УДК: 616.1: 616.98

COVID-19 PANDEMIYASI VA UNING YURAK QON TOMIR TIZIMIDAGI ASORATLARI

Boltayeva Ra'no Shohtursunovna - assistent
Xo'jamkulov Shohjahon Shomurodovich
Saidakbarov Shaxzod Toshpo'latovich - talaba
Toshkent tibbiyot akademiyasi (Toshkent, O'zbekiston)

Annotatsiya.*Ushbu maqola orqali COVID-19 infektsiyasi bilan kasallangan bemorlarda miokardit, aritmiya, perikardit, yurak ishemik kasalligi, yurak yetishmovchiligi va tromboemboliya xavfi ortgani va kardiovaskulyar asoratlar COVID-19 bilan kasallangan barcha bemorlarda qayd etilganligi, COVID-19 virusli kasalligi haqida hamda uning yuqish yo'llari haqida batafsil ma'lumotga ega bo'lishingiz mumkin. Shuningdek SARS-CoV-2 infektsiyasi bilan bog'liq yurak-qon tomir tizmidagi simtomlari keng tarqalgan bo'lib, o'tkir bosqichda yuqori o'limga va surunkali bosqichda yuqori kasallanishga olib kelganligi hamda COVID-19 virusli kasaligiga tashxis qo'yish, kasallik etologiyasi va COVID-19 virusli kasalligi ta'sirida vujudga keladigan yurak - qon tomir sistemasiga ta'sirini, zamonaviy vaksinalar yordamida virusning tarqalishini oldini olish va diagnostik ma'lumotlarni o'rganish orqali terapiyalar yoki davolash metodlaridan foydalanish va ushbu foydalanilgan metodlar inson salomatligiga ta'siri haqida kengroq ma'lumotlarga ega bo'lishingiz mumkin.*

Kalit so'zlar: *COVID-19, yurak-qon tomir(YQT) asoratlari, SARS-CoV-2, yurak miokarditi, disritmiya, yurak yetishmovchiligi, Gerz sindromi, geparin terapiyasi.*

ПАНДЕМИЯ COVID-19 И ЕЕ СЕРДЕЧНО-СОСУДИСТЫЕ ОСЛОЖНЕНИЯ

Болтаева Рано Шахтурсуновна - ассистент
Ходжамкулов Шахджахан Шомуродович
Сайдакбаров Шахзод Тошполатович - студент
Ташкентская медицинская академия (Ташкент, Узбекистан)

Аннотация. *Благодаря этой статье у всех пациентов, инфицированных COVID-19, зафиксирован повышенный риск возникновения миокардита, аритмии, перикардита, ишемической болезни сердца, сердечной недостаточности и тромбоэмболии у пациентов, инфицированных COVID-19, а также сердечно-сосудистых осложнений по поводу вирусного заболевания COVID-19 и его непередаваемость. Кроме того, сердечно-сосудистые симптомы, связанные с инфекцией SARS-CoV-2, широко распространены, вызывая высокую смертность в острой фазе и высокую заболеваемость в хронической фазе, а также диагностику вирусного заболевания COVID-19, этологию заболевания и влияние на сердечно-сосудистую систему, вызванную вирусным заболеванием COVID-19, предотвращение распространения вируса с помощью современных вакцин и использование методов терапии или лечения, изучая диагностические данные и влияние этих используемых методов на здоровье человека.*

Ключевые слова: *COVID-19, сердечно-сосудистые (ССЗ) осложнения, SARS-CoV-2, сердечный миокардит, аритмия, сердечная недостаточность, синдром Герца, гепаринотерапия.*

