

CRR
JOURNAL
OF CARDIORESPIRATORY RESEARCH

ISSN 2181-0974
DOI 10.26739/2181-0974
Impact Factor SJIF 2022: 5.937



Journal of
CARDIORESPIRATORY
RESEARCH



Volume 7, Issue 1

2026

МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ
РЕСПУБЛИКИ УЗБЕКИСТАН

Журнал кардиореспираторных исследований

JOURNAL OF CARDIORESPIRATORY RESEARCH

Главный редактор: Э.Н.ТАШКЕНБАЕВА

Учредитель:

Самаркандский государственный
медицинский университет

Tadqiqot.uz

Ежеквартальный
научно–практический
журнал

ISSN: 2181-0974
DOI: 10.26739/2181-0974



N° 1
2026

Главный редактор:

Ташкенбаева Элеонора Негматовна

доктор медицинских наук, профессор, заведующая кафедрой внутренних болезней и кардиологии №2 Самаркандского Государственного медицинского университета, председатель Ассоциации терапевтов Самаркандской области.
<https://orcid.org/0000-0001-5705-4972>

Заместитель главного редактора:

Хайбулина Зарина Руслановна

*доктор медицинских наук, руководитель отдела биохимии с группой микробиологии
ГУ «РСНПМЦХ им. акад. В. Вахидова» <https://orcid.org/0000-0002-9942-2910>*

ЧЛЕНЫ РЕДАКЦИОННОЙ КОЛЛЕГИИ:

Аляви Анис Лютфуллаевич

академик АН РУз, доктор медицинских наук, профессор, Председатель Ассоциации Терапевтов Узбекистана, Советник директора Республиканского специализированного научно-практического центра терапии и медицинской реабилитации (Ташкент)
<https://orcid.org/0000-0002-0933-4993>

Бокерия Лео Антонович

академик РАН, доктор медицинских наук, профессор, Президент научного центра сердечно-сосудистой хирургии им. А.Н. Бакулева (Москва), <https://orcid.org/0000-0002-6180-2619>

Курбанов Равшанбек Давлетович

академик АН РУз, доктор медицинских наук, профессор, Советник директора Республиканского специализированного научно-практического медицинского центра кардиологии (Ташкент), <https://orcid.org/0000-0001-7309-2071>

Шкляев Алексей Евгеньевич

д.м.н., профессор, ректор Федерального государственного бюджетного образовательного учреждения высшего образования «Ижевская государственная медицинская академия» Министерства здравоохранения Российской Федерации

Michał Tendera

профессор кафедры кардиологии Верхнесилезского кардиологического центра, Силезский медицинский университет в Катовице, Польша (Польша)
<https://orcid.org/0000-0002-0812-6113>

Покушалов Евгений Анатольевич

доктор медицинских наук, профессор, заместитель генерального директора по науке и развитию сети клиник «Центр новых медицинских технологий» (ЦНМТ), (Новосибирск), <https://orcid.org/0000-0002-2560-5167>

Зуфаров Миржамол Мирумарович

доктор медицинских наук, профессор, руководитель отдела ГУ «РСНПМЦХ им. акад. В. Вахидова» <https://orcid.org/0000-0003-4822-3193>

Акилов Хабибулла Атауллаевич

доктор медицинских наук, профессор, Директор Центра развития профессиональной квалификации медицинских работников (Ташкент)

Насирова Зарина Акбаровна

DSc, доцент кафедры внутренних болезней и кардиологии №2 Самаркандского Государственного Медицинского университета (ответственный секретарь) ORCID: 0000-0002-8722-0393 (ответственный секретарь)

Ризаев Жасур Алимджанович

доктор медицинских наук, профессор, Ректор Самаркандского государственного медицинского университета, <https://orcid.org/0000-0001-5468-9403>

Зиядуллаев Шухрат Худойбердиевич

доктор медицинских наук, профессор, первый заместитель директора по академической деятельности Самаркандского филиала Международного Университета Кимё в Ташкенте
<https://orcid.org/0000-0002-9309-3933>

Джан Ковак

Профессор, председатель Совета Европейского общества кардиологов по инсульту, руководитель специализированной кардиологии, заведующий отделением кардиологии, кардио- и торакальной хирургии, консультант-кардиолог, больница Гленфилд, Лестер (Великобритания)

Сергио Бернардини

Профессор клинической биохимии и клинической молекулярной биологии, главный врач отдела лабораторной медицины, больница Университета Тор Вергата (Рим, Италия)

Ливерко Ирина Владимировна

доктор медицинских наук, профессор, заместитель директора по науке Республиканского специализированного научно-практического медицинского центра фтизиатрии и пульмонологии Республики Узбекистан (Ташкент)
<https://orcid.org/0000-0003-0059-9183>

Цурко Владимир Викторович

доктор медицинских наук, профессор Первого Московского государственного медицинского университета им. И.М. Сеченова (Москва)
<https://orcid.org/0000-0001-8040-3704>

Тригулова Ранса Хусановна

Доктор медицинских наук, руководитель лаборатории превентивной кардиологии, ведущий научный сотрудник лаборатории ИБС и атеросклероза. Республиканский специализированный научно-практический медицинский центр кардиологии (Ташкент)
ORCID- 0000-0003-4339-0670

Тураев Феруз Фатхуллаевич

доктор медицинских наук, Директор Республиканского специализированного научно-практического медицинского центра эндокринологии имени академика Ю.Г. Туракулова

Bosh muharrir:

Tashkenbayeva Eleonora Negmatovna

tibbiyot fanlari doktori, professor, Samarqand davlat tibbiyot universiteti 2-sonli ichki kasalliklar va kardiologiya kafedrasini mudiri, Samarqand viloyati vrachlar uyushmasi raisi
<https://orsid.org/0000-0001-5705-4972>

Bosh muharrir o'rinbosari:

Xaibulina Zarina Ruslanovna

tibbiyot fanlari doktori, "akad V. Vohidov nomidagi RIJM davlat institutining mikrobiologiya guruhi bilan biokimyo kafedrasini mudiri" <https://orcid.org/0000-0002-9942-2910>

TAHRIRIYAT A'ZOLARI:

Alyavi Anis Lyutfullayevich

O'zbekiston Respublikasi Fanlar akademiyasining akademigi, tibbiyot fanlari doktori, professor, O'zbekiston Terapevtlar uyushmasi raisi, Respublika ixtisoslashtirilgan ilmiy va amaliy tibbiy terapiya markazi va tibbiy reabilitatsiya direktori maslahatchisi (Toshkent), <https://orcid.org/0000-0002-0933-4993>

Bockeria Leo Antonovich

Rossiya fanlar akademiyasining akademigi, tibbiyot fanlari doktori, professor, A.N. Bakuleva nomidagi yurak-qon tomir jarrohligi ilmiy markazi prezidenti (Moskva)
<https://orcid.org/0000-0002-6180-2619>

Kurbanov Ravshanbek Davlatovich

O'zbekiston Respublikasi Fanlar akademiyasining akademigi, tibbiyot fanlari doktori, professor, Respublika ixtisoslashtirilgan kardiologiya ilmiy-amaliy tibbiyot markazining direktor maslahatchisi (Toshkent)
<https://orcid.org/0000-0001-7309-2071>

Shklyayev Aleksey Evgenievich

Tibbiyot fanlari doktori, professor, Rossiya Federatsiyasi Sog'liqni saqlash vazirligining "Izhevsk davlat tibbiyot akademiyasi" Federal davlat byudjeti oliy ta'lim muassasasi rektori

Mixal Tendera

Katovitsadagi Sileziya Tibbiyot Universiteti, Yuqori Sileziya Kardiologiya Markazi kardiologiya kafedrasini professori (Polsha)
<https://orcid.org/0000-0002-0812-6113>

Pokushalov Evgeniy Anatolevich

tibbiyot fanlari doktori, professor, "Yangi tibbiy texnologiyalar markazi" (YTTM) klinik tarmog'ining ilmiy ishlar va rivojlanish bo'yicha bosh direktorining o'rinbosari (Novosibirsk) <https://orcid.org/0000-0002-2560-5167>

