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БИОМЕДИЦИНА ВА АМАЛИЁТ ЖУРНАЛИ

ЖУРНАЛ БИОМЕДИЦИНЫ И ПРАКТИКИ

JOURNAL OF BIOMEDICINE AND PRACTICE



ДАВРИЙЛИГИ: 2016-2026

ЖИЛД 11
СОН 4
2026

ЧОП ЭТИЛГАН САНА: 09.09.2026

Тадқиқот ва ишланмалар орқали бутун дунё бўйлаб илмий амалиётларни хабардор қилиш

ISSN 2181-9300

DOI Journal 10.26739/2181-9300

БИОМЕДИЦИНА ВА АМАЛИЁТ ЖУРНАЛИ

11 ЖИЛД, 4 СОН

ЖУРНАЛ БИОМЕДИЦИНЫ И ПРАКТИКИ

ТОМ 11, НОМЕР 4

JOURNAL OF BIOMEDICINE AND PRACTICE

VOLUME 11, ISSUE 4

ТОШКЕНТ-2026

БИОМЕДИЦИНА ВА АМАЛИЁТ ЖУРНАЛИ

№4 (2026) DOI http://dx.doi.org/10.26739/2181-9300-2026-4

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Саидов Саидамир Аброрович
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ORCID ID: *0000-0002-6616-5428*

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доктор медицинских наук, профессор, Ректор Самаркандского государственного медицинского университета, **ORCID ID:** 0000-0001-5468-9403

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ORCID ID:0000-0003-0888-9150

Ответственный за публикацию:
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***ORCID ID**: 0000-0002-0615-0144*

Мавлянов Фарход Шавкатович
*доктор медицинских наук, доцент кафедры Детской хирургии Самаркандского государственного медицинского университета, **ORCID ID:** 0000-0003-2650-4445*

Магзумова Наргиза Махкамовна
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***ORCID ID**: 0000-0002-9313-4918*

Очилов Улугбек Усманович
DSc, доцент, заведующий курсом психиатрии факультета постдипломного образования СамГМУ. Секретарь Ученого совета СамГМУ.
https://orcid.org/0000-0003-3553-8727

Шавази Наргиз Нуралиевна
DSc. доцент, заведующая кафедрой акушерства и гинекологии N 3 СамГМУ.
https://orcid.org/0000-0001-7859-9955

Юлдашев Равшан Захидович
Заведующий кафедрой Онкологии и лучевой диагностики Таджикского медицинского университета, д.м.н., профессор.Душанбе, Таджикистан
https://orcid.org/0009-0002-7165-5373

Самиева Гульноза Уткуровна
доктор медицинских наук, профессор Самаркандского государственного медицинского университета.
***ORCID ID:** 0000-0002-6142-7054*

Саидов Саидамир Аброрович
доктор медицинских наук, Ташкентский фармацевтический институт
***ORCID ID:** 0000-0002-6616-5428*

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доктор медицинских наук, Ташкентский государственный медицинский университет, доцент кафедры Дерматовенерология, детская дерматовенерология и СПИД,
***ORCID ID**: 0000-0002-3022-916X*

Теребаев Билим Алдамуратович
доктор медицинских наук, доцент кафедры Факультетской детской хирургии Ташкентского педиатрического медицинского института.
ORCID ID: 0000-0002-5409-4327

Юлдашев Ботир Ахматович
доктор медицинских наук, доцент кафедры Педиатрии, неонаталогии и пропедевтики детских болезней №2 Самаркандского государственного медицинского университета
***ORCID ID:** 0000-0003-2442-1523*

Ибрагимова Малика Худайберганова
доктор медицинских наук, профессор Ташкентский государственный медицинский университет
***ORCID ID:**0000-0002-9235-1742*

Даминов Феруз Асадуллаевич
Декан лечебного факультета №2 Самаркандского государственного медицинского университета, доктор медицинских наук, доцент. Самарканд, Узбекистан.

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ORCID: 0009-0004-7661-9253.

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PHD, Республиканский специализированный научно-практический медицинский центр педиатрии ORCID ID:0009-0007-5270-1297

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Magzumova Nargiza Makhamovna
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Ochilov Ulugbek Usmanovich
DSc, Docent, Head of the Psychiatry Course at the Faculty of Postgraduate Education of SamSMU. Secretary of the Academic Council of SamSMU. https://orcid.org/0000-0003-3553-8727

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doctor of Medical Sciences, Professor, Samarkand State Medical University ***ORCID ID****: 0000-0002-6142-7054*

Saidov Saidamir
Doctor of Medical Sciences, Tashkent Pharmaceutical Institute, ORCID ID: 0000-0002-6616-5428

Babadjanov Oybek Abdujabbarovich
Doctor of sciences in medicine, Tashkent State Medical University, Docent the Department of Dermatovenerology, pediatric dermatovenerology and AIDS, ORCID ID: 0000-0002-3022-916X

Terebaev Bilim Aldamuratovich
Doctor of Medical Sciences, Associate Professor, Tashkent Pediatric Medical Institute, Faculty of Children Department of Surgery. ORCID ID: 0000-0002-5409-4327.

Yuldashev Botir Akhmatovich
Doctor of Medical Sciences, Associate Professor of Pediatrics, Neonatology and Propaedeutics of Pediatrics, Samarkand State Medical University No. 2. ORCID ID: 0000-0003-2442-1523

Ibragimova Malika Xudayberganova
Doctor of Medical Sciences, Professor, Tashkent State Medical University ORCID ID:0000-0002-9235-1742

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Tagaev Sherkabul Baykabulovich
Doctor of Medical Sciences, Associate Professor of Surgery Department, Tashkent State Medical University ORCID: 0009-0004-7661-9253.

Sayfutdinov Zayniddin Asamutdinovich
PHD, Republican Specialized Scientific and Practical Medical Center of Pediatrics ORCID ID:0009-0007-5270-1297

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ISSN: 2181-9904
www.tadqiqot.uz
БИОМЕДИЦИНА ВА АМАЛИЁТ ЖУРНАЛИ
ЖУРНАЛ БИОМЕДИЦИНЫ И ПРАКТИКИ | JOURNAL OF BIOMEDICINE AND PRACTICE

UDK 618.177-089.888.11:618.11-008.64

SHOPULOTOVA Zarina Abdumuminovna
PhD student
Samarkand State Medical University

INDIVIDUALIZATION OF ART PROTOCOLS IN PATIENTS WITH DIFFERENT OVARIAN RESERVE

For citation: Shopulotova Zarina Abdumuminovna. Individualization of ART protocols in patients with different ovarian reserve.