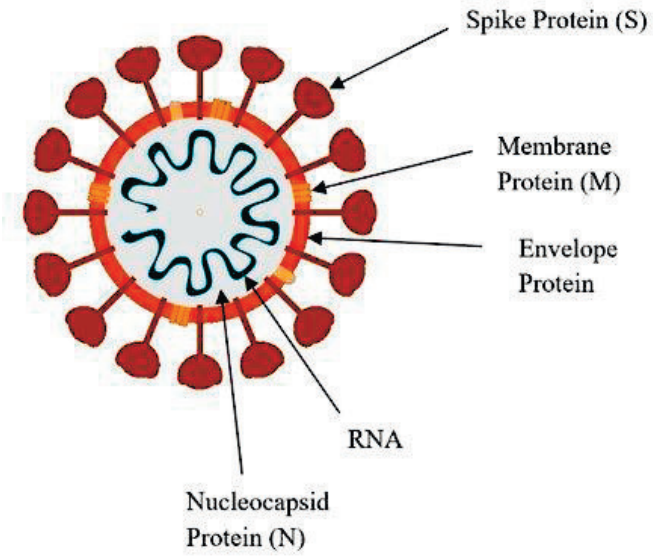
THE COVID-19 PANDEMIC AND ITS CARDIOVASCULAR COMPLICATIONS

Boltayeva Rano Shohtursunovna - assistant
Khojamkulov Shohjahon Shomurodovich
Saidakbarov Shahzod Toshpulatovich - student
Tashkent Medical Academy (Tashkent, Uzbekistan)

Abstract. *Thanks to this article, all patients infected with COVID-19 have an increased risk of myocarditis, arrhythmia, pericarditis, coronary heart disease, heart failure and thromboembolism in patients infected with COVID-19, as well as cardiovascular complications due to the viral disease COVID-19. -19 and its non-transmissibility. Detailed information about. In addition, cardiovascular symptoms associated with SARS-CoV-2 infection are widespread, causing high mortality in the acute phase and high morbidity in the chronic phase, as well as the diagnosis of the viral disease COVID-19, the ethology of the disease and the impact on the cardiovascular system caused by the viral disease COVID-19, the prevention of the spread of the virus by modern vaccines and the use of therapeutic or treatment methods, by studying the diagnostic data and the impact of these methods used on human health.*

Keywords: *COVID-19, cardiovascular (CVD) complications, SARS-CoV-2, cardiac myocarditis, arrhythmia, heart failure, Hertz syndrome, heparin therapy.Key words: COVID-19, cardiovascular disease (SSZ), SARS-CoV-2, cardiac myocarditis, arrhythmia, heart failure, Hertz syndrome, heparin therapy.*

Dolzarbligi. Butun Jahon Sog'liqni Saqlash Tashkiloti ma'lumotlariga qaraganda (2023)pandemiyaning dastlabki uch yilida og'ir o'tkir respirator sindromli koronavirus-2 (SARS-CoV-2), COVID-19 600 milliondan ortiq odamga yuqib, 6 milliondan ortiq o'limga olib keldi [1]. COVID-19 tanadagi bir nechta tizimlarga, jumladan, yurak-qon tomir (YQT) tizimiga o'z ta'sirini ko'rsatdi. Inson organizmidagi ko'p tizimlar ishtirok etgan infektsiyaning o'tkir bosqichi bo'lishi mumkin va hatto uzoq muddatli davom etishi yoki rivojlanishi mumkin. Ushbu kengaytirilgan COVID-19 taqdimoti uzoq muddatli COVID, uzoq muddatli COVID va SARS-CoV-2 infektsiyasining (PASC) o'tkir oqibati haqida gapiriladi [35]. O'pkaga nafas qisilishi, faollikning buzilishi, yurak urishi va ko'krak qafasidagi og'riqlardan tortib kardiyomiyopatiya, miokard infarkti, aritmiya, yurak yetishmovchiligi va chuqur venoz tromboz kabi murakkabroq sindromlargacha bo'lgan alomatlar kiradi [20]. COVID-19 pandemiyasi tufayli bu raqam yurak xastaliklari bilan kasallanish, tarqalish va kasalliklar avj olishni keskin suratda oshirdi. Keng tarqalgan COVID-19 sharoitida yurak-qon tomir kasalliklarining epidemiologiyasi to'g'risida faol tadqiqotlar olib borildi va uning YQT tizmi salomatligiga ta'sirini o'rganishga alohida e'tibor qaratiladi [33].



