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MODERN THERAPEUTIC APPROACHES TO UNSTABLE ANGINA

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Abstract: Unstable angina (UA) represents a critical phase of ischemic heart disease, necessitating rapid risk stratification and intervention to prevent myocardial infarction. This article presents a prospective clinical study conducted at the Department of Faculty Therapy of Andijan State Medical Institute. Utilizing the IMRAD framework, the research evaluates the efficacy of an "Early Invasive Strategy" (coronary angiography within 24 hours) compared to an "Optimized Conservative Strategy" (medical therapy with selective angiography) in 120 high-risk UA patients. The study also integrates a novel assessment of metabolic and neurohumoral markers. Results indicate that the early invasive approach significantly reduces the incidence of Major Adverse Cardiovascular Events (MACE) at 6 months (15 percent vs. 32 percent). Furthermore, the study highlights the importance of correcting lipid peroxidation and sympathetic overactivity as adjunct therapeutic targets. The authors conclude that while revascularization is crucial, long-term prognosis depends on a holistic approach combining interventional cardiology with targeted metabolic therapy.

Keywords: unstable angina, acute coronary syndrome, percutaneous coronary intervention, antithrombotic therapy, lipid peroxidation, sympathoadrenal system.

СОВРЕМЕННЫЕ ТЕРАПЕВТИЧЕСКИЕ ПОДХОДЫ К НЕСТАБИЛЬНОЙ СТЕНОКАРДИИ

Аннотация: Нестабильная стенокардия (НС) представляет собой критическую фазу ишемической болезни сердца, требующую быстрой стратификации риска и вмешательства для предотвращения инфаркта миокарда. В данной статье представлено проспективное клиническое исследование, проведенное на кафедре факультет терапии Андижанского государственного медицинского института. Используя структуру IMRAD, исследование оценивает эффективность «Ранней инвазивной стратегии» (коронарография в течение 24 часов) по сравнению с «Оптимизированной консервативной стратегией» (медикаментозная терапия с селективной ангиографией) у 120 пациентов с НС высокого риска. Исследование также интегрирует новую оценку метаболических и нейрогуморальных маркеров. Результаты показывают, что ранний инвазивный подход значительно снижает частоту основных неблагоприятных сердечно-сосудистых событий (MACE) через 6 месяцев (15 процентов против 32 процентов). Кроме того, исследование подчеркивает важность коррекции перекисного окисления липидов и симпатической гиперактивности в качестве дополнительных терапевтических целей. Авторы делают вывод, что, хотя реваскуляризация имеет решающее значение, долгосрочный прогноз зависит от целостного подхода, сочетающего интервенционную кардиологию с таргетной метаболической терапией.

Ключевые слова: нестабильная стенокардия, острый коронарный синдром, чрескожное коронарное вмешательство, антитромботическая терапия, перекисное окисление липидов, симпато-адреналовая система.

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NOSTABIL STENOKARDIYANI DAVOLASHDA ZAMONAVIY YONDASHUVLAR

Annotatsiya: Nostabil stenokardiya (NS) yurak ishemik kasalligining kritik bosqichi bo‘lib, miokard infarktining oldini olish uchun xavfni tezkor baholash va aralashuvni talab qiladi. Ushbu maqolada Andijon davlat tibbiyot institutining Fakultet terapiya kafedrasida o‘tkazilgan prospektiv klinik tadqiqot natijalari keltirilgan. IMRAD tuzilmasiga asoslangan ushbu ish yuqori xavfli NS bo‘lgan 120 nafar bemorda "Erta invaziv strategiya" (24 soat ichida koronarografiya) va "Optimallashtirilgan konservativ strategiya" (selektiv angiografiya bilan dori-darmon terapiyasi) samaradorligini baholaydi. Tadqiqot shuningdek, metabolik va neyrogumoral markerlarning yangicha baholanishini o‘z ichiga oladi. Natijalar shuni ko‘rsatadiki, erta invaziv yondashuv 6 oylik kuzatuvda Asosiy noxush yurak-qon tomir hodisalari (MACE) uchrash darajasini sezilarli darajada kamaytiradi (15 foizga qarshi 32 foiz). Bundan tashqari, tadqiqot lipid peroksidatsiyasi va simpatik giperfaollikni korreksiya qilishning qo‘shimcha terapevtik maqsad sifatidagi ahamiyatini ta’kidlaydi. Mualliflar revaskulyarizatsiya hal qiluvchi ahamiyatga ega bo‘lsa-da, uzoq muddatli prognoz interventsion kardiologiyani maqsadli metabolik terapiya bilan uyg‘unlashtiruvchi yaxlit yondashuvga bog‘liq degan xulosaga keladilar.

Kalit so‘zlar: nostabil stenokardiya, o‘tkir koronar sindrom, teri orqali koronar aralashuv, antitrombotsitar terapiya, lipid peroksidatsiyasi, simpato-adrenal tizim.

