Clinical case

Koronar arteriyalar noobstruktiv stenokardiyasi va ishemiyasi (ANOCA/INOCA): Klinik holat

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Annotatsiya: Koronar arteriyalar noobstruktiv stenokardiyasi va ishemiyasi (ANOCA/INOCA) – bu koronar arteriyalarda sezilarli to‘siq bo‘lmagan holda stenokardiya belgilari va/yoki ishemiya mavjud bo‘lgan holat. Ushbu maqola klinik holatni taqdim etadi va adabiyotlar sharhini o‘z ichiga oladi. 52 yoshli ayol bemorda tipik stenokardik og‘riqlar, musbat stress-test va koronarangiografiyada obstruktiv o‘zgarishlar yo‘qligi aniqlandi. Tahlillar natijasida ANOCA/INOCA (mikrovaskulyar stenokardiya) tashxisi qo‘yildi. Muhokamada patogenez, diagnostika va davolash strategiyalari ko‘rib chiqildi. Ushbu holat ANOCA/INOCA ning klinik ahamiyatini ta’kidlaydi va individuallashtirilgan terapiyaning muhimligini ko‘rsatadi.

Kalit so’zlar: ANOCA, INOCA, stenokardiya, ishemiya, koronar mikrosirkulyator disfunksiya, vazospazm, koronarangiografiya, Tredmil-test.

Angina and Ischemia with Non-Obstructive Coronary Arteries (ANOCA/INOCA): Clinical Case

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Abstract:
Angina and ischemia with non-obstructive coronary arteries (ANOCA/INOCA) are characterized by the presence of anginal symptoms and/or myocardial ischemia in the absence of significant coronary artery obstruction. This article presents a clinical case and includes a review of the literature. A 52-year-old woman presented with typical anginal chest pain, a positive stress test, and no obstructive lesions on coronary angiography. Based on the clinical findings, a diagnosis of ANOCA/INOCA (microvascular angina) was established. The discussion addresses the pathogenesis, diagnostic approaches, and treatment strategies. This case highlights the clinical significance of ANOCA/INOCA and emphasizes the importance of individualized therapy.

Keywords: ANOCA, INOCA, angina, ischemia, coronary microvascular dysfunction, vasospasm, coronary angiography, treadmill test.

Kirish

So‘nggi yillarda o‘tkazilgan yirik klinik tadqiqotlar shuni ko‘rsatadiki, ko‘krak qafasidagi og‘riq (stenokardiya) tufayli koronarangiografiya (KAG) qilingan bemorlarning qariyb 40% dan 70%

gacha qismida koronar arteriyalarning obstruktiv shikastlanishi (stenoz >50%) aniqlanmaydi [1]. Ushbu holat tibbiyotda ikkita asosiy atama bilan yuritiladi:

1. ANOCA (Angina with Non-Obstructive Coronary Arteries) – klinik belgilar mavjud, lekin to‘siq yo‘q.
2. INOCA (Ischemia with Non-Obstructive Coronary Arteries) – obyektiv testlar bilan tasdiqlangan ishemiya mavjud, lekin to‘siq yo‘q [1].

WISE (Women’s Ischemia Syndrome Evaluation) tadqiqoti natijalariga ko‘ra, bu sindromlar ayniqsa ayollarda ko‘p uchraydi va ularda yurak-qon tomir asoratlari (infarkt, insult) xavfi oddiy populyatsiyaga nisbatan yuqori ekanligi isbotlangan [3].

ANOCA/INOCA geterogen patologiya bo‘lib, uning negizida quyidagi mexanizmlar yotadi:

Koronar mikrosirkulyator disfunksiya (KMD): Mayda arteriolalarning struktur va funksional o‘zgarishi natijasida qon oqimi zaxirasining (CFR) kamayishi va mikrovaskulyar qarshilikning (IMR) oshishi [7]. Koronar vazospazm: Endotelial disfunksiya natijasida tomirlarning patologik qisqarishi [2].