STRUCTURAL PROTEIN	FUNCTION OF PROTEIN
Nucleocapsid Protein (N)	• Bound to RNA genome to make up nucleocapsid
Spike Protein (S)	• Critical for binding of host cell receptors to facilitate entry to host cell
Envelope protein (E)	• Interacts with M to form viral envelope
Membrane Protein (M)	• Central organiser of CoV assembly • Determines shape of viral envelope

Rasm-1. **COVID-19 virusining sxematik tuzilishi**

Pandemiya boshlanishidagi dastlabki tadqiqotlar 1% dan 100% gacha bo'lgan holatlar haqida xabar berdi [27].Yaqinda o'tkazilgan tadqiqotlar shuni ko'rsatdiki, COVID-19 sharoitida o'tkir miokard shikastlanishi ~31% ni tashkil qiladi. [30] Xabar qilingan farqlar foydalanilgan ta'riflarning va o'rganilayotgan populyatsiyaning sezilarli xarakteristikasini aks ettirishi mumkin. Xabar qilingan holatlardagi farqga qaramay, barcha tadqiqotlar shuni ko'rsatdiki, COVID-19da yurak troponinlari darajasi kasallikning klinik og'irligi, yallig'lanish va protrombotik belgilar, keksa yosh va YQT tizimiga xavfli omillari mavjudligi bilan bog'liq. Bundan tashqari, troponin darajasining ko'tarilishi kasalxonada o'lim va aritmiyalarning ko'payishi bilan bog'liqligi aniqlandi [27, 30].

COVID-19 ning o'tkir bosqichida yurak shikastlanishi mexanizmlari to'g'ridan-to'g'ri va bilvosita yo'llarni o'z ichiga oladi. Yurak qismlaridan olingan kardiomiotsitlarda [21] SARS-CoV-2 virus zarralari aniqlangan [8], virusning kirib borganligi haqida ma'lumot beradi [34]. Bundan tashqari, SARS-CoV-2 endotelial hujayralarga kirib, endoteliyani keltirib chiqarishi mumkin. Bundan tashqari, SARS-CoV-2 ga qarshi immunitet reaktsiyasi bilan qo'zg'atilgan sitokin bo'roni ham bevosita yurak shikastlanishiga olib kelishi mumkin. Shu munosabat bilan, ko'p markazli patologiya tadqiqotida yallig'lanishli yurak o'zgarishlari, shu jumladan o'rganilayotgan bemorlarning 86% ga ta'sir qiluvchi interstitsial makrofag infiltratsiyasi aniqlandi [7].

Bir nechta dalillar yurak shikastlanishining bilvosita mexanizmini ham qo'llab-quvvatlaydi. Ya'ni, nafas olish yetishmovchiligi aterotrombozsiz (2-toifa miokard infarkti) miokardni kislorod bilan ta'minlashda o'tkir nomutanosiblik bilan gipoksik shikastlanishga olib kelishi mumkin [6]. Bundan

tashqari, sitokinlarning haddan tashqari ko‘p chiqishi va angiotensin II ning haddan tashqari faolligi endotelial faollashuvga, endotelial o‘tkazuvchanlikning oshishiga, tomirlarning yallig‘lanishiga va intrakoronar tromboz (I tipdagi miokard infarkti) bilan yallig‘lanish natijasida kelib chiqqan giperkoagulatsiyaga olib kelishi mumkin [23].Aslida, COVID-19 holatlarining gistopatologik va immunogistokimyoviy tahlillari yurak mikrotomirlari ichidagi yurak fibrin mikrotromblari va megakariotsitlarni ko‘rsatdi, bu tromboz kasallik paytida miokard shikastlanishida muhim rol o‘ynashi mumkinligini ko‘rsatadi [23, 9]. Bundan tashqari, aterosklerotik blyashka beqarorligi va yorilishi, metabolik talabning oshishi va miokard disfunktsiyasi bilan yurak zahirasining kamayishi ham yurak shikastlanishining potentsial mexanizmlari sifatida tasvirlangan [22].

