0.534
Single vessel	23 (23.2)	75 (76.8)	0.518
Two vessels	67 (47.5)	73 (52.5)	**0.041**
⩾3 vessels	48 (81.4)	11 (18.6)	**0.001**
Overall	155 (38.7)	246 (61.3)	**0.045**

Note: ABI, ankle-brachial index

Further analysis showed a statistically significant association between low ABI and other clinical or demographic characteristics. Patients aged ≥65 years were significantly more likely to have low ABI than younger patients (p=0.043), whereas sex showed no significant association.

Regarding cardiovascular risk factors, hypertension (p=0.020), diabetes mellitus (p=0.001), smoking (p=0.002), and impaired renal function (p=0.037) were significantly associated with low ABI; however, hyperlipidemia (p=0.052) and BMI ≥25 kg/m² (p=0.082) showed no significant association.

Regarding clinical presentations, there were significant associations between low ABI and stable angina (p=0.021), myocardial infarction (p=0.032), and stroke or transient ischaemic attack (p=0.001); in contrast, unstable angina and chest pain evaluation showed no significant association (Table 3).

Table 3

Association between ABI and patient characteristics

Variable	ABI < 0.90 n (%)	ABI ⩾ 0.90 n (%)	p-value
Age ⩾65 years	76 (61.8)	47 (38.2)	0.043
Age <65 years	79 (28.4)	199 (71.6)	0.076
Male	118 (42.8)	158 (57.2)	0.081
Female	37 (29.6)	88 (70.4)	0.11
Hypertension	81 (38.8)	128 (61.2)	0.020
Diabetes mellitus	76 (48.1)	82 (51.9)	0.001
Smoking	102 (56.4)	79 (43.6)	0.002
Renal impairment	30 (50.8)	29 (49.2)	0.037
Hyperlipidemia	97 (40.8)	141 (59.2)	0.052
BMI ⩾25 kg/m²	78 (43.3)	102 (56.7)	0.082
Stable angina	31 (27.0)	56 (73.0)	0.021
Unstable angina	49 (46.2)	57 (53.8)	0.093
Myocardial infarction	31 (35.6)	56 (64.4)	0.032
Stroke/TIA history	20 (83.3)	4 (16.7)	0.001
Chest pain evaluation	42 (45.2)	51 (54.8)	0.073

Note: ABI, ankle-brachial index; BMI, body mass index; TIA, transient ischemic attack.

Discussions. In this cross-sectional study of patients undergoing coronary angiography for evaluation of CAD, a low ABI <0.90 was observed in 38.7 % of cases and was strongly associated with both the presence and extent of CAD. Specifically, there was a higher prevalence of low ABI among patients with multivessel disease, indicating an association between ABI and CAD.

Although the association between ABI and CAD has been previously reported, our study adds current evidence by showing this relationship in a contemporary cohort and by demonstrating that lower ABI is linked to more extensive coronary disease. These findings support

ABI as a practical, noninvasive tool for cardiovascular risk stratification in routine clinical practice. However, its clinical interpretation remains debated. Low ABI mainly reflects peripheral arterial disease and systemic atherosclerosis; it may indicate a higher overall atherosclerotic burden, but it does not directly assess myocardial ischemia or the functional significance of coronary stenosis [11,12].

The prevalence of low ABI in our study was 38.7%, which is consistent with previous reports. Prevalence rates of low ABI in patients with CAD in studies by Núñez et al. [13] have been reported to range from 31-40 %. Similarly, Al Saffar et al. [14] reported comparable results. Several studies have confirmed that low ABI is associated with higher cardiovascular risk and increased incidence of coronary events [12,13,15]. However, the prognostic value of ABI is not fully consistent across all populations and outcomes [6]. A meta-analysis of patients with CAD showed that abnormal ABI predicted major adverse cardiovascular events and mortality, but the effect was mainly driven by low ABI [12]. Borderline ABI values showed less consistent prognostic value. Other studies have reported that ABI is highly specific but has limited sensitivity for predicting future cardiovascular events, which limits its use as a stand-alone predictor of coronary events. In addition, some cohorts have found that both low and high ABI are associated with increased risk, suggesting a U-shaped relationship and further highlighting the heterogeneity of its prognostic value [16]. Therefore, ABI appears to be more useful as a marker of overall atherosclerotic burden and cardiovascular risk than as a uniform predictor of coronary events in every clinical setting [12].