Zamonaviy Yevropa kardiologiya jamiyati (ESC) tavsiyalariga ko‘ra, tashxis qo‘yishda faqat KAG bilan cheklanmaslik kerak. EAPCI ekspertlarining xulosasiga ko‘ra, invaziv funksional baholash — CFR < 2.0 va IMR 25 ko‘rsatkichlari mikrosirkulyatsiyaning buzilganini tasdiqlovchi "oltin standart" hisoblanadi [4].

Differensial diagnostika: Ko‘krak qafasidagi og‘riqlarni kardial (miokardit, gipertrofiya) va nokardial (reflyuks-ezofagit, mushak-skelet og‘riqlari) sabablari bilan qiyoslash lozim [4].

Klinik holat taqdimoti

Bemordan maqola nashr etish uchun yozma informirlangan rozilik olingan. Etika qo‘mitasining ruxsati talab etilmadi, chunki bu yagona klinik holat taqdimotidir.

Bemor: 52 yoshli ayol. Shikoyatlari: Jismoniy zo‘riqishda paydo bo‘ladigan, chap qo‘lga irradiatsiya qiluvchi tipik stenokardik og‘riqlar, harsillash, bosh aylanishi va umumiy holsizlik. Anamnezi: Arterial gipertenziya (III bosqich, 1-daraja), qandli diabet 2-turi mavjud. Tana vazni ortiqcha. Dorilarni tartibsiz qabul qilgan. Obyektiv ko‘rinishi: Tana massasi indeksi (TMI): 36,6 kg/m² (2-darajali semizlik).

- Arterial qon bosimi: 130/90 mm sim.ust.
- Yurak qisqarishlar soni (YuQS): 60 ta/min.

Instrumental va laborator tekshiruvlari:

1. EKG: Sinusli bradikardiya (50 ta/min), chap qorincha old-to‘siq sohasida ishemik o‘zgarishlar belgilari (1-rasm).

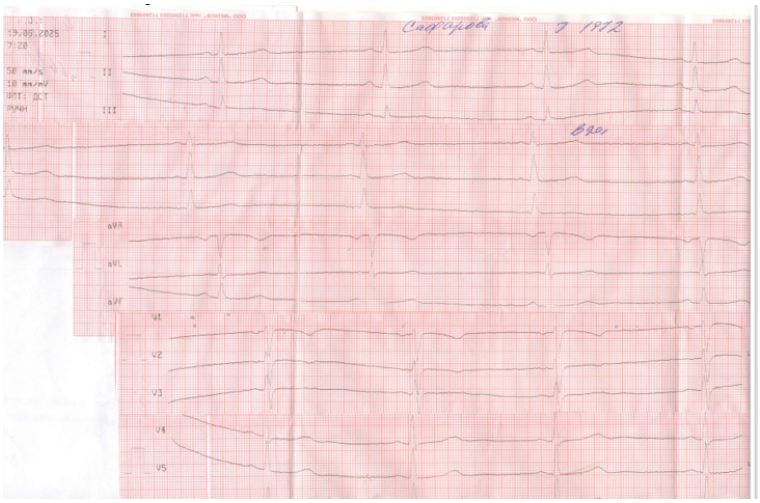

Figure 1. EKG
Rasm 1. EKG

2. Tredmil stress-testi: 10-daqiqada (4-bosqich) V4-V6 tarmoqlarida ST segmentining 1,4 mm gacha depressiyasi aniqlandi. Maksimal YuQS 132 ta/min ga (submaksimal qiymatning 93% iga) yetdi. Xulosa: Sinov musbat. (2-rasm).