O‘tkir COVID-19 infektsiyasi bo‘lgan bemorlarda miokard infarkti bilan kasallanish holatlari noaniqligicha qolmoqda. miokard infarktining (STEMI)aniq tashxisi qiyin, chunki COVID-19 miokardit, koronar spazm va stressli kardiyomiyopatiyaga olib kelishi mumkin, ularning barchasi STEMIga taqlid qiladi. Bundan tashqari, pandemiyaning dastlabki bosqichlarida shifoxona xodimlarining xavfsizligi bilan bog‘liq jiddiy tashvishlar diagnostika va davolash jarayonlarini kechiktirdi, masalan, teri orqali koronar aralashuvlar, o‘tkir ishemik koronar sindromning aniq tashxisini cheklash.STEMI bilan kasallangan COVID-19 bemorlarining taxminan 40 foizida obstruktiv koronar kasalligi yo‘qligi ma'lum bo‘ldi, bu patofiziologik mexanizm sifatida kislorod bilan ta'minlash va talab nomutanosibligini ko‘rsatadi [16].

COVID-19 miyokardit uchun muhim xavf omili bo‘lib, xavf yosh guruhiga qarab farq qiladi. 900 dan ortiq kasalxonalarda tibbiy yordam ko‘rsatish bilan bog‘liq keng qamrovli ma'muriy ma'lumotlar bazasidan foydalangan holda keng qamrovli tadqiqot miokardit bilan og‘rigan bemorlarning taxminan 42 foizida COVID-19 tarixi borligi aniqlandi [10].To‘g‘ridan-to‘g‘ri miokard shikastlanishi virusli miokarditning eng keng tarqalgan mexanizmi bo‘lsa-da, SARS-CoV-2 infektsiyasining aniq mexanizmlari asosan noma'lum bo‘lib qolmoqda [14, 11].

Kardiak aritmiyalar COVID-19 infektsiyasi bilan kasalxonaga yotqizilgan bemorlar orasida yuqori kasallanish va o‘lim bilan bog‘liq bo‘lib, ularning faqat yarmi shifoxonadan omon qolgan. Aritmiya bilan og‘rigan bemorlarning taxminan 80 foizida atriyal fibrilatsiya eng ko‘p uchraydi, keyin bradiaritmiya (~ 23%) va qorincha aritmi (~ 21%). Komorbidiyalari yuqori bo‘lgan va oldindan mavjud bo‘lgan yurak-qon tomir kasalliklari, shu jumladan konjestif yurak etishmovchiligi (KY) va koronar arter kasalligi bo‘lgan bemorlarda COVID-19 infektsiyasi paytida aritmiya rivojlanishiga ko‘proq moyil bo‘lgan. Aritmiyalar, jumladan, gipomagnezemiya yoki gipokalemiya kabi COVID-19 bilan bog‘liq elektrolitlar buzilishining rivojlanishi uchun bir nechta mexanizmlar taxmin qilingan. Boshqa ta'sir etuvchi omillar yurak o‘tkazuvchanligi tizimida tizimli yallig‘lanish va virusli shikastlanishni o‘z ichiga oladi [13].

COVID-19 bilan og‘rigan bemorlarda HF o‘tkir kasallik, o‘tkir gemodinamik stress (masalan, o‘tkir kor pulmonale) yoki o‘tkir miokard shikastlanishi tufayli yuzaga kelishi mumkin [5]. Oldingi yurak urishi yoki yurak kasalligi bo‘lgan bemorlarda o‘tkir dekompensatsiya, uzoq kasalxonada qolish, mexanik shamollatish va o‘lim xavfi yuqori bo‘lgan.Shu bilan birga, o‘tkir infektsiya paytida yangi yurak etishmovchiligi tashxisi qo‘yilgan bemorlarning 22 foizida KVH uchun tarix yoki xavf omillari mavjud emas edi [1].