A key finding of this study was the significant inverse relationship between ABI and the extent of coronary artery involvement. Lower ABI values were more frequently observed in patients with multivessel disease, particularly those with two- and three-vessel involvement. Our findings are in agreement with Criqui et al. [15], who demonstrated that lower ABI values are associated with more advanced and diffuse atherosclerotic disease.

Age was also significantly associated with low ABI, with patients aged ≥65 years being at greater risk of abnormal ABI values. The results of this study are in line with those reported by Kumar et al. [17], who noted that the prevalence of PAD increases with age. Because age is independently associated with both PAD and CAD, it may partly explain the observed association between low ABI and coronary disease [12].

Among other traditional cardiovascular risk factors, diabetes mellitus was significantly associated with low ABI. Among all participants, 39.4 % had diabetes, and a significant association was observed between abnormal ABI and diabetes ($p=0.001$). Our results are similar to those obtained from the studies conducted by Quiles et al. [18]. However, the prevalence rate of PAD in our study was slightly higher.

Similarly, hypertension was highly prevalent (52.1 %), and a significant association between low ABI and hypertension was observed, in line with the report by Armas-Padrón et al. [19]. Hypertension contributes to endothelial dysfunction and arterial stiffness, both of which may promote the progression of peripheral and coronary atherosclerosis.

A smoking habit is another significant risk factor. Approximately 45.1 % of the patients were either current smokers or former smokers. Low ABI had a significant correlation with smoking, just as Myslinski et al. have reported [20]. There are multiple reasons why smoking increases the risk of atherosclerosis; one of them is that smoking increases oxidative stress and inflammation and causes endothelial damage.

Renal impairment was also significantly associated with low ABI, although its prevalence in our study (14.7 %) was lower than that reported in previous studies [21]. Chronic kidney disease is linked to accelerated atherosclerosis and vascular calcification, which may explain this association.

Overall, our findings support ABI as a useful marker of systemic atherosclerosis and a practical tool for cardiovascular risk stratification. Its use in routine clinical assessment may help identify high-risk patients earlier and guide more intensive preventive and therapeutic strategies [22].

However, the observed association between low ABI and CAD may be partly influenced by shared cardiovascular risk factors. Age, diabetes mellitus, hypertension, smoking, renal impairment, and arterial calcification are associated with both PAD and CAD, and may partly explain the relationship between low ABI and multivessel CAD [17-20,23]. Therefore, residual confounding cannot be excluded. Future studies with multivariable adjustment and prospective follow-up are needed to clarify the independent prognostic value of ABI for coronary events and to better define its role in coronary risk assessment.

Our study has several limitations. First, due to its cross-sectional design, causal conclusions cannot be drawn from the results of the analysis. Second, this study was conducted in a single tertiary cardiology centre, which may introduce selection bias. Third, exercise ABI was not performed, which may have led to underdiagnosis of moderate PAD. It should also be noted that although major cardiovascular risk factors were analysed, no consideration was given to parameters such as inflammatory markers, disease duration, hypertension management, or medication use. Fourth, the association of each factor with ABI was assessed using univariate analysis without adjustment. No multivariable regression analysis was performed, so residual confounding by age, diabetes, smoking, hypertension, renal impairment, and other clinical factors cannot be excluded. Fifth, the severity of CAD in our study was determined by angiography only; the functional state of the vessels was not taken into account. Despite these limitations, the results remain clinically meaningful and support the relevance of ABI as a tool for cardiovascular risk assessment in this population.

Conclusions. This study demonstrated a statistically significant association between low ABI (<0.90) and both the presence and angiographic severity of CAD in patients undergoing evaluation for suspected CAD. Patients with multivessel disease most frequently exhibited lower ABI values, particularly those with two- and three-vessel disease. These findings suggest that reduced ABI may reflect a greater systemic atherosclerotic burden. ABI measurement is a simple, noninvasive, and cost-effective method that may provide additional value for cardiovascular risk stratification in patients undergoing assessment for possible CAD.