Zufarov Mirjamol Mirumarovich

tibbiyot fanlari doktori, professor, "akad V. Vohidov nomidagi RIJM davlat muassasasi" bo'limi boshlig'i"
<https://orcid.org/0000-0003-4822-3193>

Akilov Xabibulla Ataulayevich

tibbiyot fanlari doktori, professor, Tibbiyot xodimlarining kasbiy malakasini oshirish markazi direktori (Toshkent)

Nasirova Zarina Akbarovna

Samarqand davlat tibbiyot universiteti 2-sonli ichki kasalliklar va kardiologiya kafedrasini dotsenti, DSc (mas'ul kotib) ORCID: 0000-0002-8722-0393 (mas'ul kotib)

Rizayev Jasur Alimjanovich

tibbiyot fanlari doktori, professor, Samarqand davlat tibbiyot universiteti rektori
<https://orcid.org/0000-0001-5468-9403>

Ziyadullayev Shuxrat Xudoyberdiyevich

tibbiyot fanlari doktori, professor, Toshkent shahridagi Kimyo xalqaro universitetining Samarqand filiali direktorining akademik faoliyat bo'yicha birinchi o'rinbosari (Toshkent)
<https://orcid.org/0000-0002-9309-3933>

Jan Kovak

Yevropa kardiologiya jamiyati insult kengashi raisi, 2017 yildan buyon ixtisoslashtirilgan kardiologiya kafedrasini rahbari, kardiologiya, yurak va torakal jarrohlik kafedrasini mudiri, maslahatchi kardiolog Glenfild kasalxonasi, Lester (Buyuk Britaniya)

Sergio Bernardini

Klinik biokimyo va klinik molekulyar biologiya bo'yicha professor - Laboratoriya tibbiyoti bo'limi bosh shifokori – Tor Vergata universiteti kasalxonasi (Rim-Italiya)

Liverko Irina Vladimirovna

tibbiyot fanlari doktori, professor, Respublika ixtisoslashtirilgan fiziologiya va pulmonologiya ilmiy-amaliy tibbiyot markazining ilmiy ishlar bo'yicha direktor o'rinbosari (Toshkent)
<https://orcid.org/0000-0003-0059-9183>

Surko Vladimir Viktorovich

tibbiyot fanlari doktori, professori I.M. Sechenov nomidagi Birinchi Moskva Davlat tibbiyot universiteti (Moskva)
<https://orcid.org/0000-0001-8040-3704>

Trigulova Raisa Xusainovna

Tibbiyot fanlari doktori, Profilaktik kardiologiya laboratoriyasi mudiri, YuIK va ateroskleroz laboratoriyasining yetakchi ilmiy xodimi. Respublika ixtisoslashtirilgan kardiologiya ilmiy-amaliy tibbiyot markazi (Toshkent)
ORCID- 0000-0003-4339-0670

Turayev Feruz Fatxullayevich

tibbiyot fanlari doktori, akademik Y.X.To'raqulov nomidagi Respublika ixtisoslashtirilgan endokrinologiya ilmiy amaliy tibbiyot markazi direktori
<https://orcid.org/0000-0002-1321-4732>

Chief Editor:

Tashkenbaeva Eleonora Negmatovna

Doctor of Medical Sciences, professor, Head of the Department of Internal Diseases and cardiology No. 2 of the Samarkand State Medical University, Chairman of the Association of Physicians of the Samarkand Region. <https://orsid.org/0000-0001-5705-4972>

Deputy Chief Editor:

Xaibulina Zarina Ruslanovna

Doctor of Medical Sciences, Head of the Department of Biochemistry with the Microbiology Group of the State Institution "RSSC named after acad. V. Vakhidov", <https://orcid.org/0000-0002-9942-2910>

MEMBERS OF THE EDITORIAL BOARD:

Alyavi Anis Lutfullaevich

Academician of the Academy of Sciences of the Republic of Uzbekistan, Doctor of Medical Sciences, Professor, Chairman of the Association of Physicians of Uzbekistan, Advisor to the Director of the Republican Specialized Scientific - Practical Center of Therapy and Medical Rehabilitation (Tashkent) <https://orcid.org/0000-0002-0933-4993>

Bockeria Leo Antonovich

Academician of the Russian Academy of Sciences, Doctor of Medical Sciences, Professor, President of the Scientific Center for Cardiovascular Surgery named after A.N. Bakuleva (Moscow) <https://orcid.org/0000-0002-6180-2619>

Kurbanov Ravshanbek Davletovich

Academician of the Academy of Sciences of the Republic of Uzbekistan, Doctor of Medical Sciences, Professor, Advisor to the Director Republican Specialized Scientific and Practical Medical Center of Cardiology, (Tashkent) <https://orcid.org/0000-0001-7309-2071>

Shklyayev Aleksey Evgenievich

Doctor of Medical Sciences, Professor, Rector of the Federal State Budgetary Educational Institution of Higher Education "Izhevsk State Medical Academy" of the Ministry of Health of the Russian Federation

Michal Tendera

Professor of the Department of Cardiology, Upper Silesian Cardiology Center, Silesian Medical University in Katowice, Poland (Poland) <https://orcid.org/0000-0002-0812-6113>

Pokushalov Evgeny Anatolyevich

Doctor of Medical Sciences, Professor, Deputy Director General for Science and Development of the Clinic Network "Center for New Medical Technologies" (CNMT), (Novosibirsk) <https://orcid.org/0000-0002-2560-5167>

Akilov Xabibulla Ataulaevich

Doctor of Medical Sciences, Professor, Center for the development of professional qualifications of medical workers (Tashkent)

Nasyrova Zarina Akbarovna

DSc, Associate Professor of the Department of Internal Diseases and cardiology No. 2 of the Samarkand State Medical University (Executive Secretary) ORCID: 0000-0002-8722-0393 (Executive Secretary)

Rizaev Jasur Alimjanovich

Doctor of Medical Sciences, Professor, Rector of the Samarkand State Medical University <https://orcid.org/0000-0001-5468-9403>

Ziyadullaev Shuhrat Khudoyberdievich

Doctor of Medical Sciences, Professor, Deputy Director for Scientific Doctor of Medical Sciences, Professor, First Deputy Director for Academic Affairs of the Samarkand branch of Kimyo International University in Tashkent <https://orcid.org/0000-0002-9309-3933>

Jan Kovac

Professor Chairman, European Society of Cardiology Council for Stroke, Lead of Specialised Cardiology, Head of Cardiology, Cardiac and Thoracic Surgery, Consultant Cardiologist, Glenfield Hospital, Leicester (United Kingdom)

Sergio Bernardini

Full Professor in Clinical Biochemistry and Clinical Molecular Biology -Head Physician of the Laboratory Medicine Unit- University of Tor Vergata Hospital (Rome-Italy)

Liverko Irina Vladimirovna

Doctor of Medical Sciences, Professor, Deputy Director for Science of the Republican Specialized Scientific and Practical Medical Center for Phthiology and Pulmonology of the Republic of Uzbekistan (Tashkent) <https://orcid.org/0000-0003-0059-9183>

Zufarov Mirjamol Mirumarovich

Doctor of Medical Sciences, Professor, Head of the Department of the State Institution "RSNPMTSH named after acad. V. Vakhidov" <https://orcid.org/0000-0003-4822-3193>

Tsurko Vladimir Viktorovich

Doctor of Medical Sciences, professor Of Moscow State Medical University by name I.M. Sechenov (Moscow) <https://orcid.org/0000-0001-8040-3704>

Trigulova Raisa Khusainovna

Doctor of Medical Sciences, Head of the Laboratory of Preventive Cardiology, Leading Researcher of the Laboratory of IHD and Atherosclerosis. Republican Specialized Scientific and Practical Medical Center of Cardiology (Tashkent) ORCID- 0000-0003-4339-0670

Turaev Feruz Fatxullaevich

Doctor of Medical Sciences, Director of the Republican Specialized Scientific and Practical Medical Center of Endocrinology named after Academician Yu.G. Turakulova