Ishemik bo‘lmagan, stressdan kelib chiqqan kardiyomiyopatiyaning bir shakli bo‘lgan Takotsubo kardiomiopatiyasining mavjudligi (shuningdek, Gebrochenes-Gerz sindromi, vaqtinchalik apikal balon sindromi, apikal balonli kardiyomiyopatiya va singan yurak sindromi) [31] mavjudligi ham COVID-19da ko‘rsatildi. Bu yuqori yurak va yallig‘lanish biomarkerlari, jiddiy kasallik, past ejeksiyon fraktsiyasi va yuqori o‘lim bilan bog‘liq. Mexanizm katexolamin ko‘tarilishi bilan infektsiyadan kelib chiqadigan haddan tashqari stressni, sitokin bo‘ronidan ortiqcha faol immunitetni va koronar tomir disfunktsiyasining rivojlanishini o‘z ichiga olishi mumkin [32].

SARS-CoV-2 infektsiyasi bo‘lgan bemorlarda tromboembolik asoratlar xavfi 71% gacha ko‘rinadi. Diffuz tromblar emas, balki lokalizatsiya qilingan pıhtı shakllanishi ham COVID-19da o‘ziga xos xususiyatdir va birinchi navbatda o‘pka tomirlarida kuzatiladi [16]. Bir nechta tadqiqotlarda keng tarqalgan prokoagulyant giperkoagulyatsion holatlar, jumladan trombotik mikroangiopatiya, endotelial disfunktsiya, qon ketishining buzilishi va tromboz qayd etilgan. Taklif etilayotgan mexanizm endotelial shikastlanishga, trombotsitlar va koagulyatsion omillarning faollashishiga olib keladigan haddan tashqari yallig‘lanishdan kelib chiqqan sitokin bo‘ronini o‘z ichiga oladi [3].Biroq, biz an'anaviy Virxov triadasini esga olishimiz kerak: immobilizatsiya tufayli oqimning turg‘unligi, tomir ichidagi devorning shikastlanishi va giperkoagulyar holat, bularning barchasi COVID-19 infektsiyasida mavjud [2].

COVID-19 ning o‘tkir oqibati yoki uzoq muddatli YQT asoratlari dastlabki infeksiyadan 4 yoki undan ko‘proq hafta o‘tgach, doimiy yoki yangi alomatlar sifatida aniqlanadi. Alomatlar va belgilar orasida ko‘krak qafasidagi og‘riqlar, yurak urishi, buzilgan faoliyatga chidamlilik, nafas qisilishi, charchoq va ortostatik ko‘rinishlar bo‘lishi mumkin. Ushbu alomatlarning jiddiyligi o‘zgaruvchan bo‘lishi mumkin va KVH tarixi bo‘lmagan odamlarda mavjud (bemorlarning 5-29%) [24, 12]. O‘ziga xos YQT sindromlari ham mavjud bo‘lishi mumkin va ular COVID-19 ning yanada og‘ir YQT asoratlari bilan bog‘liq bo‘lib, perikardial efüzyon, miyokarditga olib keladigan yurak

shikastlanishi, miokard infarkti, chap yoki o‘ng qorincha disfunktsiyasi, aritmiya, konjestif yurak etishmovchiligi va nospesifik yurak etishmovchiligini o‘z ichiga oladi. tasvirlash bo‘yicha topilmalar [4, 17, 26, 19, 15]. Darhaqiqat, bemorlarning 60% yurak magnit-rezonansida (CRM) faol miokard yallig‘lanishini ko‘rsatadi [24, 12].

