

Coronary Artery Disease with Isolated Side Branch Lesions: Follow-Up Outcomes with Medical Treatment

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SOUHRN

Cílem této studie bylo vyjasnit klinické dilema týkající se farmakologické versus intervenční léčby pacientů s ICHS, kteří se dostavili k lékařům s izolovanými lézemi na větvích koronárních tepen. Autoři retrospektivně posoudili výsledky všech koronarografických vyšetření provedených na naší klinice v období od ledna 2020 do července 2023. Pacienti byli rozděleni do dvou skupin podle případné progresy lézí na jednotlivých větvích koronárních tepen během farmakoterapie. Z celkového počtu 400 pacientů ve studii nebyla progresse koronárních lézí během farmakoterapie zjištěna u 332 pacientů. Komparativní analýzy koronarografických údajů prokázaly, že průměr jednotlivých větví koronárních tepen během prvního koronarografického vyšetření ($p = 0,012$), procento stenóz na jednotlivých větvích ($p = 0,001$), časový interval mezi oběma koronarografickými vyšetřeními ($p = 0,049$), počty ostiálních lézí na levé marginální větvi 1 ($p = 0,006$), a počty ostiálních lézí na levé marginální větvi 2 ($p = 0,027$) se mezi oběma skupinami statisticky významně lišily. Studie ukázala nízkou rychlost progresy lézí u pacientů s ICHS a izolovaných lézí jednotlivých větví při farmakologické léčbě. Uvedená zjištění hovoří ve prospěch provádění farmakoterapie oproti intervenční léčbě u daných pacientů.

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ABSTRACT

This study aimed to eliminate the clinical dilemma between medical and interventional treatments for patients with CAD presenting with isolated side branch lesions. All coronary angiography procedures performed at our clinic between January 2020 and July 2023 were retrospectively reviewed. The patients were categorized into two groups based on whether their coronary side branch lesions progressed under medical treatment. Of the 400 patients included in the study, 332 exhibited no progression in their coronary lesions under medical treatment. Comparative analyses of angiographic data revealed that side branch vessel diameter during the first angiography ($p = 0.012$), percentage of side branch stenosis ($p = 0.001$), the time interval between the two angiographies ($p = 0.049$), ostial lesions in obtuse marginal 1 ($p = 0.006$), and ostial lesions in obtuse marginal 2 ($p = 0.027$) statistically significantly differed between the two groups. This study revealed a low rate of lesion progression in patients with CAD and isolated side branch lesions managed with medical treatment. These findings support the clinical feasibility of prioritizing medical therapy over interventional treatment for such patients.

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Introduction and objective

Coronary artery disease (CAD) is a major cardiovascular condition and a predominant cause of mortality in both developed and developing countries, significantly affecting the global population. According to the World Health Organization, approximately 17 million deaths annually are attributed to CAD, ranking it as the third leading cause of death globally.¹ While many risk factors contribute to the development of CAD, primary risks include diabetes mellitus, hypertension, hyperlipidemia, smoking, obesity, lifestyle, genetic predispositions, and psychosocial stress.² Although CAD-related mortality has declined in recent years, it still accounts for nearly one third of deaths in individuals over 35 years of age. Approximately 50% of this decline can be attributed to advancements in the management of acute coronary syndrome (ACS) and acute heart failure, alongside improved primary and secondary prevention measures. The remaining 50% of the reduction is linked to stricter control of cardiovascular risk factors such as smoking, high cholesterol, sedentary lifestyles, and hypertension.³

The primary approach to CAD treatment integrates lifestyle changes, exercise, and dietary modifications into medical therapy. Medical treatment encompasses anti-ischemic medications (β -blockers, calcium channel blockers, and nitrates), drugs preventing atherothrombotic events (aspirin and P2Y₁₂ inhibitors), and agents reducing cardiovascular risks (statins, angiotensin-converting enzyme inhibitors, and angiotensin receptor blockers).⁴

Coronary angiography is frequently employed in the diagnosis of CAD. Currently, angiographic interventional procedures constitute a cornerstone of CAD treatment.⁵ However, while coronary angiography effectively identifies lesions in epicardial arteries, it fails to visualize the smaller vessels that comprise a substantial portion of the coronary vasculature. This limitation underscores the importance of medical therapy. Furthermore, lesions detected in epicardial arteries sometimes involve side branches rather than main arteries. Since side branches are narrower than main arteries, interventional procedures such as balloon angioplasty or stent implantation are more challenging and carry higher risks, presenting a dilemma for operators. Therefore, while medical and interventional treatments complement each other in the management of CAD, determining the optimal approach remains an active area of research.⁶

In this study, we investigated the follow-up outcomes of patients with CAD and side branch lesions detected through coronary angiography who did not undergo interventional procedures. Since both medical and interventional treatments carry inherent risks for patients in the short and long term, making a definitive decision in the angiography laboratory can be challenging. The primary objective of this study was to evaluate the clinical and angiographic outcomes of medical management in cases of coronary side branch stenosis.