Алимов Дониёр Анварович
доктор медицинских наук, директор
Республиканского научного центра
экстренной медицинской помощи

Абдуллаев Акбар Хатамович
доктор медицинских наук, главный
научный сотрудник Республиканского
специализированного научно-
практического центра медицинской
терапии и реабилитации
<https://orcid.org/0000-0002-1766-4458>

Агабабян Ирина Рубеновна
кандидат медицинских наук, доцент,
заведующая кафедрой терапии ФПДО,
Самаркандского Государственного
медицинского института

Алиева Нигора Рустамовна
доктор медицинских наук, заведующая
кафедрой Госпитальной педиатрии №1
с основами нетрадиционной медицины
ТашПМИ

Исмаилова Адолат Абдурахимовна
доктор медицинских наук, профессор,
заведующая лабораторией
фундаментальной иммунологии
Института иммунологии геномики
человека АН РУз

Камалов Зайнитдин Сайфутдинович
доктор медицинских наук, профессор,
заведующий лабораторией
иммунорегуляции Института
иммунологии и геномики
человека АН РУз

Каюмов Улугбек Каримович
доктор медицинских наук, профессор,
заведующий кафедрой внутренних
болезней и телемедицины Центра
развития профессиональной
квалификации медицинских работников

Хусинова Шоира Акбаровна
кандидат философских наук, доцент,
заведующая кафедрой общей практики,
семейной медицины ФПДО
Самаркандского Государственного
медицинского института

Шодиколова Гуландом Зикрияевна
д.м.н., профессор, заведующая
кафедрой внутренних болезней № 3
Самаркандского Государственного
Медицинского Института
(Самарканд)
<https://orcid.org/0000-0003-2679-1296>

Doniyorova Farangisbonu Alisher qizi
Toshkent Davlat tibbiyot universiteti
nevrologiya va xalq tabobati kafedrasida
dotsenti, DSc.
<https://orcid.org/0009-0004-4140-4797>

Alimov Doniyor Anvarovich
tibbiyot fanlari doktori, Respublika
shoshilinch tibbiy yordam ilmiy markazi
direktori (Toshkent)

Abdullayev Akbar Xatamovich
tibbiyot fanlari doktori, O'zbekiston
Respublikasi Sog'liqni saqlash
vazirligining "Respublika
ixtisoslashtirilgan terapiya va tibbiy
reabilitatsiya ilmiy-amaliy
tibbiyot markazi" davlat
muassasasi bosh ilmiy xodimi
<https://orcid.org/0000-0002-1766-4458>

Agababayan Irina Rubenovna
tibbiyot fanlari nomzodi, dotsent, DKTF,
terapiya kafedrasida mudiri, Samarqand
davlat tibbiyot instituti

Alieva Nigora Rustamovna
tibbiyot fanlari doktori, 1-sonli gospital
pediatriya kafedrasida mudiri, ToshPТИ

Ismoilova Adolat Abduraximovna
tibbiyot fanlari doktori, professor,
O'zbekiston Respublikasi Fanlar
akademiyasining Odam genomikasi
immunologiyasi institutining fundamental
immunologiya laboratoriyasining mudiri

Kamalov Zaynitdin Sayfutdinovich
tibbiyot fanlari doktori, professor,
O'zbekiston Respublikasi Fanlar
akademiyasining Immunologiya va inson
genomikasi institutining Immunogenetika
laboratoriyasi mudiri

Qayumov Ulug'bek Karimovich
tibbiyot fanlari doktori, professor,
Tibbiyot xodimlarining kasbiy malakasini
oshirish markazi, ichki kasalliklar va
teletibbiyot kafedrasida mudiri (Toshkent)

Xusinova Shoira Akbarovna
tibbiyot fanlari nomzodi, dotsent,
Samarqand davlat tibbiyot instituti DKTF
Umumiy amaliyot va oilaviy tibbiyot
kafedrasida mudiri (Samarqand)

Shodiqulova Gulandom Zikriyevna
tibbiyot fanlari doktori, professor,
Samarqand davlat tibbiyot instituti 3-
ichki kasalliklar kafedrasida mudiri
(Samarqand)
<https://orcid.org/0000-0003-2679-1296>

Doniyorova Farangisbonu Alisher qizi
доцент кафедры неврологии и
народной медицины Ташкентского
государственного медицинского
университета, доктор медицинских
наук. <https://orcid.org/0009-0004-4140-4797>

Alimov Doniyor Anvarovich
Doctor of Medical Sciences, Director of
the Republican Scientific Center of
Emergency Medical Care

Abdullaev Akbar Xatamovich
Doctor of Medical Sciences,
Chief Researcher of the State Institution
"Republican Specialized Scientific and
Practical Medical Center for Therapy and
Medical Rehabilitation" of the Ministry of
Health of the Republic of Uzbekistan,
<https://orcid.org/0000-0002-1766-4458>

Agababayan Irina Rubenovna
PhD, Associate Professor, Head of the
Department of Therapy, FAGE,
Samarqand State Medical Institute

Alieva Nigora Rustamovna
Doctor of Medical Sciences, Head of the
Department of Hospital Pediatrics
No. 1 with the basics of alternative
medicine, TashPMI

Ismailova Adolat Abduraximovna
doctor of Medical Sciences, Professor,
Head of the Laboratory of Fundamental
Immunology of the Institute of
Immunology of Human
Genomics of the Academy of Sciences
of the Republic of Uzbekistan

Kamalov Zaynitdin Sayfutdinovich
doctor of Medical Sciences, Professor,
Head of the Laboratory of
Immunogenetics of the Institute of
Immunology and Human Genomics
of the Academy of Sciences of the
Republic of Uzbekistan

Kayumov Ulugbek Karimovich
Doctor of Medical Sciences, Professor,
Head of the Department of Internal
Diseases and Telemedicine of the Center
for the development of professional
qualifications
of medical workers

Khusinova Shoira Akbarovna
PhD, Associate Professor, Head of the
Department of General Practice,
Family Medicine FAGE of the
Samarqand State Medical Institute

Shodikulova Gulandom Zikriyevna
Doctor of Medical Sciences, professor,
head of the Department of Internal
Diseases N 3 of Samarqand state medical
institute (Samarqand)
<https://orcid.org/0000-0003-2679-1296>

Doniyorova Farangisbonu Alisher kizi
Associate Professor, Department of
Neurology and Traditional Medicine,
Tashkent State Medical University, DSc.
<https://orcid.org/0009-0004-4140-4797>

Халиков Каххор Мирзаевич
кандидат медицинских наук, доцент
заведующий кафедрой биологической
химии Самаркандского
государственного медицинского
университета

Тулабаева Гавхар Миракбаровна
Заведующая кафедрой кардиологии,
Центр развития профессиональной
квалификации медицинских
работников, д.м.н., профессор

**Абдумаджидов Хамидулла
Амануллаевич**
Бухарский государственный
медицинский институт имени Абу
Али ибн Сино. Кафедра «Хирургические
болезни и реанимация». Доктор
медицинских наук, профессор.

Саидов Максуд Арифович
к.м.н., директор Самаркандского
областного отделения
Республиканского специализированного
научно-практического медицинского
центра кардиологии (г. Самарканд)

Срождинова Нигора Зайнутдиновна
д.м.н. Заведующая научно-
исследовательской лабораторией
кардиодиабета и метаболических
нарушений РСНПМЦК

Носирова Дилангиз Акбаровна
Ассистент кафедры внутренних
болезней и кардиологии №2
Самаркандского государственного
медицинского университета
(технический секретарь)

Эсанкулов Мухаммад Олимович
Ассистент кафедры внутренних
болезней и кардиологии №2
Самаркандского государственного
медицинского университета
(технический секретарь)

Xalikov Qaxxor Mirzayevich
Tibbiyot fanlari nomzodi, dotsent
Samarqand davlat tibbiyot universiteti
Biologik kimyo kafedrasini mudiri

Tulabayeva Gavxar Mirakbarovna
kardiologiya kafedrasini mudiri, tibbiyot
xodimlarining kasbiy malakasini rivojlantirish
markazi, tibbiyot fanlari doktori, professor

Abdumadjidov Xamidulla Amanullayevich
«Abu Ali ibn Sino nomidagi Buxoro davlat
tibbiyot oliygohi» Xirurgiya kasalliklari va
reanimatsiya kafedrasini professori, tibbiyot
fanlari doktori.