http://dx.doi.org/10.5281/zenodo.22692332

ABSTRACT

Infertility remains one of the most important challenges in modern reproductive medicine and requires an individualized approach to improve the effectiveness of assisted reproductive technologies (ART). The aim of this study was to evaluate ART outcomes in patients with different ovarian reserve levels and to determine the role of personalized treatment protocols. This prospective study included 60 infertile women treated at the “Beshik” Reproductive Medicine Clinic (Samarkand, Uzbekistan) during 2025–2026. The participants were divided into two groups according to ovarian reserve: normal ovarian reserve (n=30) and diminished ovarian reserve (n=30). Ovarian reserve was assessed using anti-Müllerian hormone levels and antral follicle count, and all patients were additionally stratified according to the POSEIDON concept. Although patients with diminished ovarian reserve demonstrated lower numbers of retrieved oocytes and less favorable embryological outcomes, individualized ovarian stimulation protocols allowed satisfactory rates of oocyte maturation, fertilization, and blastocyst formation to be achieved. The findings indicate that personalization of ART protocols based on ovarian reserve assessment and POSEIDON stratification contributes to improved reproductive outcomes.

Keywords: infertility, assisted reproductive technologies, IVF, ICSI, ovarian reserve, AMH, POSEIDON, personalization

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ШОПУЛОТОВА Зарина Абдумуминовна
базовый докторант
Самаркандского государственного медицинского университета

ИНДИВИДУАЛИЗАЦИЯ ПРОТОКОЛОВ ВРТ У ПАЦИЕНТОК С РАЗЛИЧНЫМ ОВАРИАЛЬНЫМ РЕЗЕРВОМ

АННОТАЦИЯ

Бесплодие является одной из наиболее актуальных проблем современной репродуктивной медицины и требует индивидуализированного подхода для повышения эффективности вспомогательных репродуктивных технологий (ВРТ). Целью исследования явилась оценка результатов ВРТ у пациенток с различным овариальным резервом и определение значения

ISSN: 2181-9904
www.tadqiqot.uz
БИОМЕДИЦИНА ВА АМАЛИЁТ ЖУРНАЛИ
ЖУРНАЛ БИОМЕДИЦИНЫ И ПРАКТИКИ | JOURNAL OF BIOMEDICINE AND PRACTICE

ZHABBAROV Ogabek Ozimboy ogli
Candidate of Medical Sciences
MULLABAEVA Guzal Uchqunovna
Doctor of Medical Sciences
SHARIPOV Islom Mamatkhanovich
Doctor of Medical Sciences
Republican Specialized Scientific and Practical Medical Center of Cardiology

METHODS FOR THE PREVENTION OF POSTOPERATIVE ATRIAL FIBRILLATION IN PATIENTS UNDERGOING CARDIAC SURGERY

For citation: Zhabbarov Ogabek Ozimboy ogli, Mullabaeva Guzal Uchqunovna, Sharipov Islom Mamatkhanovich. Methods for the prevention of postoperative atrial fibrillation in patients undergoing cardiac surgery.

http://dx.doi.org/10.5281/zenodo.22703341

SUMMARY

This article is devoted to a review of meta-analyses and randomized clinical trials investigating the prevention of postoperative atrial fibrillation (POAF). Information is presented on the incidence, pathophysiology, prevention, and treatment strategies of POAF. The paper summarizes current evidence regarding pharmacological and non-pharmacological approaches aimed at reducing the occurrence of POAF and improving postoperative outcomes in patients undergoing cardiac surgery.

Keywords: postoperative atrial fibrillation, coronary artery bypass grafting, pathophysiology, prevention.

JABBAROV Og‘abek O‘zimboy o‘g‘li
Tibbiyot fanlari bo‘yicha falsafa doktori (PhD)
MULLABAYEVA Guzal Uchqunovna
Tibbiyot fanlari doktori (DSc)
SHARIPOV Islom Mamatxanovich
Tibbiyot fanlari doktori (DSc)
Respublika ixtisoslashtirilgan kardiologiya ilmiy-amaliy tibbiyot markazi

KARDIOJARROHLIK AMALIYOTINI O`TKAZGAN BEMORLARDA POSTOPERATSION BO‘LMACHALAR FIBRILLYATSIYASINING PROFILAKTIKASIDA QO`LLANALADIGAN USULLAR

ANNOTATSIYA

Ushbu maqola postoperatsion bo`lmachalar fibrillyatsiyasining profilaktikasi bo‘yicha o`tkazilgan meta-tahlillar va randomizatsiyalangan klinik sinovlarni ko‘rib chiqishga bag‘ishlangan.

Postoperatsion bo`lmachalar fibrillyatsiyasining tarqalishi, patofiziologiyasi va oldini olish hamda davolash usullari haqida ma’lumotlar keltirilgan.
Kalit so‘zlar: Postoperatsion bo`lmachalar fibrillyatsiyasi, aorta-koronar shuntlash, patofiziologiya, profilaktika.

ЖАББАРОВ Огабек Озимбой угли
Кандидат медицинских наук
МУЛЛАБАЕВА Гузал Учкуновна
Доктор медицинских наук
ШАРИПОВ Ислам Маматханович
Доктор медицинских наук
Республиканский специализированный научно-практический медицинский центр кардиологии

МЕТОДЫ ПРОФИЛАКТИКИ ПОСЛЕОПЕРАЦИОННОЙ ФИБРИЛЛЯЦИИ ПРЕДСЕРДИЙ У ПАЦИЕНТОВ, ПЕРЕНЕСШИХ КАРДИОХИРУРГИЧЕСКИЕ ВМЕШАТЕЛЬСТВА

РЕЗЮМЕ

Данная статья посвящена обзору метаанализов и рандомизированных клинических исследований, посвящённых профилактике послеоперационной фибрилляции предсердий (ПОФП). Представлены сведения о распространённости, патофизиологических механизмах развития, а также современных методах профилактики и лечения ПОФП. Обобщены результаты исследований, посвящённых медикаментозным и немедикаментозным подходам к снижению частоты возникновения ПОФП и улучшению послеоперационных исходов у пациентов, перенесших кардиохирургические вмешательства.
Ключевые слова: послеоперационная фибрилляция предсердий, аортокоронарное шунтирование, патофизиология, профилактика.

Kirish

Yurakning ishemik kasalligi dunyo bo‘yicha o‘lim va nogironlikning asosiy sabablaridan biri hisoblanadi. Koronar arteriyalarni shuntlash (AKSH) operatsiyasi miokard revaskulyarizatsiyasining eng samarali usullaridan biri bo‘lib, bemorlarning uzoq muddatli prognozini yaxshilaydi [1]. Biroq operatsiyadan keyingi davrda turli asoratlar rivojlanishi mumkin bo‘lib, ulardan eng ko‘p uchraydigani postoperatsion bo‘lmachalar fibrillyatsiyasidir (POBF) [2].