Patients and methods

Study design

In this study, all coronary angiographies performed in the angiography laboratory of the cardiology department of

a tertiary care hospital between January 2020 and July 2023 were retrospectively reviewed. Over three and a half years, the medical records of angiographies were examined through the hospital's system, and patients meeting the study criteria were selected. From the initial dataset, 2,562 patients were identified with $\geq 50\%$ side branch lesions. Among these, 460 patients who underwent angiography twice at an average interval of four years were included. Due to the inability to retrieve angiographic images for 50 patients and incomplete information for 10 patients, the final sample comprised 400 patients.

The patients were contacted via telephone to gather information about the medical treatments they received between the two angiographies and their existing health conditions. Additional data, including blood values, cardiac rhythm, echocardiographic parameters, angiography dates, and angiographic findings, were obtained from hospital records. Patients with $\geq 50\%$ stenosis in coronary side branches were divided into two groups: those whose stenosis percentage increased and those whose stenosis percentage did not increase between the two angiographies.

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and received approval from the local ethics committee.

Patient selection and method

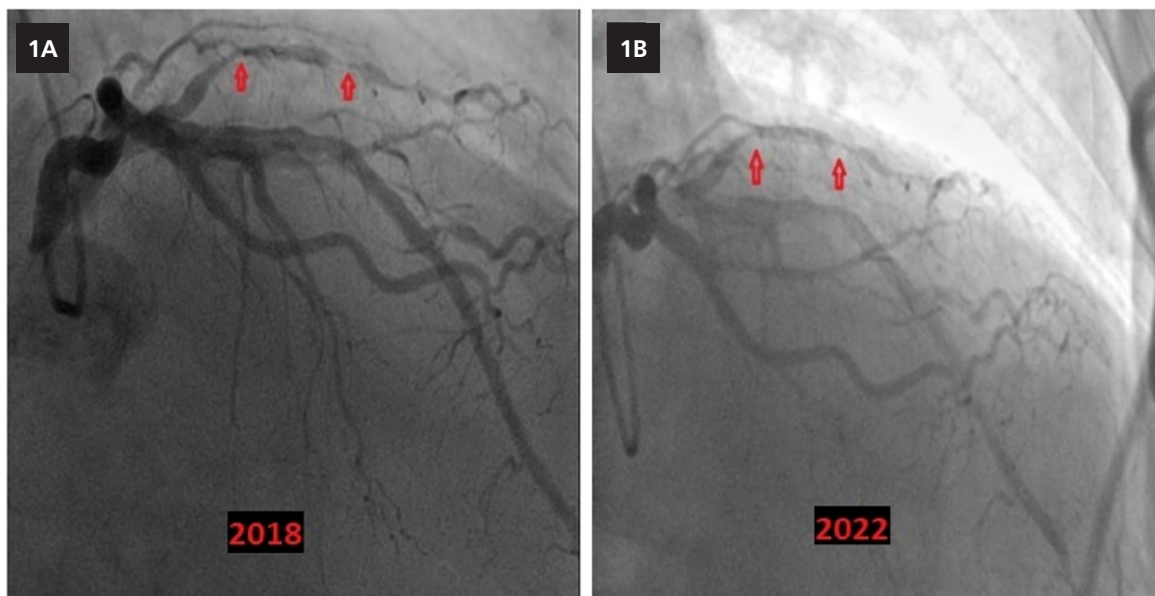
The primary criteria for the target patient group in this study, which aimed to evaluate the follow-up outcomes of coronary artery side branch lesions managed with medical therapy, were the presence of $\geq 50\%$ stenosis in the coronary artery side branch, independent of any interventional procedure performed on the main artery.