Saidov Maqsud Arifovich
tibbiyot fanlari nomzodi,
Respublika ixtisoslashgan kardiologiya
ilmiy amaliy tibbiyot markazi Samarqand
viloyat mintaqaviy filiali direktori
(Samarqand)

Srojidinova Nigora Zaynutdinovna
t.f.d. Kardiodiabet va metabolik buzilishlar
ilmiy tadqiqot laboratoriyasi mudiri

Nosirova Dilangiz Akbarovna
Samarqand davlat tibbiyot universiteti 2-son
ichki kasalliklar va kardiologiya kafedrasini
assistenti (texnik kotib)

Esankulov Muxammad Olimovich
Samarqand davlat tibbiyot universiteti 2-son
ichki kasalliklar va kardiologiya kafedrasini
assistenti (texnik kotib), PhD

Khalikov Kakhor Mirzayevich
Candidate of Medical Sciences,
Associate Professor, Head of the Department
of Biological Chemistry, Samarkand State
Medical University

Tulabayeva Gavkhar Mirakbarovna
Head of the Department of Cardiology,
Development Center professional
qualification of medical workers,
MD, professor

**Abdumadjidov Khamidulla
Amanullayevich**
“Bukhara state medical institute named
after Abu Ali ibn Sino”. DSc, professor.

Saidov Maksud Arifovich
Candidate of Medical Sciences, Director
of the Samarkand Regional Department of
the Republican Specialized Scientific and
Practical Medical Center of Cardiology
(Samarkand)

Srojidinova Nigora Zaynutdinovna
DSc, Head of Kardiodiabetes and Metabolic
Disorders Laboratory

Dilangiz Akbarovna Nosirova,
Assistant of the Department of Internal
Diseases and Cardiology No. 2, Samarkand
State Medical University (Technical Secretary)

Esankulov Muhammad Olimovich,
Assistant of the Department of Internal
Diseases and Cardiology No. 2, Samarkand
State Medical University (Technical Secretary)

MUNDARIJA | СОДЕРЖАНИЕ | CONTENT

Обзорные статьи | Review articles | Adabiyotlar sharhi

- Лим М.В., Хусайнова В.Д.**
Клинические и этиологические особенности острого стенозирующего ларинготрахеита у детей
Lim M.V., Khusainova V.D.
Clinical and etiological features of acute stenosing laryngotracheitis in children
Lim M.V., Xusainova V.D.
Bolalarda o'tkir stenozlovchi laringotraxeitning klinik va etiologik xususiyatlari..... 11
- Маматкулова Ф. Х.**
Значение тромбоцитов в патогенезе инфекционных и воспалительных заболеваний легких (обзор литературы)
Mamatkulova F.Kh.
The meaning of platelets in the pathogenesis of infectious and inflammatory lung diseases (literature review).
Mamatkulova F.X.
Yuqumli va yallig'lanishli o'pka kasalliklari patogenezida trombotsitlarning ahamiyati (adabiyotlar sharhi)..... 16
- Расулова И.Р., Максудов М.Ф., Умаров Б. Я.**
Врожденные пороки сердца: от фундаментальных исследований к клинической практике (литературный обзор)
Rasulova I.R., Maksudov M.F., Umarov B.Y. congenital heart defects: from basic research to clinical practice (literature review).
Rasulova I.R., Maksudov M.F., Umarov B.Ya.
Tug'ma yurak nuqsonlari: fundamental tadqiqotlardan klinik amaliyotga (adabiyotlar sharhi)..... 20
- Ташкенбаева Э.Н., Абдуллоева М. Д.**
Оптимизация антиангинальной терапии хронического коронарного синдрома с учётом клинико-патофизиологических фенотипов заболевания
Tashkenbaeva E.N., Abdulloeva M.D.
Optimization of antianginal therapy in chronic coronary syndrome considering clinical and pathophysiological phenotypes of the disease
Tashkenbaeva E. N., Abdullaeva M.D.
Surunkali koronar sindromda antianginal terapiyani kasallikning klinik-patofiziologik fenotiplarini hisobga olgan holda optimallashtirish..... 24
- Тригулова Р. Х., Мухтарова Ш. Ш., Юлдашева М. С.**
Взаимосвязи клинико-лабораторно-функциональных параметров у больных сахарным диабетом 2 типа и ишемической болезнью сердца с различными фенотипами сердечной недостаточности
Trigulova R.X., Mukhtarova Sh.Sh., Madina S.Y.
Interrelation of clinical, laboratory, and functional parameters in patients with type 2 diabetes mellitus and ischemic heart disease with different phenotypes of heart failure
Trigulova R.X., Muxtarova Sh.Sh., Madina S.Y.
2-tur shakarli diabet va ishemik yurak kasalligiga ega bemorlarda turli yurak yetishmovchiligi fenotiplari bilan klinik-laboratoriya-funksional ko'rsatkichlarning o'zaro bog'liqligi..... 30
- Тригулова Р.Х., Мухтарова Ш.Ш., Одилова Д.Ф.**
Стадийность системных метаболических нарушений у больных с сахарным диабетом 2 типа по консенсусному заявлению европейского общества атеросклероза 2025 года
Trigulova R.X., Mukhtarova Sh.Sh., Madina S.Y.
Staging of systemic metabolic disorders in patients with type 2 diabetes mellitus according to the 2025 consensus statement of the european atherosclerosis society
Trigulova R.Kh., Muxtarova Sh.Sh., Odilova D.F.
Staging of systemic metabolic disorders in patients with type 2 diabetes mellitus according to the 2025 consensus statement of the european atherosclerosis society..... 36
- Ярмухамедова Н.А., Лим М.В., Улугова Х.Т.**
Современное представление о течении бронхиальной астмы у детей с ожирением
Yarmukhamedova N.A., Lim M.V., Ulugova Kh.T.
Modern concepts of the course of bronchial asthma in children with obesity
Yarmuxamedova N.A., Lim M.V., Ulug'ova X.T.
Semizlikka chalingan bolalarda bronxial astmaning kechishi haqidagi zamonaviy qarashlar..... 42

Оригинальные статьи | Original articles | Original maqolalar

- Абдуллаева З.А., Ташкенбаева Э.Н., Чоудхари Акшит Хансарам, Лаванья Сачдева, Фараз Ахмад**
Двунаправленная связь между гипертонией и неврологическими расстройствами
Abdullayeva Z.A., Tashkenbaeva E.N., Choudhary Akshit Hansaram, Lavanya Sachdeva, Faraz Ahmad
The bidirectional relationship between hypertension and neurological disorders
Abdullayeva Z.A., Tashkenbaeva E.N., Choudhary Akshit Hansaram, Lavanya Sachdeva, Faraz Ahmad
Gipertoniya kasalligi va nevrologik kasalliklar o'rtasidagi ikki tomonlama bog'liqlik..... 46
- Гадаев А.Г., Халимова Х.Х.**
Клинико-практическое значение суточного мониторирования артериального давления при коморбидном течении хронической обструктивной болезни лёгких и артериальной гипертензии