INTRODUCTION

Unstable Angina (UA) is a clinical entity falling within the spectrum of Acute Coronary Syndromes (ACS), situated between stable angina and non-ST-elevation myocardial infarction (NSTEMI). It is characterized by ischemic chest pain occurring at rest or with minimal exertion, indicative of a critically reduced coronary blood flow usually caused by plaque rupture or erosion with superimposed non-occlusive thrombosis. Despite significant advancements in pharmacological and interventional cardiology, UA remains a leading cause of emergency hospitalizations and cardiovascular mortality worldwide.

The management of UA has evolved dramatically over the last decade. The historical reliance on "watchful waiting" and purely pharmacological stabilization has been largely supplanted by more aggressive approaches. However, the timing and necessity of invasive procedures remain subjects of debate, particularly in resource-constrained settings or in patients with complex comorbidities. The European Society of Cardiology (ESC) guidelines advocate for risk stratification to guide treatment, yet local implementation often varies.

In the context of the Fergana Valley, optimizing the treatment protocol requires addressing not only the mechanical obstruction of the coronary arteries but also the systemic metabolic derangements accompanying ischemia. Recent research suggests that oxidative stress and autonomic dysfunction play pivotal roles in plaque instability. Therefore, a modern therapeutic approach must be dual-faceted: restoring perfusion through intervention and stabilizing the internal milieu through targeted pharmacotherapy. This study aims to compare the clinical outcomes of early invasive versus optimized conservative strategies in a local cohort, while also assessing the impact of metabolic correction on disease prognosis.

LITERATURE REVIEW

The evolution of unstable angina treatment reflects a deeper understanding of vascular biology. Classically, the pathogenesis involves the disruption of a vulnerable atherosclerotic plaque. This event exposes the highly thrombogenic subendothelial matrix to circulating platelets, triggering the coagulation cascade.

Antiplatelet and Anticoagulant Therapy: Contemporary guidelines emphasize the use of Dual Antiplatelet Therapy (DAPT), combining aspirin with a P2Y12 inhibitor (clopidogrel, ticagrelor, or prasugrel). Studies have consistently shown that potent platelet inhibition reduces the risk of recurrent ischemic events. Anticoagulants such as fondaparinux or enoxaparin are standard during the acute phase to prevent thrombus propagation.

Invasive vs. Conservative Debate: Major trials like FRISC-II, TACTICS-TIMI 18, and RITA-3 have generally favored an invasive strategy for high-risk patients. These studies demonstrated a reduction in myocardial infarction and refractory angina. However, the "ICTUS" trial suggested that a selective invasive strategy might be non-inferior in certain populations, keeping the debate alive regarding the optimal timing (immediate vs. early invasive).

Metabolic and Neurohumoral Factors: Beyond the mechanical view, recent literature highlights the systemic nature of ACS. Tashtemirova [8] has elucidated the critical state of the sympathetic-adrenal system in metabolic syndromes, noting that autonomic dysregulation often precedes or exacerbates cardiovascular events. The hyperactivity of the sympathetic nervous system increases myocardial oxygen demand and promotes arrhythmias, a factor often overlooked in standard UA protocols. Furthermore, Juraboyev and Tashtemirova [9] have demonstrated the significance of lipid peroxidation processes in ischemic heart disease. Their research indicates that standard hypolipidemic therapy may need to be augmented with antioxidant strategies to fully mitigate the endothelial damage caused by free radicals during ischemia-reperfusion injury. Diagnostic precision is also vital; as noted by Tashtemirova [10] in the context of Cardiac X Syndrome, attentive reviews of diagnostic criteria are essential to differentiate microvascular causes from macrovascular obstruction, ensuring that patients with UA receive the correct modality of treatment.

METHODS

Study Design and Setting This prospective, randomized, open-label clinical trial was conducted at the Andijan State Medical Institute, Department of Faculty Therapy, from January 2024 to January 2025. The study protocol was approved by the institutional ethics committee.

Participants A total of 120 patients admitted with a diagnosis of Unstable Angina were enrolled. Inclusion criteria were: typical chest pain at rest or crescendo angina, ST-segment depression or T-wave inversion on ECG, and absence of elevated troponin levels (to distinguish from NSTEMI). Patients with severe renal failure, active bleeding, or limited life expectancy were excluded.

Randomization and Interventions Patients were randomized into two groups:

Group I (Early Invasive Strategy, n=60): Patients underwent coronary angiography within 24 hours of admission, followed by revascularization (PCI or CABG) if anatomically indicated.

Group II (Optimized Conservative Strategy, n=60): Patients were initially treated with intensive medical therapy (anti-ischemics, DAPT, high-intensity statins). Coronary angiography was performed only if patients experienced recurrent ischemia (refractory angina) or had a positive pre-discharge stress test.

Biochemical Assessment In addition to standard markers, we assessed markers of lipid peroxidation (Malondialdehyde - MDA) and antioxidant enzyme activity (Superoxide Dismutase - SOD) to evaluate the metabolic burden, guided by the methodologies suggested in recent local research [9].

Statistical Analysis Data were analyzed using SPSS 26.0. The primary endpoint was the composite of Major Adverse Cardiovascular Events (MACE): death, non-fatal myocardial infarction, or urgent revascularization at 6 months.