Final Statements

Prospects for Further Research. Future research should focus on large-scale, multi-center works to validate the observed association between low ABI and the severity of CAD. The generalizability of findings must be improved. Prospective longitudinal studies are required to determine whether low ABI can predict future cardiovascular events such as myocardial infarction, stroke, and mortality. Subgroup analyses in patients with comorbid conditions such as diabetes mellitus, hypertension, and chronic kidney disease may reveal variations in the relationship between peripheral and coronary artery disease. Finally, future studies should evaluate the clinical utility of ABI in guiding decision-making and risk stratification, as well as its correlation with established scoring systems for CAD severity.

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Conflict of interest. The authors report no conflicts of interest related to this publication.

Compliance with Ethical Standards. The study was conducted in accordance with the principles of the Declaration of Helsinki (75th WMA General Assembly, Helsinki, Finland, October 2024) and complied with the requirements of the Ethics Committee of the Department of Cardiovascular Surgery, College of Medicine, University of Basrah. The study protocol was reviewed and approved by the local ethics committee (no. 11 in 14/01/2022).

Use of Artificial Intelligence. No artificial intelligence (AI) tools or large language models were used in the collection, processing, or statistical analysis of the data. However, AI-based software tools were used for language polishing, grammar correction, and reference formatting during manuscript preparation. These tools did not influence the scientific content, interpretation of results, or conclusions.

Primary Data and Materials. The primary datasets generated and analysed during the current study are available from the corresponding author upon reasonable request.

Список використаної літератури

References

1. Alexander S, Seenan C. Credibility, Accuracy, and Comprehensiveness of Readily Available Internet-Based Information on Treatment and Management of Peripheral Artery Disease and Intermittent Claudication: Review. J Med Internet Res. 2022;24(10):e39555. https://doi.org/10.2196/39555
2. Gornik HL, Aronow HD, Goodney PP, et al. 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation*. 2024;149(24):e1313-e1410. https://doi.org/10.1161/CIR.0000000000001251
3. Guideline for the Management of Lower Extremity Peripheral Artery Disease: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. J Am Coll Cardiol. 2024;83(24):2497-2604.https://doi.org/10.1016/j.jacc.2024.02.013
4. Stanley GA, Scherer MD, Hajostek MM, Yammine H, Briggs CS, CrespoSoto HO, et al. Utilization of coronary computed tomography angiography and computed tomography-derived fractional flow reserve in a critical limb-threatening ischemia cohort. J Vasc Surg Cases Innov Tech. 2023;10(2):101272. https://doi.org/10.1016/j.jvscit.2023.101272
5. Krievins DK, Zellans E, Latkovskis G, Kumsars I, Krievina AK, Jegere S, et al. Diagnosis and treatment of ischemia-producing coronary stenoses improves 5-year survival of patients undergoing major vascular surgery. J Vasc Surg. 2024;80(1):240-248. https://doi.org/10.1016/j.jvs.2024.02.043
6. Bonaca MP, Hamburg NM, Creager MA. Contemporary Medical Management of Peripheral Artery Disease. Circ Res. 2021;128(12):1868-1884. https://doi.org/10.1161/circresaha.121.318258
7. Aboyans V, Canonico ME, Chastaingt L, Anand SS, Brodmann M, Couffinhal T, et al. Peripheral artery disease. Nat Rev Dis Primers. 2025;11(1):68. https://doi.org/10.1038/s41572-025-00651-0
8. Gerhard-Herman MD, Gornik HL, Barrett C, Barshes NR, Corriere MA, Drachman DE, et al. 2016 AHA/ACC Guideline on the Management of Patients With Lower Extremity Peripheral Artery Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2017;69(11):1465-1508. https://doi.org/10.1016/j.jacc.2016.11.008
9. Smolderen KG, Alabi O, Collins TC, Dennis B, Goodney PP, Mena-Hurtado C, et al. Advancing peripheral artery disease quality of care and outcomes through patient-reported health status assessment: A scientific statement from the American Heart Association. Circulation. 2022;146(20):e286–e297. https://doi.org/10.1161/cir.0000000000001105
10. Agnelli G, Belch JJ, Baumgartner I, Giovas P, Hoffmann U. Morbidity and mortality associated with atherosclerotic peripheral artery disease: A systematic review. Atherosclerosis. 2020;293:94–100. https://doi.org/10.1016/j.atherosclerosis.2019.09.012