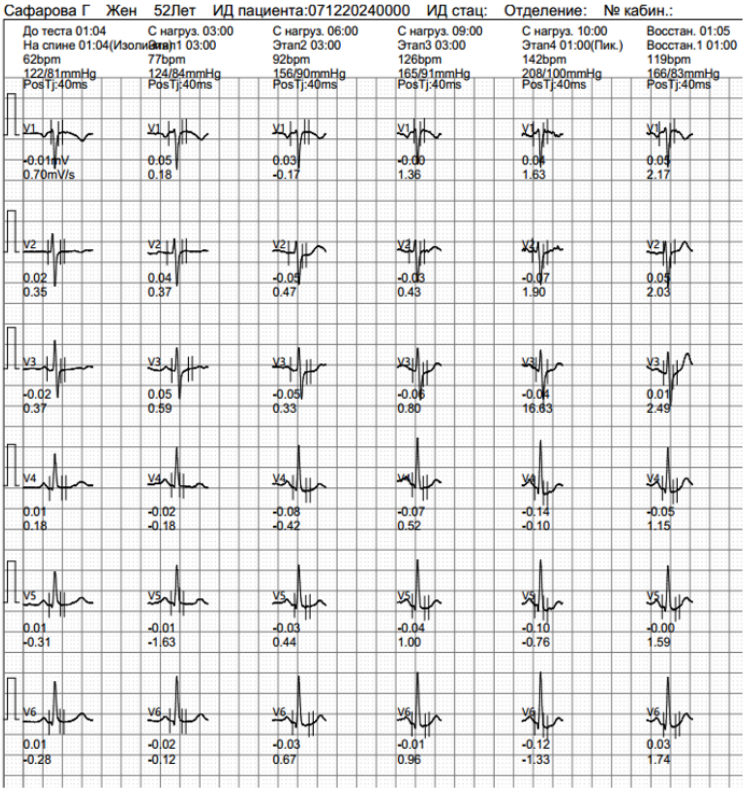

Figure 2. Treadmill Test.
Rasm 2. Tredmil Testi.

3. Exokardiografiya:

Bo‘yi: 152 sm, Vazni: 75 kg, BSA (m²): 1,78. Ritm: sinus. Puls: 56 ta/min. AQB: (ko‘rsatilmagan).

- Aorta: Fibroz halqa: 19 mm; Sinus Valsalva: 27 mm; Ko‘tariluvchi aorta: 34 mm.
- Chap qorincha (ChQ):
- ChQ YaDO (LV EDD): 34 mm;
- ChQ YaSO (LV ESD): 34 mm;
- ChQ QATQ (IVST): 12,2 mm;
- ChQ ODQ (PWT): 12,2 mm;
- Devorlarning nisbiy qalinligi (RWT): 0,47 (norma 0,42);
- ChQ miokard massasi: 258,54 gr;
- ChQ ind. miokard massasi: 145,25 gr/m² (ayollar uchun norma 43–95);
- ChQ YaDH (EDV): 129 ml; ChQ YaSHH (ESV): 47 ml;
- ChQ otish fraksiyasi (LVEF) (Biplane): 63,57
- ChQ zarb hajmi (SV): 82 ml.
- O‘ng qorincha: Bazal diametri: 33 mm; O‘rta diametri: 29 mm; TAPSE: 18 mm; Puls doppleri S: 11 sm/sek.
- Chap bo‘lmacha: Oldingi-orqa o‘lchami: 34×45 mm; Hajmi: 31 ml; Ind. hajmi: 17,42 ml/m².
- O‘ng bo‘lmacha: Oldingi-orqa o‘lchami: 33×44 mm; Hajmi: 28 ml; Ind. hajmi: 15,73 ml/m².

Klapanlar:

- Mitral klapan: Stenoz yo‘q. O‘rta gradient: 4 mm.sim.ust. Yuza maydoni: 4,6 sm². Regurgitatsiya: 0.

- Aortal klapan: Stenoz yo‘q. O‘rta gradient: 5 mm.sim.ust. Yuza maydoni: 2,8 sm². Regurgitatsiya: 0.
- Trikuspidal klapan: Regurgitatsiya darajasi: 1.
- O‘pka arteriyasi: Stenoz yo‘q. Regurgitatsiya: 0. Sistolik qon bosimi (PSAP): 27 mm.sim.ust.