Excluded from the study were patients with $<50\%$ stenosis in the coronary artery side branch, those with less than a 12-month interval between the two angiographies, those who did not take at least one antiplatelet agent (aspirin or P2Y₁₂ inhibitor) after the index angiography, those who did not receive lipid-lowering therapy (statins) following the index angiography, those with a history of bypass surgery, and those with chronic renal failure requiring dialysis.

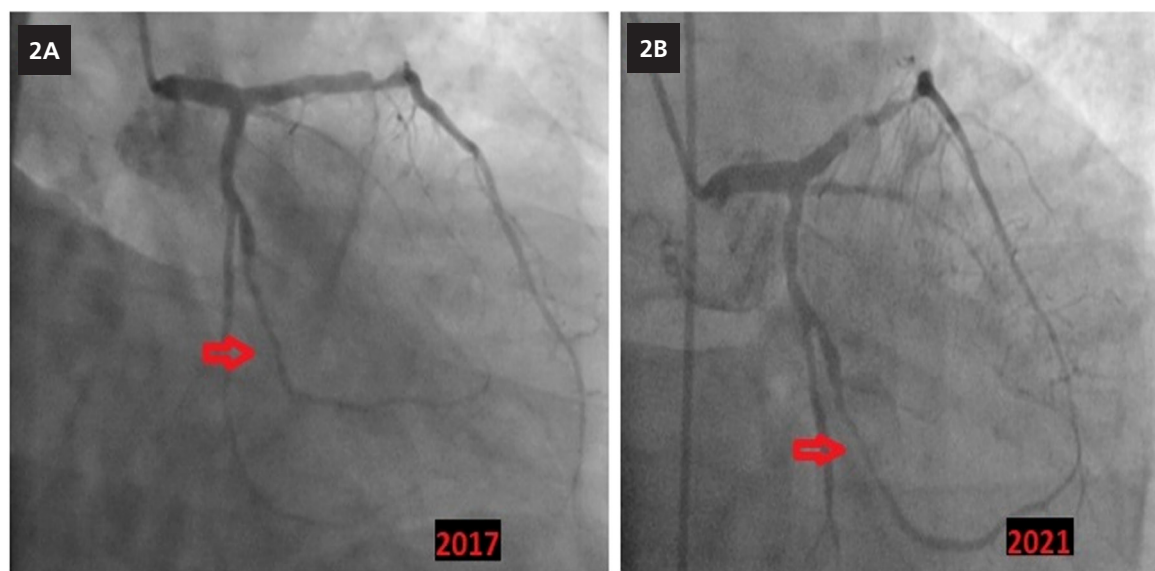
Definitions

The initial angiography, where the presence of $\geq 50\%$ stenosis in the coronary artery side branch was first identified, was defined as the index angiography, and the angiography conducted within an average of four years was accepted as the second angiography. Angiographic images of patients with $\geq 50\%$ stenosis in the coronary artery side branch during the first and second angiographies are shown in **Figures 1 and 2**.

Active smokers and individuals with a history of smoking were considered to have significant exposure to smoking. A family history of CAD was deemed significant if first-degree male relatives were diagnosed before the age of 55 and first-degree female relatives before the age of 60. Patients using antihypertensive medications or those with blood pressure $>140/90$ mmHg during outpatient follow-ups were considered to have significant hypertension. Diabetes mellitus was defined as a clinically significant condition in cases where the patient was un-



Figs 1A–B – Angiography images of a 62-year-old female patient in 2018 and 2022. (A) Proximal and mid-region lesion of the diagonal artery observed in 2018. (B) No progression observed in the same lesion in 2022.



Figs 2A–B – Angiography images of a 69-year-old male patient in 2017 and 2021. (A) Lesion of the obtuse marginal artery observed in 2017. (B) Progression observed in the same lesion in 2021.

dergoing treatment with oral antidiabetic medications or insulin, had a fasting plasma glucose level exceeding 126 mg/dL, or demonstrated a glycated hemoglobin (HbA_{1c}) value of 6.5% or higher, which reflects the average glucose levels over three months. Dyslipidemia, on the other hand, was characterized by a low-density lipoprotein cholesterol level exceeding 116 mg/dL despite effective lifestyle modifications and the use of lipid-lowering medications, such as statins.