Turli mualliflarning ma’lumotlariga ko‘ra, POBF AKSH amaliyotidan keyin 20–40% hollarda kuzatiladi, odatda jarrohlik amaliyotidan keyingi 1-5 kunlarda va uchrashning pik davri jarrohlikning 2-3 kuniga to`gri keladi. Odatda POBF oson yechim topiladigan muommodak ko`rinadi ammo ba`zida esa kasallanishn va o`limni ortishiga sabab bo`lishi mumkun. POBFni rivojlanishi q`shimcha dori vositalarini qo`llanishiga, dori vositalari yordam bermaganda elektro kardioverisya qo`llanilishiga olib keladi, bu esa o`z navbatida kasalxonada davolanish muddatining uzayishi, insult xavfining ortishi hamda davolash xarajatlarining ko‘payishiga olib keladi [2, 3]. Shu sababli POBF profilaktikasi zamonaviy kardiojarrohlikning dolzarb muammolaridan biri bo‘lib qolmoqda.

Postoperatsion bo‘lmachalar fibrillyatsiyasining patogenezi

Yalig`lanish jarayoni.

POBF rivojlanishi murakkab va ko‘p omilli jarayon hisoblanadi. Uning asosiy mexanizmlaridan biri yallig‘lanish reaksiyasi bo`ib, yallig‘lanishga qarshi preparatlarni qo‘llash natijasida bo‘lmachalar fibrillyatsiyasi (BF) rivojlanish chastotasi kamaygan. Bu esa operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi (POBF) rivojlanishining asosiy etiologik omillaridan biri yallig‘lanish jarayoni ekanligini tasdiqlaydi [4]. Shuningdek, olimlarning ta’kidlashicha, operatsiyadan oldingi davrda C-reaktiv oqsil darajasining yuqori bo‘lishi POBF rivojlanishining asosiy sabablaridan biridir. Bundan tashqari, operatsiyadan keyingi davrda POBF rivojlangan va rivojlanmagan bemorlar guruhlari taqqoslanganda, POBF kuzatilgan bemorlarda CRO darajasi

sezilarli darajada yuqori ekanligi aniqlangan. Demak, yallig‘lanish biomarkerlari yurakning elektr faolligini kuchaytirish orqali turli yurak aritmiyalarining rivojlanishiga hissa qo‘shishi mumkin[5].

Perikardda suyuqlik yig`ilishi

So‘nggi yillarda POBF rivojlanishini asosiy farazlaridan biri bu perikardda yi`gilgan suyuqlik chap bo`lmachaning orqa devorini qitiqlashi va unga fizik va komyoviy ta`siri natijasida turli yurak ritmining buzilishlariga sabab deb qaralmoqda, va POBF rivojlanishini kamaytirish maqsadida orqa perikardiotomiya usuliga qiziqish ortmoqda. Ushbu usul perikard bo‘shlig‘idagi suyuqlikning chap plevra bo‘shlig‘iga erkin chiqib ketishini ta’minlaydi va operatsiyadan keyingi perikardial eksudat hamda mahalliy yallig‘lanish reaksiyasini kamaytirish orqali aritmiya xavfini pasaytirishi mumkin[6].

Oksidlovchi stress

Gipotezalardan biriga ko‘ra, ochiq yurak operatsiyalari vaqtida ishemiya yoki reperfuziya fonida oksidlovchi stressning kuchayishi kuzatilishi mumkin. Bu holat reaktiv kislorod shakllari (RKS)ning ortiqcha hosil bo‘lishiga olib keladi, natijada organizmning antioksidant himoya imkoniyatlari yetarli bo‘lmay qoladi va to‘qimalar shikastlanadi [7]. Sun’iy qon aylanish apparati (SQA) qo‘llanilganda ham ushbu jarayon mitoxondriyalarda energiya ishlab chiqarilishini kamaytirib, mitoxondrial adenozintrifosfatga (ATF) bog‘liq K^+ kanallariga ta’sir ko‘rsatadi [8]. Mazkur mexanizm yurak miokardida neytrofillarning faollashuviga sabab bo‘lib, reaktiv kislorod shakllari hamda litik fermentlar miqdorining oshishiga olib keladi [9. Suleiman MS, Zacharowski K, Angelini GD. Inflammatory response and cardioprotection during open-heart surgery: the importance of anaesthetics. Br J Pharmacol. 2008;153:21–33.]. Shuningdek, yurak hujayralarida reaktiv kislorod shakllari konsentratsiyasining ortishi yurak ritmi buzilishlarini quyidagi yo‘llar orqali yuzaga keltirishi mumkin:

Yurakning potensialga bog‘liq Na^+ kanali faoliyatining o‘zgarishi;

Ca^{2+} almashinuvining buzilishi;

Miotsitlarda mitoxondriya funksiyasining buzilishi;

Hujayralararo birikmalar disfunksiyasi [9].

Oksidlovchi stressning rolini baholash maqsadida operatsiyadan oldingi davrda askorbin kislotasi va N-atsetilsistein kabi antioksidant preparatlar qo‘llanilgan. Natijada aortokoronar shuntlash (AKSh) operatsiyasini boshdan kechirgan bemorlarda POBF rivojlanish chastotasi sezilarli darajada kamaygan [10].

Operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasining xavf omillari

Operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi (POBF) yurak operatsiyalaridan so‘ng rivojlanadigan ko‘p omilli asorat bo‘lib, uning rivojlanishiga ta’sir etuvchi ko‘plab predispozitsiya qiluvchi omillar mavjud. Ularni shartli ravishda quyidagi guruhlarga ajratish mumkin:

- operatsiyagacha bo‘lgan omillar;
- operatsiya davridagi omillar;
- operatsiyadan keyingi omillar.

Mazkur omillarning barchasi bo‘lmachalar fibrillyatsiyasi uchun mavjud substratlarning shakllanishi, bo‘lmachalar remodellanishi natijasida o‘tkazuvchanlik buzilishlarining saqlanib qolishi hamda yallig‘lanish yo‘llari, oksidlovchi stress va vegetativ disfunksiya orqali fibrillyatsiyaning induksiyalanishi natijasida POBF rivojlanishiga olib keladi.