ChQ diastolik funksiyasi:

- E pik tezligi: 82 sm/sek; A pik tezligi: 87 sm/sek; E/A nisbati: 0,94;
- e’ tezligi (lateral): 9 sm/sek; e’ tezligi (septal): 9 sm/sek;
- E/e’ nisbati: 9,11.
- Pastki kavak vena (IVC): <21 mm; Nafas aktida kollaps: >50%.

Xulosa: Yurak bo‘shliqlarining dilatatsiyasi aniqlanmadi. Chap qorincha devorlarining gipertrofiyasi aniqlandi. Mahalliy qisqaruvchanlikning buzilish zonalari aniqlanmadi. Miokard massasi, shu jumladan indeks ko‘rsatkichlari oshgan. Chap qorinchaning global qisqaruvchanligi saqlangan. Aorta kengaymagan. O‘pka arteriyasida sistolik bosim 27 mm.sim.ust. Chap qorinchaning diastolik disfunksiyasi aniqlangan.

4. Koronarangiografiya:

Film tavsifi:

LMCA (Chap asosiy koronar arteriya) – o‘zgarishsiz. LAD (Oldingi qorinchalararo tarmoq) – o‘zgarishsiz. DiagA (Diagonal tarmoq) – o‘zgarishsiz. IM (Intermedial arteriya) – o‘zgarishsiz. Cx (Aylanib o‘tuvchi tarmoq) – o‘zgarishsiz. OM (Chetlanuvchi marginal tarmoq) – o‘zgarishsiz. RCA (O‘ng koronar arteriya) – o‘zgarishsiz. PLV RCA (O‘ng koronar arteriyaning orqa lateral tarmog‘i) – o‘zgarishsiz. RCA PDA (O‘ng koronar arteriyaning orqa qorinchalararo tarmog‘i) – o‘zgarishsiz. Miokard qon aylanish turi: O‘ng.

Xulosa: Obstruktiv koronar arteriya kasalligi aniqlanmadi.

5. Bo‘yin tomirlari dopplerografiyasi: Tekshiruv davomida gemodinamik jihatdan ahamiyatli o‘zgarishlar aniqlanmadi. O‘ng umumiy uyqu arteriyasining diametri 6,5 mm ni tashkil etadi (norma: 6,3–7,0 mm).

6. EGFDS: Reflyuks-ezofagit va diafragmaning qizilo‘ngach teshigi aksial churrasi.

7. Laborator tahlil xulosasiga ko‘ra bemorda qand miqdori nazoratlanmaganligi (HbA1c yuqori), jigar fermentlari hamda yallig‘lanish ko‘rsatkichining ko‘tarilgani (ALT/AST, SRO) va vitamin D tanqisligi mavjudligi, past zichlikdagi lipoproteidlar (PZLP) miqdori ham tavsiya etilgan ko‘rsatkichdan baland ekanligi aniqlangan. (Jadval-1)

Muhokama

Ushbu klinik holat ANOCA/INOCA (mikrovaskulyar stenokardiya) tashxisini to‘liq asoslaydi. Bemorda tipik og‘riqlar va musbat stress-test natijalari bo‘lishiga qaramay, angiografiyada to‘siq aniqlanmaganligi jarayonning mikrosirkulyator darajada ekanligidan dalolat beradi.