Statistical analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences version 21.0 (SPSS Inc.,

Chicago, IL, USA) to compare the data of patients with and without an increase in stenosis percentage. The Kolmogorov–Smirnov and homogeneity of variances tests were used to evaluate parametric and non-parametric distributions. The independent-samples t-test was used to compare variables with parametric distributions, while the Mann–Whitney U test was used for non-parametric distributions. Categorical variables were compared using the chi-square test. Parametric continuous variables were expressed as mean $\pm$ standard deviation, while non-parametric variables were expressed as median (minimum–maximum) values. Categorical variables were presented as frequencies and percentages. Pearson and Spearman

Table 1 – Baseline parameters of patients included in the study

Variables	Patients with increased stenosis percentage (n = 68)	Patients without increased stenosis percentage (n = 332)	p-value
Age (year)	67.95 ± 10.31	65.82 ± 9.76	0.105
Sex (female/male)	14 / 54	64 / 268	0.804
Body mass index (kg/m ²)	27.7 (20–44.9)	27.7 (19–43)	0.887
Hypertension (%)	53	237	0.270
Diabetes mellitus (%)	27	132	0.993
Hyperlipidemia (%)	21	96	0.745
CAD history (%)	27	126	0.786
Smoking (%)	16	110	0.120
Family history (%)	5	22	0.828
ASA (%)	62	292	0.448
Statin (%)	66	326	0.543
ACE inhibitor/RB (%)	44	217	0.918
P2Y ₁₂ inhibitor (%)	29	160	0.404
Beta blocker (%)	43	224	0.499
Hemoglobin (g/dL)	14.65 (8.3–18.5)	14.5 (8.8–18.5)	0.700
Hematocrit (%)	42 (24–53)	42 (28–53)	0.485
WBC count (× 10 ⁹ /L)	8.1 (4.7–14.4)	8.3 (3.9–20)	0.403
Platelet count (× 10 ⁹ /L)	221.5 (125–404)	218 (109–520)	0.744
MCV (fL)	88 (72–98)	87 (69–100)	0.321
MPV (fL)	8.42 ± 0.86	8.51 ± 1.13	0.559
Neutrophil count (%)	4.8 (2–11.7)	5 (1.5–16.7)	0.516
Lymphocyte count (%)	2.1 (0.7–5.1)	2.1 (0.4–6.5)	0.685
Glucose (mg/dL)	114 (63–446)	119 (65–434)	0.362
Creatinine (mg/dL)	0.8 (0.54–1.8)	0.8 (0.4–3)	0.800
GFR (ml/min/1.73 m ²)	83.5 (39–124)	90 (14–119)	0.167
CRP (mg/L)	4 (1–99)	4 (1–116)	0.287
Total cholesterol (mg/dL)	202.13 ± 46.4	202.47 ± 52.4	0.960
HDL (mg/dL)	40 (26–78)	40 (23–87)	0.864
TG (mg/dL)	175.5 (41–585)	150.5 (36–580)	0.069
LDL (mg/dL)	140.01 ± 35.37	137.26 ± 40.77	0.605
LDL-2 (mg/dL)	109.13 ± 39.67	108.43 ± 40.81	0.898
Delta LDL (mg/dL)	31.61 ± 48.94	28.30 ± 47.23	0.600

ACEi – angiotensin-converting enzyme inhibitor; ARB – angiotensin receptor blocker; ASA – acetylsalicylic acid; CAD – coronary artery disease; CRP – C-reactive protein; GFR – glomerular filtration rate; HDL – high-density lipoprotein; LDL – low-density lipoprotein; MCV – mean corpuscular volume; MPV – mean platelet volume; TG – triglycerides; WBC – white blood cell.

Table 2 – Echocardiographic and electrocardiographic parameters of patients

Variables	Patients with increased stenosis percentage	Patients without increased stenosis percentage	p-value
LV-EF (%)	60 (30–65)	60 (25–65)	0.911
LVEDD (mm)	48 (37–74)	47 (38–69)	0.618
LVESD (mm)	32 (20–50)	30 (21–59)	0.152
Left atrium (mm)	38 (30–51)	38 (30–64)	0.707
Aortic velocity (m/s)	130 (90–461)	137.5 (80–436)	0.446
Ascending aorta (mm)	36 (25–44)	36 (28–48)	0.906
E wave (cm/s)	60 (20–100)	60 (20–158)	0.592
A wave (cm/s)	70 (30–120)	70 (30–158)	0.659
Rhythm (AF/SR)	7/61	21/311	0.243

AF – atrial fibrillation; A wave – late diastolic wave; E wave – early diastolic wave; LVEDD – left ventricular end-diastolic diameter; LV-EF – left ventricular ejection fraction; LVESD – left ventricular end-systolic diameter; SR – sinus rhythm.

correlation analyses were conducted to evaluate correlations. Univariable and multivariable binary logistic regression analyses were performed to identify dependent and independent predictors. A *p*-value of <0.05 was considered statistically significant for all analyses.