Operatsiyagacha bo‘lgan omillar

Operatsiyadan oldingi omillar ichida eng muhimlaridan biri bemorning yoshi hisoblanadi. Tadqiqotlar natijalariga ko‘ra, 72 yoshdan katta bemorlarda POBF rivojlanish chastotasi 55 yoshgacha bo‘lgan bemorlarga nisbatan qariyb 5 baravar yuqori bo‘lgan [11]. Qarish jarayoni ishemiya va reperfuziya shikastlanishlariga sezuvchanlikning ortishi, bo‘lmachalar fibrozi, o‘tkazuvchanlik buzilishlari hamda chap qorincha chiqarish fraksiyasining pasayishi orqali POBF rivojlanishiga salbiy ta’sir ko‘rsatadi [12]. 6475 nafar bemor ishtirok etgan yirik tadqiqotda 65

yoshdan katta bemorlar POBF rivojlanishi bo‘yicha yuqori xavf guruhiga kirishi aniqlangan (OR=2,4; 95% CI 2,06–2,74; p<0,0001) [11].

Etnik mansublik ham muhim omil hisoblanadi. Prospektiv tadqiqotlarda POBFning eng past uchrash darajasi Yaqin Sharq va Osiyo aholisi orasida kuzatilgan. AQShda o‘tkazilgan tadqiqotlarda esa yevropoid irq vakillarida afroamerikaliklarga nisbatan POBF ko‘proq uchragan [13].

Shuningdek, quyidagi hamroh kasalliklar POBF rivojlanishining mustaqil prediktorlari sifatida qayd etilgan:

- surunkali obstruktiv o‘pka kasalligi;
- qandli diabet;
- revmatik yurak kasalligi;
- arterial gipertenziya;
- surunkali buyrak yetishmovchiligi;
- surunkali yurak yetishmovchiligi;
- miokard infarkti [14].

Operatsiyadan oldingi EKG o‘zgarishlari, jumladan P tishchasi davomiyligi va morfologiyasi, P dispersiyasi, PR hamda QRS intervallaridagi o‘zgarishlar ham POBF rivojlanishi bilan bog‘liq [15].

Laborator ko‘rsatkichlardan:

- miya natriyuretik peptidining yuqori darajasi;
- elektrolitlar muvozanatining buzilishi;
- semizlik;
- metabolik sindrom

POBF rivojlanishi xavfini oshiradi [16].

Operatsiya davridagi omillar

POBF rivojlanish chastotasi bajarilgan kardiojarrohlik amaliyoti turiga bog‘liq [87]. O`tkazilgan tadqiqotlar natijalariga ko‘ra: izolyatsiyalangan AKSh operatsiyasidan keyin – taxminan 30%; klapan operatsiyalaridan keyin – 40%; kombinatsiyalangan operatsiyalardan keyin – 60% holatlarda POBF kuzatilshi aniqlangan [17].

Klapan patologiyalarida bo‘lmachalar dilatatsiyasi POBF rivojlanishining asosiy prediktori hisoblanadi [18].

Operatsiya vaqtida quyidagi omillar ham POBF xavfini oshiradi: aortani qisib turish vaqtining uzayishi; sun’iy qon aylanish apparatidan foydalanish davomiyligi; yuqori o‘pka venasini kanulyatsiya qilish usuli; bikaval venoz kanulyatsiya; suyuqliklar balansining buzilishi [19].

Chap bo‘lmacha quloqchasini tikib yopish ham POBF rivojlanish chastotasini oshirishi mumkin. 86 mingdan ortiq bemorni qamrab olgan tadqiqotlarda operatsiya vaqtida chap bo‘lmacha quloqchasini yopish POBF uchrashini oshirganligi ko‘rsatilgan [20].

Operatsiyadan keyingi omillar

POBF rivojlanishining asosiy operatsiyadan keyingi xavf omillari quyidagilar hisoblanadi: pnevmoniya; sun’iy nafas oldirishning uzoq davom etishi; gemodinamik beqarorlik sababli kardiotonik va vazopressor preparatlar qo‘llanilishi; tashvish va depressiya holatlari [21]. Shuningdek, quyidagi holatlar ham POBFni keltirib chiqarishi mumkin: o‘pka arteriyasi tromboemboliyasi; pnevmotoraks; qon ketishlar; nafas yo‘llari bilan bog‘liq muammolar; miokard ishemiyasi; infeksiya va sepsis. Operatsiyadan keyingi barcha ushbu omillar shifoxonada davolanish muddatining uzayishiga va davolash xarajatlarining oshishiga olib keladi. Shu sababli, samarali profilaktik strategiyalarni qo‘llash POBF rivojlanish chastotasini hamda davolash xarajatlarini sezilarli kamaytirishi mumkin.

Postoperativ bo`lmachalar fibrillyatsiyasi profilaktikasi

Jarrohlik amaliyotidan keyin yuzaga keluvchi bo`lmachalar fibrillyatsiyasni oldini olishda asosan farmakologik va nofarmakologik usullardan foydalaniladi. Formokologik usullarni ichida eng keng tarqalgani va samaradorliligi bo`yicha ajralib turuvchi dori vositalari quyidagilardir:

β-adrenoretseptor antagonistlari (β-blokatorlar) alohida yoki digoksin hamda kalsiy kanallari blokatorlari kabi boshqa antiaritmik preparatlar bilan birgalikda qo‘llanilishi mumkin. Ular odatda operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasining (POBF) oldini olish maqsadida

qo‘llanadi. β-blokatorlar yurak operatsiyalaridan keyin bo‘lmachalar fibrillyatsiyasiga moyillikni oshiruvchi β-adrenergik stimulyatsiya ta’sirini susaytiradi. POBF rivojlanish chastotasini kamaytirishdagi β-blokatorlarning samaradorligi bir qator tadqiqotlarda isbotlangan. Shu sababli, qarshi ko‘rsatmalar mavjud bo‘lmagan bemorlarga aortokoronar shuntlash (AKSh) operatsiyasidan keyin bo‘lmachalar fibrillyatsiyasi rivojlanishining oldini olish maqsadida β-blokatorlarni perioperatsion davrda standart terapiya sifatida buyurish tavsiya etiladi [22]. Olimlar metoprolol, atenolol, sotalol yoki propranolol kabi β-blokatorlarni operatsiyadan oldin qabul qilib, operatsiyadan keyingi davrda ham davolashni davom ettirgan bemorlarda POBF rivojlanish chastotasi ushbu preparatlarni operatsiyadan keyin qabul qilmagan bemorlarga nisbatan sezilarli darajada past bo‘lganligini aniqlaganlar (17,1% ga nisbatan 38,1%; p<0,02) [23]. Shunday qilib, klinik tadqiqotlar β-blokatorlarning operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi rivojlanish chastotasini va o‘lim ko‘rsatkichlarini kamaytirishdagi samaradorligini tasdiqlagan. Olingan natijalarga asoslanib, ochiq yurak operatsiyasi rejalashtirilayotgan bemorlarga qarshi ko‘rsatmalar mavjud bo‘lmagan hollarda β-blokator terapiyasini operatsiyadan oldin boshlash va operatsiyadan keyin ham davom ettirish tavsiya etiladi.