- Gadayev A.G., Xalimova X.X.**
Clinical and practical significance of 24-hour ambulatory blood pressure monitoring in comorbidity of chronic obstructive pulmonary disease and arterial hypertension
Gadayev A.G., Xalimova X.X.
O'pkaning surunkali obstruktiv kasalligi va arterial gipertenziya komorbidlikda kechganda bir kecha-kunduzlik qon bosimini monitoringining klinik va amaliy ahamiyati..... 50
3. **Исмаилов С.И., Хайбуллина З.Р., Абдуллаева М.А., Хаджибаев Д.А., Хайдаров А.Э., Рейимназарова З.Д.**
Интегральные показатели гемодинамики и кислородного обеспечения у пожилых женщин с ишемической болезнью сердца и хронической сердечной недостаточностью на фоне ожирения и сахарного диабета 2 типа
Ismailov S.I., Khaibullina Z.R., Abdullaeva M.A., Khadjibaev D.A., Khaidarov A.E., Reyimnazarova Z.D.
Integral indices of hemodynamics and oxygen supply in elderly women with ischemic heart disease and chronic heart failure against the background of obesity and type 2 diabetes mellitus.
Ismoilov S.I., Xaybullina Z.R., Abdullayeva M.A., Xadjibaev D.A., Xaydarov A.E. Reyimnazarova Z.D.
yosh qizlarda ishemiya yurak kasalligi va surunkali yurak yetishmovchiligi fonida semiriklik va 2-tip diabet shikastlanishi kontekstida gemodinamika va kislorod ta'minotining integral ko'rsatkichlari..... 56
4. **Ливерко И.В., Халимзода Л.М., Абдуганиева Э.А.**
Роль нейтрофильно-лимфоцитарного соотношения и клинических шкал в идентификации очень частых обострений хронической обструктивной болезни легких
Liverko I.V., Khalimzoda L. M., Abduganieva E. A.
The role of neutrophil-to-lymphocyte ratio and clinical scores in identifying very frequent exacerbators of COPD
Liverko I.V., Xalimzoda L.M., Abduganiyeva E.A.
Surunkali obstruktiv o'pka kasalligida (so'ok) juda tez-tez zo'rayishlarga moyil bemorlarni aniqlashda neyrofil-limfotsitlar nisbati va klinik shkalalarning roli..... 63
5. **Мавлянова З.Ф., Рузиева А.А., Мавлянов С.Ф.**
Генетические предикторы адаптации сердечно-сосудистой системы у подростков футболистов: роль полиморфизмов генов ACE и NOS3
Mavlyanova Z. F., Ruziyeva A. A., Mavlyanov S. F.
Genetic predictors of cardiovascular adaptation in adolescent football players: the role of ACE and NOS3 gene polymorphisms
Mavlonova Z. F., Ro'ziyeva A. A., Mavlyanov S. F.
O'smir futbolchilarda yurak-qon tomir tizimi adaptatsiyasining genetik prediktorlari: ACE va NOS3 genlari polimorfizmlarining roli..... 68
6. **Назаров Ф.Ю., Юсуfoва М.Ф.**
Сравнительная оценка эффективности комплексной терапии на показатели центральной гемодинамики у больных перенесших коронавирусную инфекции
Nazarov F.Yu., Yusufova M.F.
Comparative evaluation of the effectiveness of comprehensive therapy on central hemodynamic parameters in patients who have recovered from coronavirus infection
Nazarov F.Yu., Yusufova M.F.
Koronavirus infeksiyasini boshdan kechirgan bemorlarda kompleks terapiyaning markaziy gemodinamika ko'rsatkichlariga ta'sirining qiyosiy baholanishi..... 74
7. **Ризаев Ж.А., Бобоева Н.А.**
Цифровые и эхокардиографические подходы для персонализации реабилитации после инфаркта миокарда: результаты сравнительного клинического исследования
Rizaev Zh.A., Boboeva N.A.
Digital and echocardiographic approaches for personalizing rehabilitation after myocardial infarction: results of a comparative clinical study
Rizaev J.A., Boboyeva N.A.
Miokard infarktidan keyingi reabilitatsiyani shaxsiylashtirish uchun raqamli va exokardiografik yondashuvlar: qiyosiy klinik tadqiqot natijalari..... 80
8. **Рузиева А.А., Мавлянова З.Ф.**
Функциональное состояние сердечно-сосудистой системы и особенности адаптации к физическим нагрузкам у подростков-футболистов в предсоревновательном периоде
Ruzieva A.A., Mavlyanova Z.F.
Functional state of the cardiovascular system and features of adaptation to physical exercise in adolescent -football players in the pre-competition period
Ruziyeva A.A., Mavlyanova Z.F.
Musobaqa oldi davrida o'smir futbolchilarda yurak-qon tomir tizimining funksional holati va jismoniy yuklamalarga moslashish xususiyatlari..... 85
9. **Ташкенбаева Э.Н., Мухаммад Таййуб, Пайзуллаева У.Ф., Пулатова К.С.**
Инсулинорезистентность как предиктор рестеноза и нестабильности артериального давления после чрескожного коронарного вмешательства
Tashkenbayeva E.N., Tayyub M., Payzullayeva U.F., Pulatova K.S.
Insulin resistance as a predictor of restenosis and blood pressure instability after percutaneous coronary intervention

	Tashkenbayeva E.N., Muhammad Tayyub, Payzullayeva U.F., Pulatova K.S.	
	Perkutan koronar aralashuvdan so'ng restenoz va arterial qon bosimi beqarorligi prediktori sifatida insulinrezistentlik	90
10.	Турсунов Ж.Т., Муминов Ш.К.	
	Влияние карбоксиангиографии на липидный профиль и воспалительные маркёры у отставных военнослужащих с критической ишемией нижних конечностей и хронической болезнью почек	
	Tursunov J.T., Muminov Sh.K.	
	Impact of carboxyangiography on lipid profile and inflammatory markers in retired military personnel with critical limb ischemia and chronic kidney disease	
	Tursunov J.T., Muminov Sh. K.	
	Oyoq kritik ishemiyasi va surunkali buyrak kasalligi bo'lgan nafaqadagi harbiylarda karboxiografiyaning lipid profili va yallig'lanish markerlariga ta'siri.....	95
11.	Хамидов О.А., Бобоева Н.А.	
	Клиническая эффективность цифровой платформы в персонализации кардиореабилитации после инфаркта миокарда	
	Xamidov O.A., Boboeva N.A.	
	Clinical efficiency of the digital platform in personalizing cardiorehabilitation after myocardial infarction	
	Xamidov O.A., Boboeva N.A.	
	Miokard infarktidan keyin kardioreabilitatsiyani shaxsiylashtirishda raqamli platformaning klinik samaradorligi	101

**Ташкенбаева Э.Н.**

д.м.н., профессор,
кафедра внутренних болезней и кардиологии №2,
Самаркандский государственный медицинский университет,
Самарканд, Узбекистан

Мухаммад Таййуб

Студент, международный факультет
Самаркандский государственный
медицинский университет
Самарканд, Узбекистан

Пайзуллаева У.Ф.

Ассистент, кафедра организации
фармацевтического дела, PhD
Самаркандского государственного
медицинского университета
Самарканд, Узбекистан

Пулатова К.С.

Ассистент, кафедра внутренних
болезней и кардиологии №2.
Самаркандский государственный
медицинский университет
Самарканд, Узбекистан

ИНСУЛИНОРЕЗИСТЕНТНОСТЬ КАК ПРЕДИКТОР РЕСТЕНОЗА И НЕСТАБИЛЬНОСТИ АРТЕРИАЛЬНОГО ДАВЛЕНИЯ ПОСЛЕ ЧРЕСКОЖНОГО КОРОНАРНОГО ВМЕШАТЕЛЬСТВА

For citation: Tashkenbayeva E.N., Tayyub M., Payzullayeva U.F., Pulatova K.S.. INSULIN RESISTANCE AS A PREDICTOR OF RESTENOSIS AND BLOOD PRESSURE INSTABILITY AFTER PERCUTANEOUS CORONARY INTERVENTION. JOURNAL OF CARDIORESPIRATORY RESEARCH. 2026, vol 7, issue 1.



<http://dx.doi.org/10.26739/2181-0974/2026/7/1/16>

АННОТАЦИЯ

Инсулинорезистентность (ИР) — ключевое звено между метаболическими нарушениями и неблагоприятными сердечно-сосудистыми исходами. Данное ретроспективное исследование (2020–2026 гг.) оценивает прогностическую роль индекса HOMA-IR в развитии рестеноза и нестабильности артериального давления (АД) у пациентов после чрескожного коронарного вмешательства (ЧКВ). Установлено, что высокий уровень HOMA-IR является независимым предиктором рестеноза в стенке, повышенной воспалительной активности и долгосрочных осложнений, независимо от наличия диабета. ИР также связана с симпатической гиперактивностью, что провоцирует вариабельность АД в послеоперационном периоде. Учет ИР позволяет персонализировать риски и оптимизировать метаболическую терапию после ЧКВ.