Results

Patients' presentation data

A total of 400 patients who underwent coronary angiography twice with an average interval of 36 ± 8 months

Table 3 – Angiographic comparison of stenosis in obtuse marginal and diagonal arteries

Variables	Patients with increased stenosis percentage (n = 68)	Patients without increased stenosis percentage (n = 332)	<i>p</i> -value
Index angiography stenosis percentage	80 (60–95)	70 (50–95)	0.001
Side branch diameter (mm)	2.25 (1.5–3)	2.25 (1.5–3)	0.012
Time interval between two angiographies (months)	36 (11–83)	33 (9–86)	0.049
Diagonal 1 artery lesion	34	201	0.108
Ostial	8	52	0.412
Proximal	18	99	0.580
Mid	10	65	0.348
Distal	–	–	–
Diagonal 2 artery lesion	7	49	0.334
Ostial	2	16	0.496
Proximal	3	28	0.258
Mid	2	5	0.411
Distal	–	–	–
Diagonal 3 artery lesion	1	1	0.213
Ostial	–	–	–
Proximal	1	1	0.213
Mid	–	–	–
Distal	–	–	–
Obtuse marginal 1 lesion	27	85	0.018
Ostial	9	15	0.006
Proximal	16	54	0.151
Mid	4	24	0.692
Distal	0	1	0.650
Obtuse marginal 2 lesion	6	18	0.282
Ostial	4	5	0.027
Proximal	2	11	0.875
Mid	0	3	0.431
Distal	–	–	–

Table 4 – Univariable and multivariable regression analyses of factors associated with increased stenosis percentage

Variables	Univariable analysis			Multivariable analysis		
	OR	95% CI	<i>p</i> -value	OR	95% CI	<i>p</i> -value
Index angiography side branch stenosis percentage	1.047	1.018–1.077	0.001	1.060	1.027–1.093	<0.001
Side branch diameter	2.606	1.167–5.823	0.019	2.534	1.074–5.980	0.034
Time interval between two angiographies	1.014	1.000–1.028	0.047	1.016	1.001–1.031	0.033
Obtuse marginal 1 lesion	1.914	1.110–3.299	0.020			
Obtuse marginal 2 lesion	3.224	1.348–7.709	0.009	4.575	2.715–12.207	0.002
Obtuse marginal 3 lesion	4.087	1.058–15.638	0.040	4.198	1.046–16.857	0.043

CI – confidence interval; OR – odds ratio.

were included in the study. Among these, 68 patients (14 females and 54 males; mean age 67.95 ± 10.31 years) showed an increase in side branch stenosis percentage, whereas 332 patients (64 females and 268 males; mean age 65.82 ± 9.76 years) did not. In 13 of the 332 patients without increased stenosis percentage (four females and nine males; mean age 61.07 ± 11.55 years), a decrease in stenosis percentage was observed.

An examination of the 68 patients with increased stenosis revealed that in 24 cases, the second coronary angiography was indicated solely due to an increased stenosis percentage in the side branch, without any lesions in other arteries. Of these 24 patients, seven were diagnosed with stable angina pectoris, 10 with unstable angina pectoris, and seven with acute subendocardial myocardial infarction. Percutaneous coronary intervention (PCI) was performed in five patients with unstable angina pectoris and four patients with acute subendocardial myocardial infarction. In the remaining 44 patients with an increased stenosis percentage, both side branch lesions and lesions in other major arteries had increased. Among these, PCI was performed in one patient with lateral myocardial infarction, three patients with posterior myocardial infarction, and six patients with subendocardial myocardial infarction.

Comparison of patients' presentation data

The comparison of demographic data, blood parameters, and electrocardiographic and echocardiographic findings between patients with and without an increased stenosis percentage is presented in **Tables 1** and **2**. No statistically significant differences were found between the two groups regarding these parameters.

Comparison of angiographic findings

The comparison of angiographic findings is shown in **Table 3**. Statistically significant differences were found between the two groups in terms of side branch stenosis percentage in the index angiography ($p = 0.001$), side branch vessel diameter ($p = 0.012$), time interval between the two angiographies ($p = 0.049$), obtuse marginal 1 lesions (particularly ostial lesions; $p = 0.006$), and obtuse marginal 2 lesions ($p = 0.027$).