11. Pan Y, Luo Y, Hong J, He H, Dai L, Zhu H, Wu J. Advances for the treatment of lower extremity arterial disease associated with diabetes mellitus. Front Mol Biosci. 2022;9:929718. https://doi.org/10.3389/fmolb.2022.929718
12. Ribera A, Ferreira-González I, Marsal JR, Cascant P, Permanyer-Miralda G, Abdul-Jawad O, et al. Prognostic value of an abnormal ankle-brachial index in patients receiving drug-eluting stents. Am J Cardiol. 2011;108(9):1225-31. https://doi.org/10.1016/j.amjcard.2011.06.036
13. Liu L, Sun H, Nie F, Hu X. Prognostic Value of Abnormal Ankle-Brachial Index in Patients With Coronary Artery Disease: A Meta-Analysis. Angiology. 2020;71(6):491-497. https://doi.org/10.1177/0003319720911582
14. Núñez D, Morillas P, Quiles J, Cordero A, Guindo J, Soria F, et al. Usefulness of an abnormal ankle-brachial index for detecting multivessel coronary disease in patients with acute coronary syndrome. Rev Esp Cardiol. 2010;63(1):54–59. https://doi.org/10.1016/s1885-5857(10)70009-8
15. Al Saffar HB, Al Ghizzi HJ, Muhammed SM. The ankle-brachial pressure index as a predictor of coronary artery disease severity. J Fac Med Baghdad. 2009;51(3):254–258. https://doi.org/10.32007/jfacmedbagdad.5131119
16. Criqui MH, Matsushita K, Aboyans V, Hess CN, Hicks CW, Kwan TW, et al. Lower extremity peripheral artery disease: Contemporary epidemiology, management gaps, and future directions: A scientific statement from the American Heart Association. Circulation. 2021;144(9):e171–e191. https://doi.org/10.1161/cir.0000000000001005
17. Alzamora MT, Forés R, Pera G, Baena-Díez JM, Valverde M, Torán P. Low, borderline and normal ankle-brachial index as a predictor of incidents outcomes in the Mediterranean based-population ARTPER cohort after 9 years follow-up. PLoS One. 2019;14(1):e0209163. https://doi.org/10.1371/journal.pone.0209163
18. Kumar A, Bano S, Bhurgri U, Kumar J, Ali A, Dembra S, et al. Peripheral Artery Disease as a Predictor of Coronary Artery Disease in Patients Undergoing Coronary Angiography. Cureus. 2021;13(5):e15094. https://doi.org/10.7759/cureus.15094
19. Quiles J, Morillas P, Bertomeu V, Mazon P, Cordero A, Soria F, et al. Combination of ankle brachial index and diabetes mellitus to predict cardiovascular events and mortality after an acute coronary syndrome. Int J Cardiol. 2011;151(1):84–88. https://doi.org/10.1016/j.ijcard.2010.04.097
20. Armas-Padrón AM, Sicilia-Sosvilla M, Rodríguez-Bello S, López-Carmona MD, Ruiz-Esteban P, Hernández D. Abnormal ankle-brachial index, cardiovascular risk factors and healthy lifestyle factors in hypertensive patients: prospective cohort study from a primary care urban population. BMC Prim Care. 2022;23(1):232. https://doi.org/10.1186/s12875-022-01837-1
21. Myslinski W, Stanek A, Feldo M, Mosiewicz J. Ankle-Brachial Index as the Best Predictor of First Acute Coronary Syndrome in Patients with Treated Systemic Hypertension. Biomed Res Int. 2020;2020:6471098. https://doi.org/10.1155/2020/6471098
22. Foster MC, Ghuman N, Hwang SJ, Murabito JM, Fox CS. Low ankle-brachial index and the development of rapid estimated GFR decline and CKD. Am J Kidney Dis. 2013;61(2):204-10. https://doi.org/10.1053/j.ajkd.2012.07.009
23. Tullos BW, Sung JH, Lee JE, Criqui MH, Mitchell ME, Taylor HA. Ankle-brachial index (ABI), abdominal aortic calcification (AAC), and coronary artery calcification (CAC): the Jackson heart study. Int J Cardiovasc Imaging. 2013;29(4):891-7. https://doi.org/10.1007/s10554-012-0145-y
24. Santilli F, Blaha MJ, Ricci F, Simeone P. Hunting for a coronary artery disease diagnosis in asymptomatic patients with diabetes mellitus: if, how and when. Cardiovasc Diabetol. 2025;24(1):418. https://doi.org/10.1186/s12933-025-02966-4