Ключевые слова: Инсулинорезистентность; ЧКВ; рестеноз коронарных артерий; нестабильность АД; HOMA-IR; ишемическая болезнь сердца; сахарный диабет.

Tashkenbayeva E.N.

Head of the Department of Internal
Medicine and Cardiology No. 2, DSc
Samarkand State Medical University,
Samarkand, Uzbekistan

Muhammad Tayyub

Student of the international faculty of the
Samarkand State Medical University,
Samarkand, Uzbekistan

Payzullaeva U.F.

Assistant of the Department of Organization
of Pharmaceutical Work, PhD
Samarkand State Medical University,

Samarkand, Uzbekistan

Pulatova K.S.Assistant of the Department of Internal
Medicine and Cardiology No. 2,
Samarkand State Medical University,
Samarkand, Uzbekistan**INSULIN RESISTANCE AS A PREDICTOR OF RESTENOSIS AND BLOOD PRESSURE INSTABILITY AFTER PERCUTANEOUS CORONARY INTERVENTION****SUMMARY**

Insulin resistance (IR) is a critical link between metabolic dysfunction and adverse cardiovascular outcomes. This retrospective study (2020–2026) evaluates the prognostic value of HOMA-IR in predicting in-stent restenosis and blood pressure (BP) instability following percutaneous coronary intervention (PCI). Results indicate that elevated HOMA-IR is an independent predictor of restenosis, increased inflammatory activity, and poor long-term outcomes, regardless of diabetes status. Additionally, IR-related sympathetic hyperactivity contributes to post-PCI hemodynamic instability. Identifying IR as a predictor enhances risk stratification and supports a personalized cardiometabolic approach for PCI patients.

Key words: Insulin resistance; Percutaneous coronary intervention; In-stent restenosis; Blood pressure instability; HOMA-IR; Coronary artery disease; Diabetes mellitus; Endothelial dysfunction; Cardiometabolic risk.

Tashkenbayeva E.N.Samarqand davlat tibbiyot universiteti
2-son ichki kasalliklar va
kardiologiya kafedrasini mudiri, t.f.d., prof.
Samarqand, O'zbekiston**Muhammad Tayyub**Samarqand davlat tibbiyot
universiteti xalqaro fakulteti
talabasi, Samarqand, O'zbekiston.**Payzullayeva U.F.**Farmatsevtika ishini tashkil
qilish kafedrasini assistenti, PhD
Samarqand davlat tibbiyot universiteti,
Samarqand, O'zbekiston**Pulatova K.S.**Ichki kasalliklar va
kardiologiya №2 kafedrasini assistenti,
Samarqand davlat tibbiyot universiteti,
Samarqand, O'zbekiston**PERKUTAN KORONAR ARALASHUVDAN SO'NG RESTENOZ VA ARTERIAL QON BOSIMI BEQARORLIGI PREDIKTORI SIFATIDA INSULINREZISTENTLIK****ANNOTATSIYA**

Insulinrezistentlik (IR) metabolik buzilishlar va noxush yurak-qon tomir natijalari o'rtasidagi asosiy bog'lovchi bo'g'indir. Ushbu retrospektiv tadqiqot (2020–2026) perkutan koronar aralashuvdan (PKA) keyingi restenoz va qon bosimi beqarorligini bashorat qilishda HOMA-IR ko'rsatkichining rolini baholaydi. Aniqlanishicha, yuqori HOMA-IR darajasi diabet mavjudligidan qat'i nazar, stent ichi restenoz, yallig'lanish faolligi va uzoq muddatli asoratlarni uchun mustaqil prediktor hisoblanadi. Shuningdek, IR simpatik giperaktivlikni keltirib chiqarib, operatsiyadan keyingi qon bosimi o'zgaruvchanligiga sabab bo'ladi. IR holatini inobatga olish PKA'dan keyingi xavflarni baholash va davolashni individuallashtirish imkonini beradi.

Kalit so'zlar: Insulinrezistentlik; PKA; restenoz; qon bosimi beqarorligi; HOMA-IR; yurak ishemik kasalligi; qandli diabet.

By restoring coronary blood flow and lowering ischemic consequences, percutaneous coronary intervention (PCI) has significantly improved the prognosis of patients with obstructive coronary artery disease. In-stent restenosis and post-procedural hemodynamic instability continue to be clinically significant issues that have a detrimental impact on long-term outcomes, quality of life, and healthcare expenditures despite advancements in stent technology and adjunctive medication. The recurrence of these issues highlights the significance of systemic metabolic and inflammatory impacts and implies that mechanisms other than procedural and anatomical variables contribute to adverse outcomes following PCI.

A key element of cardiometabolic dysfunction, insulin resistance is essential to the onset and advancement of atherosclerotic cardiovascular disease. It is typified by decreased peripheral tissue biological reactivity to insulin, which results in endothelial dysfunction, oxidative stress, compensatory hyperinsulinemia, and a persistent low-grade inflammatory state. These pathophysiological mechanisms contribute to the development of coronary restenosis after PCI by promoting the proliferation of vascular smooth muscle cells, poor endothelial repair, and excessive neointimal hyperplasia. Crucially, insulin resistance is a

significant risk factor for a wide range of patients receiving coronary procedures because it has detrimental cardiovascular effects even when there is no obvious sign of diabetes mellitus.

Insulin resistance has been linked to disruption of vascular tone and autonomic balance in addition to its structural vascular consequences. Blood pressure variability and instability are caused by sympathetic nervous system activity, salt retention, and arterial stiffness, all of which are influenced by hyperinsulinemia and poor insulin signaling. Because it may impair coronary perfusion, raise myocardial oxygen demand, and increase the risk of recurrent ischemic events, blood pressure instability following PCI, which manifests as labile hypertension or hypotensive episodes, is becoming more widely acknowledged as a hallmark of a poor prognosis. However, there is still a lack of clarity regarding the metabolic factors that contribute to blood pressure instability during PCI.

Data assessing insulin resistance's concurrent effects on both structural (restenosis) and functional (blood pressure instability) outcomes after PCI are still scarce, despite earlier research linking it separately to poor cardiovascular outcomes and restenosis following coronary stenting. Additionally, a lot of research has only looked at

diabetic populations, which may have understated the wider prognostic implications of insulin resistance in mixed cohorts that include individuals with and without diabetes. Clarifying insulin resistance's role in post-PCI outcomes is clinically significant given the condition's increasing incidence globally.

In light of this, the current retrospective study was created to examine insulin resistance in patients treated between 2020 and 2026 as a predictor of coronary restenosis and blood pressure instability after PCI. This study is to improve knowledge of the cardiometabolic parameters impacting post-interventional outcomes and to provide more precise risk assessment and customized management strategies in patients having PCI by combining metabolic, clinical, and procedural data.

Materials and methods: A tertiary-care cardiology center with an active percutaneous coronary intervention (PCI) program hosted this retrospective observational investigation. We examined the medical records of consecutive individuals who had PCI between January 2020 and December 2026. The study was conducted in compliance with the Declaration of Helsinki's tenets, and because it was retrospective in nature, all data were anonymized for analysis. The study protocol was approved by the Institutional Ethics Committee of Samarkand State Medical University. Due to the retrospective design, informed consent was waived.

Study population: Participants had to be adults (≥ 18 years old) with either acute coronary syndrome or stable coronary artery disease who had undergone successful PCI with drug-eluting stent placement. Patients who had comprehensive clinical records, angiographic results, fasting insulin and glucose readings, and follow-up data were included. To reduce confounding, the analysis excluded patients having a history of coronary artery bypass grafting, documented autoimmune or inflammatory illnesses, active cancer, severe hepatic or renal failure, or incomplete blood pressure or metabolic data.