Kalsiy kanallari blokatorlari: digidropiridin guruhiga mansub kalsiy kanallari blokatorlari (KKB) ACC/AHA tavsiyalarida I sinf tavsiyasiga ega bo‘lsa , Amerika ko‘krak qafasi jarrohlari assotsiatsiyasi (AATS) tavsiyalarida II sinf tavsiyasiga kiritilgan. O‘tkazilgan metatahlil natijalari shuni ko‘rsatdiki, KKBlarning aksariyati yurak operatsiyalaridan keyingi bo‘lmachalar fibrillyatsiyasi (POBF) rivojlanish chastotasini kamaytirishda sezilarli samaradorlik ko‘rsatmagan. Biroq ayrim KKB kichik guruhlari ijobiy natijalarni namoyish etgan. Xususan, digidropiridin hosilalari supraventrikulyar taxikardiya rivojlanish xavfini sezilarli kamaytirgan (OR=0,62; 95% CI 0,41–0,93; p=0,02), shuningdek diltiazem (OR=0,54; 95% CI 0,28–1,04) va verapamil (OR=0,69; 95% CI 0,42–1,15) ham supraventrikulyar taxikardiya uchrash chastotasini pasaytirgan [24]. Mazkur preparatlar xavfsiz va samarali hisoblanadi, biroq bradikardiya yoki sistolik disfunksiya bilan bog‘liq yurak yetishmovchiligi mavjud bemorlarda ularni qo‘llashga qarshi ko‘rsatmalar mavjud. Ayrim tadqiqotlarda verapamilning operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi rivojlanish chastotasiga sezilarli ta’sir ko‘rsatmasligi aniqlangan, randomizatsiyalangan nazoratli tadqiqotlarning metatahlillari ham verapamil AKSh operatsiyasidan keyin supraventrikulyar aritmiyalar rivojlanish xavfini kamaytirmasligini tasdiqlagan (OR=0,91; 95% CI 0,57–1,46). Verapamil singari, diltiazem ham plasebo bilan taqqoslanganda POBF profilaktikasida samarali bo‘lmagan [25]. Shunday qilib, bo‘lmachalar fibrillyatsiyasi vaqtida qorinchalar qisqarishlari chastotasini nazorat qilishda qo‘llaniladigan kalsiy kanallari blokatorlari operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasining profilaktikasida muhim o‘rin egallamaydi [24].

Magniy

Olimlarning fikriga ko‘ra, magniy preparatlarini qo‘llash bo‘lmachalarning refrakter davrini uzaytirishi va antiaritmik ta’sir ko‘rsatishi mumkin. 6037 nafar bemor ishtirok etgan yirik tadqiqotda yurak operatsiyalaridan keyingi bo‘lmachalar fibrillyatsiyasi (POBF) rivojlanishining oldini olishda magniyning samaradorligi o‘rganilgan. Natijalarga ko‘ra, magniy qo‘llanilishi POBF rivojlanish xavfini sezilarli darajada kamaytirgan (OR=0,69; 95% CI 0,56–0,86; p=0,002) [26]. Operatsiyadan keyingi davrda magniy qo‘llanilganda yanada yaqqolroq natijalar kuzatilgan (OR=0,51; 95% CI 0,34–0,77; p=0,003) [139]. Tadqiqotchilar kardioplegik eritma tarkibida magniyni yuqori dozalarda (80 va 100 mg/kg, 60 mg/kg bilan taqqoslaganda) qo‘llash sun’iy qon aylanish apparati (SQA) yordamida operatsiya qilinayotgan bemorlarda POBF rivojlanish chastotasini kamaytirishini aniqlaganlar [27].

Biroq ushbu ma’lumotlar boshqa tadqiqot natijalari bilan mos kelmaydi. 2041 nafar bemor ishtirok etgan retrospektiv tahlilda aortokoronar shuntlash (AKSh) yoki AKSh bilan birgalikda yurak klapanlari operatsiyasini boshdan kechirgan bemorlarda operatsiyadan keyingi davrda yuqori dozadagi magniy qo‘llanilishi operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi rivojlanish xavfini oshirishi mumkinligi aniqlangan [28]. Mazkur qarama-qarshi natijalar magniyni POBF profilaktikasida keng qo‘llash imkoniyatlarini cheklaydi va uni qo‘llashdan oldin qon zardobidagi magniy miqdorini aniqlash zarurligini ta’kidlaydi.

Amiodaron

Amiodaron III sinf antiaritmik preparat bo‘lib, lipofil xususiyatga ega va Na^+ kanallari, Ca^{2+} kanallari hamda β-adrenoretseptorlarni bloklash orqali kompleks ta’sir mexanizmiga ega. Cochrane metatahliliga ko‘ra, amiodaron kardiojarrohlik amaliyotlaridan keyingi bo‘lmachalar fibrillyatsiyasi rivojlanish chastotasini sezilarli kamaytirgan (OR=0,43; 95% CI 0,34–0,54) hamda statsionarda davolanish muddatini o‘rtacha 0,95 kunga qisqartirgan [29]. Shuningdek, amiodaron paroksizmal bo‘lmachalar fibrillyatsiyasini davolashda ham samarali ekanligi qayd etilgan . PAPABEAR tadqiqotida (n=601) amiodaron plasebo bilan taqqoslangan va preparatning 65 yoshdan kichik hamda katta bemorlarda, AKSh yoki kombinatsiyalangan yurak operatsiyalaridan keyin POBF rivojlanish chastotasini sezilarli kamaytirishi aniqlangan. Amiodaronni vena ichiga yoki peroral shaklda, operatsiyadan oldingi va keyingi davrlarda qo‘llash bir xil samaradorlikka ega deb topilgan. Yuqori dozalar (>5000 mg) past dozalarga (<3000 mg) nisbatan biroz samaraliroq bo‘lsa-da, past dozalarda nojo‘ya ta’sirlar kamroq kuzatilgan [30]. Klinik tadqiqotlarga ko‘ra, amiodaron va β-blokatorlarning samaradorligi POBF profilaktikasida deyarli bir xil bo‘lgan (OR=0,77; 95% CI 0,55–1,06) [31]. Ayrim randomizatsiyalangan tadqiqotlarda esa amiodaron va β-blokatorlarni birgalikda qo‘llash faqat metoprolol qo‘llanilishiga nisbatan samaraliroq natijalar bergan [32].