Взаємозв’язок між гомілково-плечовим індексом і тяжкістю ішемічної хвороби серця у дорослих пацієнтів, яким проводиться коронарографія

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Резюме

Вступ. Захворювання периферичних артерій (ЗПА) є проявом системного атеросклерозу та часто асоціюється з ішемічною хворобою серця (ІХС). Гомілково-плечовий індекс (ГПІ) є простим, неінвазивним методом виявлення ЗПА та може відображати загальний атеросклеротичний тягар. Незважаючи на відомий зв’язок між ЗПА та ІХС, роль ГПІ у прогнозуванні наявності та тяжкості ІХС у пацієнтів, яким проводиться коронарографія, залишається недостатньо визначеною, особливо в умовах сучасної клінічної практики. Метою цього дослідження було оцінити зв’язок між зниженим ГПІ та наявністю ІХС, а також визначити, чи може ГПІ сприяти стратифікації серцево-судинного ризику.

Матеріали та методи. У це поперечне дослідження включено 401 послідовного пацієнта з підозрою на ІХС, яким виконано планову коронарографію в спеціалізованому кардіологічному центрі в період з січня 2022 року по травень 2024 року. ГПІ вимірювали перед проведенням коронарографії за допомогою портативного доплерівського пристрою. Значення <0,90 вважалося патологічним. Значущу ІХС визначали як стеноз ≥50 % стовбура лівої коронарної артерії або ≥70 % інших основних коронарних артерій. Тяжкість ІХС класифікували за кількістю уражених коронарних судин. Зв’язок між ГПІ та клінічними показниками оцінювали за допомогою критерію χ^2.

Результати. Знижений ГПІ (<0,90) виявлено у 155 (38,7 %) пацієнтів. Багатосудинне ураження коронарних артерій спостерігалося у 198 (49,4 %) пацієнтів. Встановлено достовірний обернений зв'язок між ГПІ та кількістю уражених судин: знижений ГПІ частіше спостерігався у пацієнтів із двосудинним (p=0,041) та трисудинним ураженням (p=0,001).

Знижений ГПІ також достовірно асоціювався з віком ≥65 років (p=0,043), артеріальною гіпертензією (p=0,020), цукровим діабетом (p=0,001), курінням (p=0,002), нирковою недостатністю (p=0,037), стабільною стенокардією (p=0,021), інфарктом міокарда (p=0,032) та перенесеним інсультом або транзиторною ішемічною атакою (p=0,001).

Висновки. Знижений гомілково-плечовий індекс достовірно пов'язаний як з наявністю, так і з тяжкістю ІХС. Він частіше зустрічається у пацієнтів із мультисудинним ураженням і відображає загальний атеросклеротичний тягар. Таким чином, визначення ГПІ може мати додаткову клінічну цінність як простий, неінвазивний інструмент стратифікації серцево-судинного ризику у пацієнтів, яким проводиться коронарографія з приводу підозри на ІХС.

Ключові слова: *гомілково-плечовий індекс; ішемічна хвороба серця; захворювання периферичних артерій; атеросклероз; коронарографія; стратифікація серцево-судинного ризику.*

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