Yaqinda o‘tkazilgan tadqiqotda AQSh Veteranlar ishlari bo‘yicha departamentining milliy sog‘liqni saqlash ma'lumotlar bazasidan foydalangan holda COVID-19 bilan kasallangan 150 000 dan ortiq kishilar guruhi tahlil qilindi. 5,8 million tarixiy va 5,6 million zamonaviy nazorat bilan solishtirganda, COVID-19 infektsiyasini boshdan kechirgan odamlarda ishemik va ishemik bo‘lmagan yurak kasalliklari, miokardit, perikardit, aritmiya, HF va tromboembolik hodisalar xavfi yuqori. Ushbu tadqiqotda kasalxonaga yotqizilgan va kasalxonaga yotqizilmagan bemorlarda YQT asoratlari haqida xabar berilgan, garchi KVHning jiddiyligi dastlabki COVID-19 infektsiyasining og‘irligi bilan bevosita bog‘liq edi. Bundan tashqari, COVID-19 ning YQT oqibati barcha yosh guruhlarida, jinsi, irqi, yurak xuruji tarixi bo‘lmagan bemorlarda va gipertoniya, semizlik, giperlipidemiya va diabet kabi KVH xavf omillari bo‘lmagan yosh bemorlarda mavjud edi [36].

O‘tkir infektsiyadan keyin yurak shikastlanishining davom etish mexanizmlari, ehtimol, multifaktorialdir. Yurak to‘qimalarida virusli turg‘unlik, immun disregulyatsiya va yurak antijenlariga otoimmün javobning rivojlanishi bilan bog‘liq yallig‘lanish tufayli uzoq muddatli funktsional va tizimli yurak shikastlanishi potentsial mexanizmlar sifatida taklif qilingan [28].Doimiy yallig‘lanish to‘qimalarning shikastlanishiga va miyokard fibroziga olib kelishi mumkin, bu esa qorincha moslashuvining pasayishiga, miyokard perfuziyasining buzilishiga, miokard qattiqligining oshishiga, qisqarish qobiliyatining pasayishiga va potentsial aritmiyalarga olib keladi [30, 25, 28].Markaziy asab tizimining sensitizatsiyasi kabi neyrofiziologik mexanizmlar, shuningdek, PASC bemorlarida charchoq, nafas qisilishi, ortostatik intolerans va buzilgan faoliyat tolerantligi kabi CV belgilarini tushuntirish uchun potentsial omil sifatida taklif qilingan [18]. Prognoz qilinganidan 30% pastroq bo‘lganligi ko‘rsatilgan, bu anormal ventilyatsiya, qon aylanishini cheklash va dekonditsionerlik normaldan past bo‘lgan kardiorespirator fitnes uchun javobgar bo‘lishi mumkinligini ko‘rsatadi va ba'zilarini tushuntiradi. Bunday bemorlarda yurak belgilari mavjud [29].

COVID-19 ning o‘tkir bosqichidan keyingi davrda YQT asoratlarining yuqori tarqalishini inobatga olgan holda, o‘tkir bosqichda CVD xavf omillari yoki YQT asoratlari bo‘lgan shaxslarda keng qamrovli YQT skriningini o‘tkazish tavsiya etiladi. COVID-19 bilan bog‘liq yurak-qon tomir kasalliklarini boshqarish va keyingi parvarishlash uchun kompleks yondashuv taqdim etildi [25]. Qisqacha aytganda, bemorni dastlabki baholash quyidagilarni o‘z ichiga olishi kerak:

O‘tmishdagi COVID-19 tibbiy tarixini har tomonlama ko‘rib chiqish. Uzoq muddatli simptomlarni to‘liq baholash. Aqliy, jismoniy va kognitiv salomatlikni baholash. KVH uchun xavf omillarini ko‘rib chiqish (semizlik, giperglikemiya, diabetes mellitus, giperlipidemiya, tamaki iste’moli, uyqu apnesi, sedentarizm, noto‘g‘ri ovqatlanish va stress). YQT sharoitlari va potentsial YQT ta'siriga ega bo‘lgan dorilar (beta-blokerlar, kaltsiy kanallari blokerlari, ACE inhibitörleri, anti-aritmik vositalar, antikoagulyantlar, antiplatelet agentlari, antigistaminlar, sovuqni dekonjestanlar) uchun buyurilganlarga qaratilgan joriy dori-darmonlarni baholash.