Kortikosteroidlar

Operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi (POBF) rivojlanishining yallig‘lanish bilan bog‘liq patogenezini hisobga olib, uning profilaktikasida kortikosteroidlar ham qo‘llanilgan. Biroq steroid preparatlarining samaradorligi bo‘yicha o‘tkazilgan bir qator tadqiqotlar qarama-qarshi natijalarni ko‘rsatgan [33]. Shu bilan birga, 12 001 nafar bemorni qamrab olgan yirik tadqiqot yurak operatsiyalaridan keyin kortikosteroidlarni qo‘llash POBF rivojlanish chastotasini kamaytirishini tasdiqlamagan, biroq ushbu preparatlar qo‘llanilganda operatsiyadan keyingi giperglikemiya rivojlanishi ham qayd etilgan [34]. Yirik tadqiqotlardan biri 16 013 nafar bemor ma’lumotlarini o‘z ichiga olgan metatahlil natijalariga ko‘ra, kardiojarrohlik amaliyotini boshdan kechirgan bemorlarda steroid preparatlar qo‘llanilganda yurak aritmiyalari asosiy guruhda nazorat guruhiga nisbatan kamroq kuzatilgan (25,7% va 28,3%; OR=0,91; 95% CI 0,86–0,96; p=0,0005) [35]. Shunday qilib, kortikosteroidlar yurak ritmiga ijobiy ta’sir ko‘rsatishi mumkin bo‘lsa-da, ularning nojo‘ya ta’sirlari mavjudligi sababli muntazam ravishda qo‘llash tavsiya etilmaydi. Ushbu preparatlar faqat kutilayotgan foyda mumkin bo‘lgan xavflardan ustun bo‘lgan hollarda kardiojarrohlik amaliyotini boshdan kechirgan bemorlarga buyurilishi maqsadga muvofiqdir.

Nosteroid yallig‘lanishga qarshi preparatlar

Nosteroid yallig‘lanishga qarshi preparatlar (NYaQP) kardiojarrohlik amaliyotidan keyingi bemorlarda hujayralardagi oksidlovchi shikastlanish va tizimli yallig‘lanish jarayonlariga ta’sir ko‘rsatadi. Ozay va hamkorlari tomonidan o‘tkazilgan yirik randomizatsiyalangan tadqiqotda metoprolol va karvedilolni birgalikda qo‘llash supraventrikulyar aritmiyalar profilaktikasida ushbu preparatlarni alohida qo‘llashga nisbatan samaraliroq ekanligi aniqlangan. Supraventrikulyar aritmiyalar uchrash chastotasi kombinatsiyalangan davolash guruhida metoprolol va karvedilol monoterapiyasi bilan taqqoslaganda mos ravishda 8,7% ga nisbatan 35,9% va 8,7% ga nisbatan 24% ni tashkil etgan (har ikkala holatda p<0,05). Bundan tashqari, kombinatsiyalangan davolash statsionarda qolish muddatini ham qisqartirgan (7,6 kun va 9,6 kun; p=0,004) [36]. Kazemi va hamkorlari tomonidan o‘tkazilgan boshqa tadqiqotda NYaQP va plaseboning POBF rivojlanishiga ta’siri baholangan. Tadqiqot natijalariga ko‘ra, POBF rivojlanish chastotasi (11,7% va 15,8%; p=0,34), statsionarda davolanish davomiyligi (7,4±1,3 va 7,2±0,9 kun; p=0,6) hamda operatsiyadan keyingi o‘lim ko‘rsatkichlari (0,83% va 1,66%; p=0,56) bo‘yicha guruhlar o‘rtasida ishonchli farq aniqlanmagan [37]. 1026 nafar bemorni qamrab olgan so‘nggi metatahlil natijalari esa NYaQP operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi rivojlanish chastotasini samarali kamaytirishini ko‘rsatgan (OR=0,55; 95% IS 0,40–0,77; p=0,001) [38]. Biroq turli tadqiqotlarda olingan qarama-qarshi natijalar sababli NYaQPlarni hozircha POBF profilaktikasida standart profilaktik vosita sifatida tavsiya etish mumkin emas.

1.3.11. Kolxitsin

Kolxitsin yallig‘lanishga qarshi va simpatolitik ta’sirga ega preparat sifatida ma’lum. Shu sababli u ACC/AHA tavsiyalarida operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi profilaktikasi uchun IIb sinf tavsiyasiga kiritilgan [39]. Biroq ESC tavsiyalarida kolxitsin POBF rivojlanishini kamaytiruvchi preparatlar qatoriga kiritilmagan [40]. COPPS-2 tadqiqotida yurak operatsiyasini boshdan kechirgan 360 nafar bemor ishtirok etgan. Tadqiqot davomida statsionar davrda va operatsiyadan 3 oy o‘tgach POBF rivojlanishi baholangan. Natijalar kolxitsin va plasebo guruhlari o‘rtasida sezilarli farq yo‘qligini ko‘rsatgan (33,9% va 41,7%; mutlaq farq 7,8%; 95% CI –2,2 dan 17,6 gacha). Biroq kolxitsin postperikardiotomiya sindromi rivojlanish chastotasini sezilarli kamaytirgan [41]. COPPS-1 tadqiqotida esa operatsiyadan keyingi dastlabki 3 kun davomida kolxitsin qabul qilgan bemorlarda kardiojarrohlik amaliyotidan keyingi bir oy ichida POBF rivojlanish chastotasi sezilarli darajada kamaygan. Kolxitsinning POBF rivojlanishiga ta’sirini o‘rgangan boshqa tadqiqotlarda ham preparat plaseboga nisbatan POBF rivojlanish xavfini sezilarli kamaytirganligi aniqlangan (OR=0,69; 95% IS 0,57–0,84; p=0,0002). Bundan tashqari, statsionarda davolanish muddati o‘rtacha 1,2 kunga qisqargan (95% CI –1,89 dan –0,44 gacha; p=0,002) [42]. Shu bilan birga, kolxitsin qabul qilgan bemorlarda oshqozon-ichak tizimi bilan bog‘liq nojo‘ya ta’sirlar soni sezilarli oshgan (OR=2,52; 95% IS 1,62–3,93; p<0,0001) [43]. Preparatning nojo‘ya ta’sirlari mavjud bo‘lishiga qaramay, POBF rivojlanish chastotasining sezilarli kamayishi uning klinik ahamiyatini saqlab qoladi. Shu sababli, kelgusida oshqozon-ichak tizimi bilan bog‘liq nojo‘ya ta’sirlarni kamaytirishga qaratilgan qo‘shimcha tadqiqotlarni o‘tkazish maqsadga muvofiq hisoblanadi.