To determine the correlation between the side branch stenosis increase and the side branch stenosis percentage in the index angiography, the Spearman correlation test was performed, which yielded a correlation coefficient of 0.167 ($p = 0.001$). In patients with an increased side branch stenosis percentage, the receiver operating characteristic curve analysis for stenosis percentage revealed a cut-off value of 69.1% for the side branch stenosis percentage in the index angiography, with a sensitivity of 52.7% and a specificity of 77.5% (area under the curve: 0.622, 95% confidence interval: 0.546–0.698, $p = 0.002$; **Fig. 1**).

To identify predictors of an increased side branch stenosis percentage, univariate and multivariate regression analyses were conducted (**Table 4**). According to the multivariate regression analysis, independent predictors of side branch stenosis progression included the side branch stenosis percentage in the index angiography ($p < 0.001$), side branch vessel diameter ($p = 0.034$), time interval between the two angiographies ($p = 0.033$), obtuse margin-

al 1 ostial lesion ($p = 0.002$), and obtuse marginal 2 ostial lesion ($p = 0.043$).

Discussion

In this study, we investigated the outcomes of patients with CAD and isolated significant side branch lesions, as identified through coronary angiography, who were managed with medical therapy. The comparison of demographic data, blood parameters, and electrocardiographic and echocardiographic findings between patients with and without an increase in stenosis percentage revealed no statistically significant differences. However, the comparison of angiographic stenosis values showed statistically significant differences between the two groups concerning side branch vessel diameter, side branch stenosis percentage in the index angiography, the time interval between the two angiographies, and ostial lesions in both obtuse marginal 1 and obtuse marginal 2.

Advancements in medical therapy options for CAD have significantly improved the control of angina symptoms. Patients receive classical conservative treatments (beta-blockers, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, antiplatelet therapy, and statins) as well as antianginal drugs (calcium channel blockers, nitrates, ivabradine, trimetazidine, and ranolazine). For patients with refractory angina under these therapies, PCI may be considered. However, PCI carries risks of early complications such as bleeding, hyperacute stent thrombosis, cerebral embolism, arterial injury, and coronary dissection, as well as late complications such as stent thrombosis, in-stent restenosis, and recurrent myocardial infarction. Compared to major epicardial arteries, coronary side branch lesions are relatively thinner, often involve bifurcation lesions, and supply smaller myocardial territories, making interventional procedures such as balloon angioplasty or stent implantation challenging and risky. These complexities pose considerations for operators regarding treatment decisions. While medical and interventional therapies complement each other in the management of CAD, studies have demonstrated the superiority of one over the other in different contexts.⁷

In our study, among the 332 patients without an increased stenosis percentage, no progression in existing side branch lesions was observed over an average follow-up of four years with medical therapy. Of the 68 patients with increased stenosis percentage, only 19 underwent PCI, as they presented with ACS and the culprit lesion was considered to be in the side branch. The remaining 49 patients continued medical therapy for their coronary side branch lesions. As a result, 381 patients, regardless of stenosis progression, were managed with medical therapy. Similar to our study, a multicenter ORBITA trial conducted by Al-Lamee et al. in 2018 demonstrated no superiority of PCI over medical therapy in patients with significant epicardial coronary artery stenosis.⁸ However, unlike Al-Lamee et al., we focused on coronary side branches, which are thinner and supply smaller myocardial territories compared to epicardial coronary arteries, and observed no progression in these lesions under medical therapy.

When determining treatment options for patients with significant coronary artery stenosis, the myocardial territory supplied by the side branch should also be considered. In comparison to epicardial coronary arteries, the area supplied by side branches is smaller. If the affected myocardial territory exceeds 10%, a more detailed evaluation for PCI should be undertaken. In a study by Hyung et al., the impact of ischemia caused by side branch lesions on myocardial territory was assessed, and no correlation was found between fractional flow reserve values and stenosis percentage. However, a side branch vessel length greater than 73 mm was deemed significant. The authors also reported that only 20% of non-left main coronary artery side branch lesions affected more than 10% of myocardial tissue, as determined by fractional flow reserve and coronary computed tomography angiography.⁹ Based on these findings and our results, PCI should be reconsidered for side branch lesions that affect less than 10% of the myocardial territory.