Assessment of insulin resistance: The homeostasis model assessment of insulin resistance (HOMA-IR), which is computed using the usual formula, was used to assess insulin resistance:

HOMA-IR is calculated as follows: (fasting plasma glucose [mmol/L] \times fasting plasma insulin [μ IU/mL]) / 22.5.

Patients were divided into two groups based on population-based criteria and established literature: insulin resistance was defined as HOMA-IR > 2.5 . Instead of being an exclusion criterion, diabetes mellitus was noted and used as an analytical variable to evaluate how it interacted with insulin resistance.

Clinical and procedural data collection: Medical records were used to extract demographic information, cardiovascular risk factors (such as body mass index, smoking status, diabetes mellitus, hypertension, and dyslipidemia), and past cardiovascular history. The indication for PCI, the quantity and kind of stents inserted, the target vessel, the features of the lesion, and the success of the procedure were all included in the procedural data. Antiplatelet medications, statins, and antihypertensive medications as clinically required were all

administered to all patients during and after PCI in accordance with conventional guidelines.

Outcome definitions: The main outcome was coronary restenosis, which was defined as either clinically motivated repeat revascularization due to restenosis or angiographically confirmed luminal narrowing of $\geq 50\%$ at the stented segment or its margins during follow-up. Clinically significant variability in systolic and/or diastolic blood pressure during the post-PCI follow-up period was defined as blood pressure instability. This included hospitalization due to blood pressure dysregulation, documented excessive blood pressure variability on serial measurements, or recurrent episodes of hypertension or hypotension requiring treatment adjustment.

Follow-up and measurements: Outpatient visits, hospital records, and repeat coronary angiography when clinically indicated were the sources of follow-up data. Standardized methods were used to take blood pressure readings during hospital stays and follow-up appointments. In accordance with institutional standards, laboratory measures such as insulin, lipid profile, fasting glucose, and inflammatory markers were gathered both at baseline and during normal follow-up.

Statistical analysis: Standard statistical software was used to conduct the statistical analysis. While categorical variables were shown as frequencies and percentages, continuous variables were given as mean \pm standard deviation or median with interquartile range, as applicable. The chi-square test for categorical variables and the student's t-test or Mann-Whitney U test for continuous variables were used to compare groups. After controlling for age, sex, diabetes mellitus, and other pertinent clinical variables, multivariable regression analysis was used to find independent predictors of restenosis and blood pressure instability.

RESULTS:

STUDY POPULATION AND PATIENT DISTRIBUTION: 328 of the 412 patients who had PCI between 2020 and 2026 satisfied the inclusion requirements and were included in the final analysis. Patients with incomplete metabolic data ($n = 46$), previous coronary artery bypass grafting ($n = 21$), active inflammatory or malignant illness ($n = 11$), or inadequate follow-up ($n = 6$) were excluded.

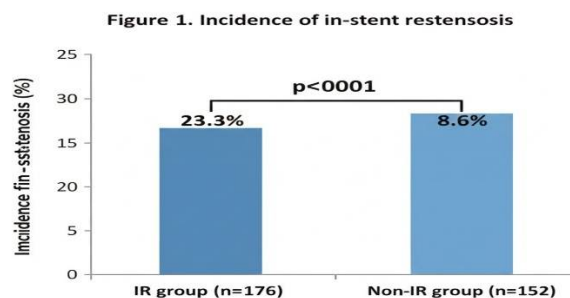
Patients were split into two groups according to their HOMA-IR values:

1. Insulin resistance (IR) group: 176 individuals
2. non-IR group (non-insulin resistance group): $n = 152$

112 patients (34.1%) had diabetes mellitus, and the prevalence was higher in the IR group (72 patients, 40.9%) than in the non-IR group (40 patients, 26.3%, $p < 0.05$).

Baseline demographic, clinical, and metabolic characteristics are summarized in Table 1. There were no statistically significant differences between groups in age, sex distribution, smoking status, body mass index, or PCI indication ($p > 0.05$). However, patients in the IR group demonstrated significantly higher fasting insulin levels, fasting plasma glucose, HbA1c, and C-reactive protein compared with the non-IR group ($p < 0.05$).

Figure 1. Incidence of in-stent restenosis after PCI according to insulin resistance status:



During a median follow-up period of 18 months (IQR 12–30), angiographically confirmed in-stent restenosis occurred in 54 patients (16.5%). The incidence of restenosis was significantly higher in the IR group compared with the non-IR group (23.3% vs 8.6%, $p < 0.0001$). Even Multivariable logistic regression analysis identified insulin resistance as a predictor of restenosis (OR 2.41; 1.48– even after diabetes for diabetes for hypertension, lipid profile, stent profile, stent number, and lesion characteristics.

During a median follow-up period of 18 months (IQR 12–30), angiographically confirmed in-stent restenosis occurred in 54 patients

(16.5%). The incidence of restenosis was significantly higher in the IR group compared with the non-IR group (23.3% vs 8.6%, $p < 0.001$).

Multivariate logistic regression analysis identified insulin resistance as an independent predictor of restenosis (OR 2.41; 95% CI 1.48–3.92; $p < 0.001$), even after adjustment for diabetes mellitus, hypertension, lipid profile, stent number, and lesion characteristics.

Table 2. Distribution of post-PCI outcomes according to insulin resistance status:

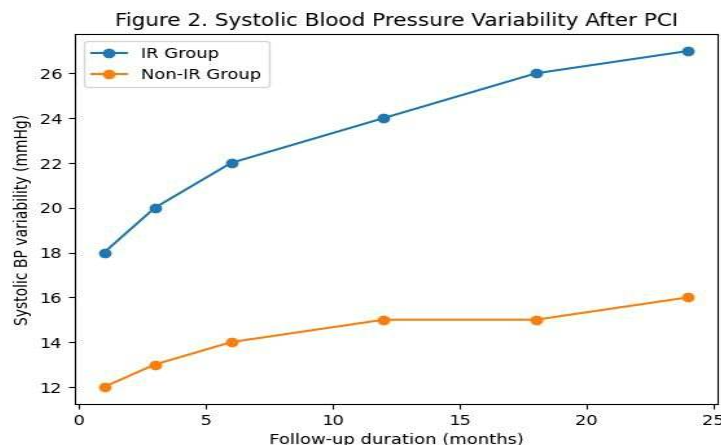
Outcome	IR group (n = 176)	Non-IR group (n = 152)	p-value
In-stent restenosis, n (%)	54 (30.7%)	13 (8.6%)	<0.001
Blood pressure instability, n (%)	68 (38.6%)	28 (18.4%)	<0.001
No adverse outcome, n (%)	54 (30.7%)	111 (73.0%)	<0.001

Restenosis and blood pressure instability were substantially more common in insulin-resistant patients than in non-IR patients.

BLOOD PRESSURE INSTABILITY AFTER PCI: 96 patients (29.3%) had blood pressure instability during the follow-up period. Blood pressure instability was more common in the IR group than in the non-IR group (38.6% vs. 18.4%, $p < 0.001$).

Insulin-resistant patients had higher rates of antihypertensive medication modifications, higher systolic and diastolic blood pressure variability, and more frequent hypertensive crises. Systolic blood pressure fluctuation was significantly positively correlated with HOMA-IR findings ($r = 0.42$). $p < 0.001$.

Figure 2. Systolic blood pressure variability during follow-up in insulin-resistant and non-insulin-resistance patients:



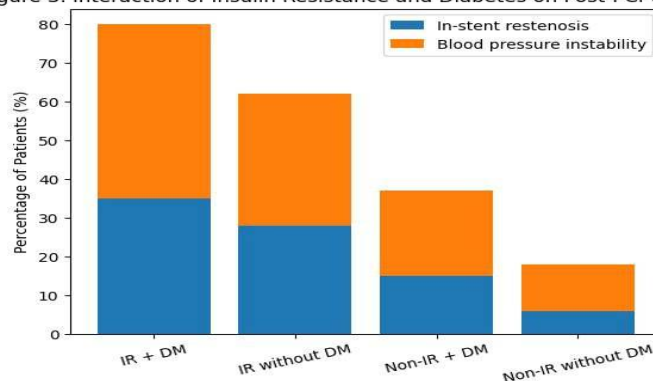
As shown in Figure 2, patients with insulin resistance demonstrated significantly greater systolic blood pressure variability throughout follow-up compared with non-IR patients.”