POBF profilaktikasining nofarmakologik usullari

Bo‘lmachalar elektrokardiostimulyatsiyasi

Bo‘lmachalar refrakterligining dispersiyasi va bo‘lmachalarning muddatidan oldingi qisqarishlari operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi (POBF) rivojlanishiga olib keluvchi muhim omillardan hisoblanadi. Shu sababli tadqiqotchilar ushbu mexanizmlarni bostirish orqali POBF rivojlanish chastotasini kamaytirish maqsadida tezlashtirilgan bo‘lmachalar elektrokardiostimulyatsiyasini qo‘llashni taklif qilganlar. Bir qator tadqiqotlarda bo‘lmachalarni elektrostimulyatsiya qilish protokollari o‘rganilgan. O‘ng bo‘lmachaning alohida stimulyatsiyasi hamda ikki bo‘lmachali (biatrial) stimulyatsiya POBF rivojlanish chastotasini sezilarli kamaytirganligi ko‘rsatilgan [44]. Bidar va hamkorlari tomonidan o‘tkazilgan randomizatsiyalangan tadqiqotda 148 nafar bemor ikki guruhga ajratilgan. Birinchi guruhda operatsiyadan keyingi davrda ortiqcha bo‘lmachalar stimulyatsiyasi sotalol bilan birgalikda qo‘llanilgan bo‘lsa, ikkinchi guruh faqat sotalol qabul qilgan. Tadqiqot natijalariga ko‘ra, aortani qisib turish vaqti 50 daqiqadan ortiq bo‘lgan bemorlarda biatrial elektrokardiostimulyatsiya kech rivojlangan POBF (operatsiyadan 6–30 kun o‘tib yuzaga keladigan fibrillyatsiya) chastotasini sezilarli kamaytirgan (p=0,006) [45].

Posterior perikardiotomiya

POBF profilaktikasining muhim nofarmakologik usullaridan biri orqa perikardiotomiya hisoblanadi. Ushbu usul xavfsiz va texnik jihatdan nisbatan sodda bajariladigan amaliyot bo‘lib, operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi rivojlanish chastotasini sezilarli kamaytirishi isbotlangan. Xususan, AKSh va orqa perikardiotomiya birgalikda bajarilgan bemorlarda POBF rivojlanish chastotasi 6% ni tashkil etgan bo‘lsa, izolyatsiyalangan AKSh amaliyotidan keyin bu ko‘rsatkich 34% ni tashkil etgan [46]. Bundan tashqari, orqa perikardiotomiya erta va kech davrlarda perikardial suyuqlik to‘planishi hamda yurak tamponadasi rivojlanish xavfini kamaytiradi. Orqa perikardiotomiyani bajarish texnikasi perikardning orqa qismida chap diafragma nerviga parallel ravishda 4–6 sm uzunlikdagi bo‘ylama kesma hosil qilishdan iborat bo‘lib, kesma chap pastki o‘pka venasi darajasidan diafragmagacha davom ettiriladi. Yana bir o‘tkazilgan metatahlilda esa orqa perikardiotomiya bajarilgan bemorlarda POBF rivojlanish chastotasi 10,8%, nazorat guruhida esa 28,1% bo‘lganligi aniqlangan (OR=0,33; 95% CI 0,16–0,69; p=0,003). Ushbu natijalar operatsiyadan keyingi perikardial ekssudat miqdorini kamaytirish POBF profilaktikasining muhim mexanizmlaridan biri ekanligini ko‘rsatadi, chunki kardiojarrohlik amaliyotlaridan keyin perikardial ekssudat POBF rivojlanishining asosiy omillaridan biri hisoblanadi [47]. Yevropa kardiologlar jamiyati va Yevropa kardio-torakal jarrohlar assotsiatsiyasining 2024-yilda ishlab chiqilgan

bo‘lmachalar fibrillyatsiyasini davolash bo‘yicha qo‘shma tavsiyalariga ko‘ra, perioperatsion fibrillyatsiya operatsiya vaqtida birinchi marta yuzaga kelgan aritmiyani anglatadi. Operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi esa operatsiyadan keyingi ilk davrda ilk bor rivojlangan bo‘lmachalar fibrillyatsiyasi sifatida ta’riflanadi va yurak operatsiyasini boshdan kechirgan bemorlarning 30–50% ida uchraydi [48]. Nekardiojarrohlik amaliyotlaridan keyin esa ushbu ko‘rsatkich 5–30% ni tashkil etadi. POBF keyingi 5 yil davomida bo‘lmachalar fibrillyatsiyasi qaytalanish xavfini 4–5 baravar oshiradi [49] hamda insult, miokard infarkti, yurak yetishmovchiligi va o‘lim xavfining mustaqil omili hisoblanadi [50,51,52,53,54,55]. POBF bilan bog‘liq boshqa noxush holatlarga gemodinamik beqarorlik, statsionarda davolanish muddatining uzayishi, nozokomial infeksiyalar, buyrak asoratlari, qon ketishlar, shifoxona ichidagi o‘lim ko‘rsatkichlarining oshishi hamda reabilitatsiya xarajatlarining ortishi kiradi. Operatsiyadan oldin propranolol yoki karvedilolni N-atsetilsistein bilan birgalikda qo‘llash yurak va noyurak operatsiyalaridan keyin POBF rivojlanish chastotasini kamaytirishi aniqlangan [56,57]. Yana bir yirik tahlillardan birida 89 ta randomizatsiyalangan klinik tadqiqot va 23 ta metatahlilni (19 211 bemor) qamrab olgan β-blokatorlar qo‘llanilishi yurak operatsiyalaridan keyin o‘lim, miokard infarkti yoki insult rivojlanish xavfini sezilarli kamaytirmasligini ko‘rsatgan. Shu bilan birga, mutaxassislar statsionar davrda POBF profilaktikasi maqsadida amiodaron qo‘llashni tavsiya qiladilar. Metatahlillarga ko‘ra, amiodaron (peroral yoki vena ichiga yuborilgan shaklda) β-blokatorlar bilan birgalikda qo‘llanganda POBF rivojlanish chastotasini kamaytirishda yuqori samaradorlikka ega bo‘lgan [58]. Steroidlar, magniy preparatlari, sotalol, bo‘lmachalar elektrostimulyatsiyasi hamda epikardial yog‘ qavatiga botulotoksin yuborish kabi usullar POBF profilaktikasida yetarli darajadagi ilmiy dalillarga ega emas [59]. Orqa perikardiotomiya kabi oddiy jarrohlik usulini qo‘llash esa operatsiyadan keyingi perikardial ekssudat hajmini kamaytirib, POBF rivojlanish xavfini sezilarli pasaytiradi (OR=0,44; 95% IS 0,27–0,70; p=0,0005) [60,61]. Kardiojarrohlik amaliyotlaridan keyingi statsionar davrda oral antikoagulyantlarni qo‘llash tromboembolik asoratlar xavfini kamaytirishi mumkin bo‘lsa-da, qon ketish xavfini sezilarli oshiradi [57]. Shu bilan birga, ayrim tadqiqotchilar oral antikoagulyantlarning umumiy o‘lim ko‘rsatkichlarini kamaytirishi [62] va tromboembolik asoratlar xavfini pasaytirishi mumkinligini ta’kidlaydilar. Biroq ushbu tadqiqotlarda qon ketishlar chastotasi ham yuqoriroq bo‘lganligi qayd etilgan [63]. Hozirgi vaqtda davom etayotgan randomizatsiyalangan klinik tadqiqotlar (NCT04045665 va NCT03968393) operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasi bo‘lgan bemorlarda oral antikoagulyantlarni uzoq muddat qo‘llashning optimal strategiyasini aniqlashga qaratilgan. Mutaxassislar guruhi o‘tkir qon ketish xavfi bartaraf etilgandan so‘ng tromboembolik xavf omillari individual baholangan holda oral antikoagulyantlarni uzoq muddat qo‘llash imkoniyatini ko‘rib chiqishni tavsiya etadi. Operatsiyadan keyin perikard bo‘shlig‘ida qon va eksudat to‘planishi bo‘lmachalar miokardiga mexanik ta’sir ko‘rsatib, yallig‘lanish mediatorlari ajralishini kuchaytiradi. Natijada bo‘lmachalarda elektr impulslarining o‘tishi buziladi va fibrillyatsiya rivojlanishi uchun qulay sharoit yuzaga keladi [64,65].