Jiddiy o‘pka, tromboembolik va yurak asoratlarini tashxislash, davolash va istisno qilish uchun YQT tizimini to‘liq tekshirish va laboratoriya va yurak testlarini talab qilish kerak. Bularga to‘liq qon ro‘yxati, elektrolitlar, troponin darajasi, miya natriuretik peptidi, D-dimer, C-reaktiv oqsil, cho‘kish tezligi, lipidlar paneli, jigar funktsiyasi testlari, glyukoza, kreatinin, EKG, ekokardiyogram, funktsional imkoniyatlar testi (stress testi, echo) kiradi, stress testi, 6 daqiqalik yurish testi. Yurak urishi, ortostatik intolerans va aritmiya mavjud bo‘lganda ambulator yurak monitoringi (Xolter, hodisa monitori) talab qilinishi kerak. Agar jiddiy buzilishlar aniqlansa, CRM va yurak kompyuter tomografiyasi (CTA) ni o‘z ichiga olgan holda qo‘shimcha tekshirish tavsiya etiladi. Yuqori xavfli shaxslar uchun invaziv koronar angiografiya ko‘rsatilishi mumkin. Aritmiya klinikasi va avtonom disfunktsiya klinikasi kabi ixtisoslashgan klinikalarga murojaat qilish juda tavsiya etiladi. Bundan tashqari, jismoniy va kasbiy terapiya, psixologiya va ijtimoiy xizmatlar kabi tegishli xizmatlarga murojaat qilish kasallikning umumiy yukini engillashtirish uchun zarur yordam beradi [35, 25, 28].

O‘tkir COVID-19 bilan bog‘liq bo‘lgan YQT asoratlari uchun aniq isbotlangan davolash mavjud bo‘lmaganda, KVH xavf omillarini nazorat qilish va joriy ko‘rsatmalardan foydalangan holda o‘ziga xos YQT kasalliklarini boshqarish tavsiya etiladi. Virusli miokardit va stressli kardiomiopatiyani boshqarish qorincha disfunktsiyasi va aritmik xavf uchun terapiyaga asoslangan bo‘lishi kerak. Atrial fibrilatsiyani boshqarishda yurak urish tezligini yetarli darajada nazorat qilish afzalroq strategiya hisoblanadi [28, 29]. Birlamchi perkutan aralashuvlar (PCI) STEMI uchun parvarish standarti bo‘lib qoldi. Uzoq muddatli davolanish uchun ko‘rsatmalarga muvofiq tibbiy terapiya, shu jumladan beta-blokerlar, antiplatelet agentlari, nitratlar, statinlar va geparin terapiyasi qo‘llanilishi kerak [29].

Xulosa qilib shuni aytishim mumkin, YQT asoratlari o‘tkir va PASC infektsiyasining keng tarqalgan ko‘rinishidir. Ular miokard shikastlanishi, o‘tkir koronar sindromlar, miokardit, kardiyomiopatiya, aritmiya, yurak urish tezligi va chuqur venoz tromboz

kabi bir nechta YQT kasalliklarini qamrab oladi. Kasallikdan omon qolganlar orasida KVH xavfi va zarari katta. Tadqiqotlar SARS-CoV-2 va YQT tizimi o'rtasidagi o'zaro ta'sirni va yurak disfunktsiyasiga olib keladigan biologik jarayonlarni tushuntirish uchun zarur. YQT ko'rinishlari hozirda COVID-19 pandemiyasidan oldin ishlab chiqilgan belgilangan ko'rsatmalarga muvofiq boshqariladi. Diagnostika va mashqlar aralashuvini tushunish va aniqlashtirish uzoq davom etgan pandemiyada KVH rivojlanishining oldini olish va boshqarish uchun zarurdir.

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