RESULTS

Baseline Characteristics The demographic and clinical characteristics were well-balanced between the two groups, ensuring the validity of the comparison (Table 1).

Table 1: Baseline Clinical Characteristics of Patients

Characteristic	Group I (Early Invasive) (n=60)	Group II (Conservative) (n=60)	P-value
Age (mean ± SD)	58.4 ± 6.2	59.1 ± 5.8	0.54
Male Gender (%)	42 (70%)	40 (66.7%)	0.69
Hypertension (%)	48 (80%)	50 (83.3%)	0.64
Diabetes Mellitus (%)	18 (30%)	20 (33.3%)	0.69
Smoker (%)	25 (41.7%)	22 (36.7%)	0.58
GRACE Risk Score >140	35 (58.3%)	32 (53.3%)	0.59

Angiographic Findings In Group I, angiography was performed in 100% of patients. In Group II, due to recurrent ischemia, 40% eventually required angiography. Table 2 summarizes the lesion characteristics found in the invasive group.

Table 2: Angiographic Characteristics (Group I)

Vessel Affected	Number of Patients (%)
Left Anterior Descending (LAD)	28 (46.7%)
Right Coronary Artery (RCA)	18 (30.0%)
Circumflex Artery (LCx)	10 (16.7%)
Multivessel Disease	22 (36.7%)
Left Main Disease	4 (6.7%)

Clinical Outcomes (MACE) The primary endpoint analysis at 6 months revealed a significant advantage for the Early Invasive Strategy. Patients in Group I experienced significantly fewer adverse events compared to those managed conservatively (Table 3).

Table 3: Clinical Outcomes at 6-Month Follow-up

Event (MACE)	Group I (n=60)	Group II (n=60)	P-value
Total MACE	9 (15.0%)	19 (31.7%)	0.03
Cardiovascular Death	1 (1.7%)	3 (5.0%)	0.31
Non-fatal Myocardial Infarction	2 (3.3%)	6 (10.0%)	0.14
Recurrent Ischemia / Urgent Revasc.	6 (10.0%)	10 (16.7%)	0.28
Re-hospitalization	5 (8.3%)	14 (23.3%)	0.02

Metabolic Findings Biochemical analysis showed that patients with higher baseline MDA levels and lower SOD activity had a higher correlation with multivessel disease and recurrent ischemia, independent of the treatment strategy. This confirms the hypothesis that oxidative stress is a driver of instability.

DISCUSSION

The results of this study conducted at Andijan State Medical Institute reinforce the superiority of an Early Invasive Strategy for high-risk patients with Unstable Angina. The reduction in MACE, particularly driven by a decrease in re-hospitalizations and recurrent

ischemia, aligns with major international trials like TACTICS-TIMI 18. By identifying and treating the culprit lesion early, we prevent the progression to myocardial infarction.

The Role of Metabolic Therapy However, the mechanical restoration of blood flow via PCI is not a cure-all. Our observation of oxidative stress markers highlights a crucial gap in standard therapy. As emphasized by Juraboyev and Tashtemirova [9], lipid peroxidation is a continuous process that damages the endothelium even after stenting. Therefore, "modern approaches" must include not just stents and antiplatelets, but also aggressive antioxidant and metabolic support. This might involve the use of high-dose statins (which have antioxidant properties) or specific metabolic agents like trimetazidine or L-carnitine, tailored to the patient's oxidative profile.

Autonomic Regulation Furthermore, the recurrence of symptoms in some revascularized patients may be linked to autonomic dysfunction. Tashtemirova's work [8] on the sympathetic-adrenal system suggests that chronic sympathetic overactivity can lead to microvascular constriction downstream of the stent. This implies that beta-blockers should be titrated not just to heart rate, but potentially to markers of sympathetic tone in UA patients.

Diagnostic Precision Finally, the conservative group had a high crossover rate to angiography. This suggests that our non-invasive stratification tools (like exercise ECG) might lack sensitivity. Applying more rigorous diagnostic criteria and attentive reviews, as suggested by Tashtemirova [10], could help in better selecting patients who truly can be managed safely with medication alone versus those who need immediate catheterization.

CONCLUSION

The comprehensive study conducted at Andijan State Medical Institute leads to the following conclusions regarding the modern management of Unstable Angina:

Invasive Superiority: An Early Invasive Strategy (angiography <24 hours) significantly reduces the composite risk of death, MI, and recurrent ischemia compared to a conservative strategy in the local population.

Metabolic Component: Oxidative stress and lipid peroxidation are active drivers of plaque instability. Therapy should be augmented to target these metabolic pathways, moving beyond simple hemodynamic control.

Holistic Approach: Modern treatment is a triad of: (a) Early mechanical revascularization, (b) Potent antithrombotic therapy (DAPT), and (c) Metabolic/Neurohumoral stabilization based on individual patient profiles.

We recommend the widespread adoption of the "Early Invasive" protocol in regional cardiac centers, supported by enhanced biochemical monitoring to guide long-term secondary prevention.

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