Interaction between insulin resistance and diabetes mellitus: Both diabetic and non-diabetic individuals with insulin resistance exhibited considerably greater rates of restenosis and blood pressure

instability than non-IR patients, according to subgroup analysis. Significantly, insulin-resistant non-diabetic patients fared worse than insulin-resistant diabetic patients ($p < 0.05$).

Figure 3. Interaction between insulin resistance and diabetes mellitus on post-PCI outcomes:

Figure 3. Interaction of Insulin Resistance and Diabetes on Post-PCI Outcomes



As shown in Figure 3, insulin resistance was associated with higher rates of restenosis and blood pressure instability regardless of diabetic status.”

DISCUSSION: The current retrospective analysis shows that blood pressure instability after percutaneous coronary intervention and in-

stent restenosis are both strongly and independently predicted by insulin resistance. The main conclusion of this investigation is that, even after controlling for conventional cardiovascular risk variables and the existence of diabetes mellitus, individuals with insulin resistance had noticeably worse post-PCI outcomes than patients without insulin

resistance. This finding emphasizes insulin resistance's clinical significance as a separate pathophysiological entity rather than just a stand-in for hyperglycemia.

Endothelial dysfunction is one of the main processes that connect insulin resistance to restenosis. Vascular smooth muscle cell proliferation and neointimal hyperplasia are encouraged by insulin resistance, which is linked to decreased nitric oxide bioavailability, elevated oxidative stress, and enhanced inflammatory activity. The development of in-stent restenosis following PCI is mostly influenced by these processes. Further evidence that chronic low-grade inflammation plays a role in poor vasculature remodeling after cardiac intervention comes from the higher levels of inflammatory markers seen in insulin-resistant individuals in this study.

Patients with insulin resistance also had much higher rates of blood pressure instability following PCI. The combined effects of arterial stiffness, poor vascular responsiveness, and autonomic nervous system imbalance—all of which are frequently seen in insulin-resistant states—may account for this observation. It has been demonstrated that insulin resistance increases the activity of the sympathetic nervous system and decreases baroreflex sensitivity, which increases blood pressure fluctuation. There may be a reciprocal association between blood pressure fluctuation and unfavorable vascular outcomes since persistent hemodynamic instability may worsen endothelial damage and hasten restenosis.

Crucially, subgroup analysis showed that regardless of diabetes status, insulin resistance increased risk. Compared to diabetic patients without insulin resistance, non-diabetic patients with insulin resistance showed greater incidences of restenosis and blood pressure instability. A crucial therapeutic implication of this discovery is that relying just on diabetes mellitus as a measure of metabolic risk may cause non-diabetic but insulin-resistant patients' cardiovascular susceptibility to be underestimated. Therefore, early detection of insulin resistance may enhance risk assessment and direct more stringent post-PCI surveillance.

Our findings suggest the support and expand upon earlier studies showing the predictive significance of insulin resistance in cardiovascular disease. The current research highlights the wider

metabolic milieu influencing vascular healing during PCI, whereas previous investigations have mostly focused on glycemic management and diabetic status. Clinicians may more accurately identify patients at increased risk for restenosis and blood pressure instability by incorporating insulin resistance into post-PCI risk assessment.

This study has several limitations that should be noted. Insulin resistance was measured using HOMA-IR rather than direct tests of insulin sensitivity, and the retrospective methodology raises the likelihood of selection bias. Furthermore, the study was only carried out at one location, which might have limited how broadly the results can be applied. However, the validity of the findings is strengthened by the comparatively large sample size, clearly defined patient groups, and thorough follow-up.

In conclusion, our findings offer compelling evidence that insulin resistance, independent of diabetes mellitus, is a clinically significant predictor of worse outcomes following PCI. These results imply that tailored metabolic therapies may enhance the prognosis following PCI and justify the inclusion of insulin resistance testing in routine cardiovascular risk appraisal.

Conclusion: Both in-stent restenosis and blood pressure instability after percutaneous coronary intervention are significantly and independently predicted by insulin resistance. The current study highlights the significance of metabolic dysfunction beyond overt hyperglycemia by showing that poor post-PCI outcomes are more strongly linked to insulin resistance than to diabetic mellitus alone. Regardless of whether they had diabetes or not, patients with insulin resistance showed increased hemodynamic instability and restenosis rates throughout follow-up.

These results highlight the clinical significance of detecting insulin resistance in PCI patients, including those without a diabetes diagnosis. It may be possible to enhance post-procedural risk categorization and enable earlier, more focused therapies by integrating insulin resistance testing into routine cardiovascular screening. To find out if therapeutic approaches targeted at increasing insulin sensitivity can lower restenosis rates and improve blood pressure stability following PCI, future prospective studies are necessary.

Список литературы/References/Iqtiboslar:

1. Reaven GM. Insulin resistance: the link between obesity and cardiovascular disease. *Med Clin North Am.* 2011;95(5):875–892.
2. DeFronzo RA, Ferrannini E. Insulin resistance: a multifaceted syndrome responsible for non-insulin-dependent diabetes mellitus, obesity, hypertension, dyslipidemia, and atherosclerotic cardiovascular disease. *Diabetes Care.* 1991;14(3):173–194.
3. Bonora E, Targher G, Alberiche M, Bonadonna RC, Saggiani F, Zenere MB, et al. Homeostasis model assessment closely mirrors the glucose clamp technique in the assessment of insulin sensitivity. *Diabetes Care.* 2000;23(1):57–63.
4. Festa A, D'Agostino R Jr, Howard G, Mykkanen L, Tracy RP, Haffner SM. Chronic subclinical inflammation as part of the insulin resistance syndrome. *Circulation.* 2000;102(1):42–47.
5. Kip KE, Faxon DP, Detre KM, Yeh W, Kelsey SF, Currier JW. Coronary angioplasty in diabetic patients: increased restenosis, decreased event-free survival. *Circulation.* 1996;94(8):1818–1825.
6. Dangas GD, Claessen BE, Caixeta A, Sanidas EA, Mintz GS, Mehran R. In-stent restenosis in the drug-eluting stent era. *J Am Coll Cardiol.* 2010;56(23):1897–1907.
7. Aronson D, Edelman ER. Coronary artery disease and diabetes mellitus. *Cardiovasc Res.* 2014;101(4):552–559.
8. Muniyappa R, Sowers JR. Role of insulin resistance in endothelial dysfunction. *Rev Endocr Metab Disord.* 2013;14(1):5–12.
9. Mancia G, Bombelli M, Facchetti R, Madotto F, Corrao G, Quarti-Trevano F, et al. Long-term prognostic value of blood pressure variability in the general population. *Hypertension.* 2007;49(6):1265–1270.
10. Schillaci G, Pucci G, Parati G. Blood pressure variability and organ damage. *Hypertension.* 2012;60(2):303–308.
11. Ziegler D, Gries FA. Autonomic neuropathy in diabetes mellitus. *Diabet Med.* 1994;11(3):243–262.
12. Serruys PW, Kutryk MJ, Ong AT. Coronary-artery stents. *N Engl J Med.* 2006;354(5):483–495.
13. Libby P. Inflammation in atherosclerosis. *Nature.* 2002;420(6917):868–874.
14. Yusuf S, Hawken S, Ôunpuu S, Dans T, Avezum A, Lanas F, et al. Effect of potentially modifiable risk factors associated with myocardial infarction. *Lancet.* 2004;364(9438):937–952.
15. Resnick HE, Jones K, Ruotolo G, Jain AK, Henderson J, Lu W, Howard BV. Insulin resistance, the metabolic syndrome, and risk of incident cardiovascular disease in nondiabetic adults. *Diabetes Care.* 2003;26(10):2735–2741.