In the 2013 COURAGE trial by Spertus et al., the 12-month follow-up outcomes of optimal medical therapy and PCI in epicardial coronary arteries were compared. No significant differences were observed in one-year survival, mortality, or myocardial infarction rates, except for patients whose symptoms could not be controlled with optimal medical therapy, for whom PCI was recommended.¹⁰ In our study, the patients were followed up for an average of 48 months, with medical therapy being the primary treatment strategy. Only 19 patients presenting with ACS and suspected culprit lesions in side branches underwent PCI, while 381 patients with coronary side branch lesions were managed with medical therapy.

Coronary artery side branch lesions are frequently observed in the ostial segment.¹¹ Ostial coronary side branch lesions are associated with certain serious complications that may arise during interventional procedures. These include the extension of dissection into the distal portion of the main branch during stent implantation, inadequate coverage of the side branch ostium by the stent, and the shifting of the lesion's carina into the main vessel due to insufficient pre-dilatation.¹² Therefore, the decision to treat wide (>2 mm) ostial side branch lesions medically or interventionally remains controversial. In a study conducted by Brueck et al. in 2004, interventional treatment of diagonal artery ostial lesions with >75% stenosis was found to be safe but did not reduce adverse cardiac events or eliminate angina compared to medical therapy.¹³ Of the patients included in our study, 111 had ostial side branch lesions, with 78 involving the diagonal artery ostium and 33 involving the obtuse marginal artery ostium. During approximately four years of follow-up, no progression was observed in diagonal ostial lesions (1, 2, or 3), whereas obtuse marginal ostial lesions (1 and 2) demonstrated progression, which was statistically significant. This could be attributed to the steeper angulation of the obtuse marginal artery compared to the diagonal artery and the relatively smaller caliber of the circumflex artery compared to the left anterior descending artery, resulting in reduced blood flow. Yiannis et al. proposed that in bifurcation regions with significant coronary artery expansion, early disruption of intravascular laminar blood flow led to reduced endothelial shear stress, which

stimulated atherogenesis, the formation of atherosclerotic plaques, and vascular remodeling.¹⁴ In another study, Peter et al. suggested that the more frequent occurrence of atherothrombotic events in the ostial coronary segment was primarily due to the high shear stress at the bifurcation region. This stress induced the release of nitric oxide and matrix metalloproteinases, which promoted the "outward remodeling" phenomenon, in which the arterial wall remodeled toward the lumen. It is believed that this outward remodeling increases blood flow, flow velocity, and shear stress in the affected vessel, thereby enhancing platelet activation and raising the possibility of thrombosis formation.¹⁵

A recent study by Torun et al. investigated the medical management of isolated ostial bifurcation lesions and found no statistical differences compared to interventional treatment over an average follow-up of 36.6 months.¹⁶ In our study, we evaluated the outcomes of medical treatment for lesions in the ostial and non-ostial segments of side branches (proximal, mid, and distal). Progression was observed in only the obtuse marginal 1 ostial and obtuse marginal 2 ostial lesions under medical treatment. In the aforementioned study, Torun et al. investigated the follow-up outcomes of side branch ostial lesions with both medical and interventional treatments. In contrast, our research did not include an interventional treatment arm; instead, it focused solely on the follow-up results of patients treated with medical therapy.

Our study has certain limitations. First, the specific coronary artery responsible for the symptoms in patients with $\geq 50\%$ stenosis in the second angiography was not clearly identified. Second, both the group with increased stenosis percentage and the group with no change in stenosis were initiated on medium-to-high-dose lipid-lowering therapy after the index angiography. However, it was observed that the patients did not fully achieve the current guideline targets during follow-up. Third, as our study was retrospective, only the follow-up results of patients who received medical treatment were examined. Therefore, this study does not provide information on which treatment option is more beneficial for patients with significant coronary side branch lesions.

Conclusion

Our study found that medical therapy generally prevented progression in coronary artery side branch lesions, supporting its use as an appropriate treatment approach for isolated coronary side branch lesions. However, as highlighted by our findings, the follow-up of lesions, particularly those involving the obtuse marginal, varies. Therefore, we defer to interventional cardiologists on whether the obtuse marginal artery should be considered a side branch or a main branch.

Acknowledgments

None.

Data availability

The data that support the findings of this study are available on request from the corresponding author. The data

are not publicly available due to privacy or ethical restrictions.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Ethical statement

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and received approval from the local ethics committee.

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