1. Metabolik omillar va kardiometabolik disfunksiya: Bemordagi semizlik va dekompensatsiyalangan qandli diabet (HbA1c 7,5%) endotelial disfunksiyaning asosiy omillaridandir. Ilmiy adabiyotlarda (masalan, CorMicA tadqiqotida) ta’kidlanganidek, surunkali yallig‘lanish va giperglikemiya mayda tomirlarning kengayish qobiliyatini keskin kamaytiradi [5].
2. Gipertrofiya va ishemiya bog‘liqligi: ExoKGda aniqlangan chap qorincha gipertrofiyasi miokardning kislorodga bo‘lgan ehtiyojini oshiradi. Mikrovaskulyar disfunksiya sharoitida bu ehtiyoj qondirilmaydi, natijada jismoniy yuklama vaqtida EKGda ST segmenti depressiyasi ko‘rinishidagi ishemiya yuzaga keladi [6].
3. Differensial diagnostikaning muhimligi: Bemorda aniqlangan reflyuks-ezofagit og‘riq sindromini murakkablashtiradi. Bu holatda "aralash genezli og‘riq" haqida gapirish mumkin: bir tomondan yurak ishemiyasi, ikkinchi tomondan gastroezofageal reflyuks og‘riqni kuchaytiruvchi omil bo‘lib xizmat qilmoqda.
4. Davolash strategiyasi: Davolash rejasiga Ranolazin (mikrovaskulyar oqimni yaxshilash uchun) va Amlodipin (vazodilatatsiya uchun) kiritilgani xalqaro tavsiyalarga mos keladi [2]. Shuningdek, Metformin va PPI (proton pompa ingibitori) (oshqozon uchun) qo‘llanilishi nafaqat asosiy kasallikni, balki uni kuchaytiruvchi xavf omillarini ham bartaraf etishga qaratilgan.

Table 1. Laboratory Test Results
Jadval 1. Laboratoriya tekshiruvlar natijalari

Tekshiruv turi va ko‘rsatkichlar	**Natija**	**Me’yor**
Lipid spektri:		
Umumiy xolesterin	168 mg/dl	< 150 mg/dl
Triglitseridlar	102 mg/dl	< 150 mg/dl
Yuqori zichlikdagi lipoproteidlar (YuZLP)	43 mg/dl	> 40 mg/dl
Past zichlikdagi lipoproteidlar (PZLP)	100 mg/dl	55–70 mg/dl
Aterogenlik koeffitsienti	2,9	< 3,0
Biokimyoviy tahlil:		
Glyukoza (nahorgi, venadan)	5,5 mmol/l	3,9–5,9 mmol/l
Glikirlangan gemoglobin (HbA1c)	7,5%	< 7,0%
Mochevina	5,4 mmol/l	1,7–8,3 mmol/l
Kreatinin	78 mkmol/l	44–97 mkmol/l
Koptokchalar filtratsiyasi tezligi (GFT)	75 ml/daq/1,73 m²	90–120 ml/daq
Siydik kislotasi	5,9 mg/dl	2,4–5,7 mg/dl
ALT (Alaninaminotransferaza)	69 U/l	< 31 U/l
AST (Aspartataminotransferaza)	36 U/l	< 31 U/l
Umumiy bilirubin	12,3 mkmol/l	8,5–20,0 mkmol/l
Yallig‘lanish va vitaminlar:		
S-reaktiv oqsil (SRO)	10,0 mg/l	< 5,0 mg/l
Vitamin D	19,71 ng/ml	30–100 ng/ml

Tashxis: Bemor shikoyati, anamnezi, klinik va instrumental ma’lumotlarga asoslanib ANOCA/INOCA (mikrovaskulyar stenokardiya) tashxisi qo‘yildi.

Xulosa

Ushbu holat ANOCA/INOCA ni mustaqil va jiddiy klinik birlik sifatida qabul qilish zarurligini ko‘rsatadi. Koronar arteriyalarda obstruksiyaning yo‘qligi bemorda xavf yo‘qligini anglatmaydi. Bunday bemorlarda hayot tarzini o‘zgartirish, metabolik nazorat va individuallashtirilgan antiishemik terapiya hayot sifatini yaxshilash va asoratlarning oldini olishda hal qiluvchi ahamiyatga ega.

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Authors’ contribution

Conceptualization, N.U. and K.U.; methodology, N.U.; software, D.Q.; validation, N.U., K.U. and D.G.; formal analysis, K.U.; investigation, K.U. and D.G.; resources, N.U.; data curation, D.G. and D.Q.; writing—original draft preparation, K.U.; writing—review and editing, N.U. and D.G.; visualization, D.Q.; supervision, N.U.; project administration, N.U.; funding acquisition, N.U. All authors have read and agreed to the published version of the manuscript.