Posterior perikardiotomiya usuli birinchi marta Mulay va hammualliflar tomonidan tavsiflangan bo‘lib, uning mohiyati perikard bo‘shlig‘ini chap plevra bo‘shlig‘i bilan tutashtirishdan iborat. Ushbu usul operatsiyadan keyingi davrda perikardial suyuqlikning to‘planishini kamaytiradi va yurak atrofida mahalliy yallig‘lanish rivojlanishining oldini oladi [66]. Nazariy jihatdan, perikardial eksudat hajmining kamayishi bo‘lmachalarning mexanik qitiqlashini pasaytiradi va natijada POBF rivojlanish xavfini kamaytirishi mumkin [3]. Klinik tadqiqotlar natijalari shuni ko`rsatadiki Mulay va hammualliflar tomonidan o‘tkazilgan dastlabki randomizatsiyalangan tadqiqotda orqa perikardiotomiya bajarilgan bemorlarda POBF rivojlanish chastotasi nazorat guruhiga nisbatan sezilarli darajada past bo‘lgan [66]. va yana bir tadqiqotda Farsak va hammualliflar o‘z tadqiqotlarida ham shunga o‘xshash natijalarni qayd etib, posterior perikardiotomiya POBF rivojlanish xavfini ishonchli ravishda kamaytirishini ko‘rsatganlar [67]. Keyinchalik o‘tkazilgan bir qator klinik tadqiqotlar ushbu usulning samaradorligini tasdiqladi va operatsiyadan keyingi perikardial eksudat hamda tamponada rivojlanish chastotasi kamayishini aniqladi [3,67]. Gaudino va hammualliflar tomonidan o‘tkazilgan PALACS tadqiqoti ushbu yo‘nalishdagi eng yirik randomizatsiyalangan tadqiqotlardan biri hisoblanadi. Mazkur tadqiqot natijalariga ko‘ra, orqa

perikardiotomiya bajarilgan bemorlarda postoperatsion bo‘lmachalar fibrillyatsiyasi nazorat guruhiga nisbatan sezilarli darajada kam uchragan. Bundan tashqari, usulning xavfsizligi yuqori bo‘lib, operatsiyaga bog‘liq qo‘shimcha jiddiy asoratlar kuzatilmagan [68]. Biancari va hammualliflar tomonidan o‘tkazilgan meta-tahlil natijalariga ko‘ra, orqa perikardiotomiya POBF rivojlanish xavfini taxminan 40–50% ga kamaytiradi [3]. Mualliflar ushbu usulni yurak jarrohligidan keyingi davrda aritmiyalar profilaktikasining istiqbolli yo‘nalishi sifatida baholaganlar. Boshqa meta-tahlillarda ham orqa perikardiotomiyaning perikardial tamponada va eksudat rivojlanish chastotasini kamaytirishi tasdiqlangan [3,68].

Xulosa

Profilaktika va davolash usullarining takomillashib borayotganiga qaramay, postopertsion bo‘lmachalar fibrillyatsiyasi (POBF) kardiojarrohlik operatsiyalarini boshdan kechirgan bemorlarda dolzarb klinik muammo bo‘lib qolmoqda. POBFni profilaktikasi uchun ko`plab farmakologik usullar qo`llanilsada, β-blokatorlar va amiodaron qo‘llanilishi yuqori samaradorlikni namoyon etgan bo‘lib, ular standart davolash yondashuvlari sifatida qaralishi lozim. Bo‘lmachalarni overdrayv (tezlashtirilgan) stimulyatsiya qilish kabi boshqa usullar ham yaxshi natijalarni ko‘rsatgan bo‘lsa-da, tashkiliy va texnik murakkabliklar sababli kardiojarrohlar hamjamiyati tomonidan keng qabul qilinmagan. POBF patofiziologiyasi haqidagi zamonaviy bilimlarning kengayishi yangi profilaktik va davolash strategiyalarining ishlab chiqilishiga imkon berdi. Xususan, operatsiyadan keyin perikard bo‘shlig‘ini drenajlash hamda parasimpatik faollikni mahalliy bostirishga qaratilgan usullar dastlabki tadqiqotlarda yuqori samaradorlikni namoyish etdi. Posterior perikardiotomiya perikardial suyuqlik to‘planishini kamaytirish va mahalliy yallig‘lanish jarayonlarini cheklash orqali POBF profilaktikasida samarali usul sifatida namoyon bo‘lmoqda [3, 68]. Zamonaviy randomizatsiyalangan tadqiqotlar va meta-tahlillar ushbu usulning xavfsizligi hamda klinik samaradorligini tasdiqlamoqda. Biroq ushbu yondashuvlarning klinik ahamiyati va xavfsizligini to‘liq baholash uchun yirik randomizatsiyalangan nazoratli tadqiqotlar o‘tkazilishi zarur. Shunday qilib, operatsiyadan keyingi bo‘lmachalar fibrillyatsiyasining oldini olish va davolash bo‘yicha mavjud strategiyalarni takomillashtirish, shuningdek yangi samarali usullarni amaliyotga joriy etish ushbu asorat bilan bog‘liq noxush oqibatlarni kamaytirishning muhim yo‘nalishlaridan biri bo‘lib qolmoqda.

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ISSN 2181-9300

DOI Journal 10.26739/2181-9300

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ЖУРНАЛ БИОМЕДИЦИНЫ И ПРАКТИКИ
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