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Ethics approval

This clinical case was prepared in accordance with the ethical principles of the Declaration of Helsinki. Written informed consent for publication was obtained from the patient. Ethical review and approval were waived because this study represents a single clinical case report.

Nashrga xabardor qilingan rozilik

Mazkur klinik holat va unga oid materiallarni ilmiy maqola shaklida nashr etish uchun bemordan yozma xabardor qilingan rozilik olingan.

Consent for publication

Written informed consent was obtained from the patient for the publication of this clinical case and the accompanying materials.

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Ushbu maqolada keltirilgan ma’lumotlar tegishli muallifdan asosli so‘rovga binoan olinishi mumkin. Bemorning shaxsiy ma’lumotlarini himoya qilish va maxfiylikni ta’minlash maqsadida ma’lumotlarning ommaviy foydalanishi cheklangan.

Data Availability Statement

The data supporting the findings of this clinical case are available from the corresponding author upon reasonable request. Data are not publicly available in order to protect patient privacy and confidentiality.

Rahmatnomalar

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Conflict of interest

The authors declare that they have no conflicts of interest related to this study. No third party had any role in the design of the study, data collection, analysis or interpretation of the data, preparation of the manuscript, or the decision to publish the article.

Qisqartmalar

ANOCA	koronar arteriyalarda obstruksiya bo‘lmagan stenokardiya
INOCA	koronar arteriyalarda obstruksiya bo‘lmagan ishemiya
KAG	koronarangiografiya
KMD	koronar mikrosirkulyator disfunksiya
CFR	koronar oqim zaxirasi
IMR	mikrosirkulyator qarshilik indeksi
EKG	elektrokardiografiya
ExoKG	exokardiografiya

Adabiyot

[1] V. Kunadian et al., “An EAPCI Expert Consensus Document on Ischaemia with Non-Obstructive Coronary Arteries in Collaboration with European Society of Cardiology Working Group on Coronary Pathophysiology Microcirculation Endorsed by Coronary Vasomotor Disorders International Study Group,” European Heart Journal, vol. 41, no. 37, pp. 3504–3520, Jun. 2020, https://doi.org/10.1093/eurheartj/ehaa503.

[2] T. J. Ford et al., “Stratified medical therapy using invasive coronary function testing in angina,” Journal of the American College of Cardiology, vol. 72, no. 23, pp. 2841–2855, Sep. 2018, https://doi.org/10.1016/j.jacc.2018.09.006.

[3] C. N. B. Merz et al., “The Women’s Ischemia Syndrome Evaluation (WISE) Study: protocol design, methodology and feasibility report,” Journal of the American College of Cardiology, vol. 33, no. 6, pp. 1453–1461, May 1999, https://doi.org/10.1016/s0735-1097(99)00082-0.

[4] J. Knuuti et al., “2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes,” European Heart Journal, vol. 41, no. 3, pp. 407–477, Aug. 2019, https://doi.org/10.1093/eurheartj/ehz425.

[5] T. J. Ford et al., “Stratified medical therapy using invasive coronary function testing in angina,” Journal of the American College of Cardiology, vol. 72, no. 23, pp. 2841–2855, Sep. 2018, https://doi.org/10.1016/j.jacc.2018.09.006.

[6] B. A. Samuels et al., “Comprehensive Management of ANOCA, Part 1—Definition, patient population, and Diagnosis,” Journal of the American College of Cardiology, vol. 82, no. 12, pp. 1245–1263, Sep. 2023, https://doi.org/10.1016/j.jacc.2023.06.043.

[7] L. Viola, M. Masters, U. Shafiq, K. R. Jujjavarapu, and S. Luthra, “Ischemia with No Obstructive Coronary Artery Disease (INOCA): A Review,” Life, vol. 15, no. 10, p. 1554, Oct. 2025, https://doi.org/10.3390/life15101554.