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ISSN: 3030-3001

МЕДИЦИНА, ПЕДАГОГИКА И ТЕХНОЛОГИЯ: ТЕОРИЯ И ПРАКТИКА

Research Science and Innovation House

НАША ИНДЕКСАЦИЯ

SJIF 2023: 3.019, 2024: 5.444
ResearchBib Impact factor: 11.79

http://universalpublishings.com

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ISSN: 3030-3001
Том 4, Выпуск 10, 31 Октябрь

Научный журнал «**МЕДИЦИНА, ПЕДАГОГИКА И ТЕХНОЛОГИЯ: ТЕОРИЯ И ПРАКТИКА**»:

31.10.2026.

В данном сборнике опубликованы статьи, принятые на научную журнал «**Медицина, Педагогика и Технология: Теория и Практика**» 2026 г., Выпуск 4, Часть 10.

Всем статьям журнала присваивался уникальный номер **DOI**, который индексировался в международных научных базах данных **Zenodo**, **Open Aire**, **Google Scholar**.

Диссертациями официально признаются статьи, опубликованные в национальных журналах из списка журналов, рекомендованных ВАК для публикации основных научных результатов диссертаций.

Основание: Страница 3 перечня научных изданий, рекомендованных для публикации основных научных результатов диссертаций ВАК Республики Узбекистан. – Ташкент: 2019. – 160 с.

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РОЛЬ МЕДИЦИНСКОЙ СЕСТРЫ В ПРОФИЛАКТИКЕ СЕРДЕЧНО-СОСУДИСТЫХ ЗАБОЛЕВАНИЙ

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Аннотация: *В статье рассматривается роль медицинской сестры в профилактике сердечно-сосудистых заболеваний как одного из ключевых направлений современной профилактической медицины. Особое внимание уделяется сестринскому участию в раннем выявлении факторов риска, контроле артериального давления, оценке образа жизни пациента, формировании приверженности к лечению и профилактическим рекомендациям. Подчёркивается значение санитарно-просветительной работы, направленной на коррекцию питания, повышение физической активности, отказ от вредных привычек и развитие навыков самоконтроля. Эффективное сестринское сопровождение способствует снижению модифицируемых факторов риска, предупреждению осложнений и повышению ответственности пациентов за собственное здоровье.*

Ключевые слова: *сердечно-сосудистые заболевания, медицинская сестра, профилактика, сестринская помощь, факторы риска, артериальное давление, здоровый образ жизни, санитарно-просветительная работа, приверженность к лечению.*

Annotatsiya: *Maqolada yurak-qon tomir kasalliklarining oldini olishda tibbiyot hamshirasining o‘rni zamonaviy profilaktik tibbiyotning muhim yo‘nalishlaridan biri sifatida yoritilgan. Hamshiraning xavf omillarini erta aniqlash, arterial qon bosimini nazorat qilish, bemorning turmush tarzini baholash, davolash va profilaktik tavsiyalarga rioya etishini mustahkamlashdagi faoliyati tahlil qilinadi. Shuningdek, sog‘lom ovqatlanish, jismoniy faollikni oshirish, zararli odatlardan voz kechish va o‘z-o‘zini nazorat qilish ko‘nikmalarini shakllantirishga qaratilgan sanitariya-ma’rifiy ishlarning ahamiyati ochib beriladi. Samarali hamshiralik yordami boshqariladigan xavf omillarini kamaytirish, asoratlarning oldini olish va bemorning o‘z salomatligiga mas’uliyatini oshirishga xizmat qiladi.*

yurak-qon tomir kasalliklari, tibbiyot hamshirasi, profilaktika, hamshiralik yordami, xavf omillari, arterial qon bosimi, sog‘lom turmush tarzi, sanitariya-ma’rifiy ishlar, davolashga rioya qilish.

Abstract *: This article examines the role of nurses in the prevention of cardiovascular diseases as an essential component of modern preventive healthcare. Particular attention is given to nursing activities related to the early identification of risk factors, blood pressure monitoring, assessment of patients' lifestyles, and improvement of adherence to treatment and preventive recommendations. The importance of health education aimed at promoting healthy nutrition, regular physical activity, smoking cessation, and effective self-monitoring is also emphasized. Consistent nursing support can contribute to reducing modifiable cardiovascular risk factors, preventing complications, and strengthening patients' responsibility for their own health.*

Keywords*: cardiovascular diseases, nurse, prevention, nursing care, risk factors, blood pressure, healthy lifestyle, health education, treatment adherence.*

Введение

Сердечно-сосудистые заболевания остаются одной из наиболее значимых медико-социальных проблем современного здравоохранения. Их развитие тесно связано не только с наследственными и возрастными факторами, но и с образом жизни человека: недостаточной физической активностью, нерациональным питанием, курением, хроническим стрессом, избыточной массой тела и недостаточным контролем артериального давления. Именно поэтому профилактика занимает особое место в снижении риска развития заболевания и его осложнений. Медицинская сестра находится в непосредственном и регулярном контакте с пациентом, что определяет её важную роль в профилактической работе. Сестринская деятельность включает выявление факторов сердечно-сосудистого риска, контроль основных показателей здоровья, наблюдение за состоянием пациента, обучение принципам здорового образа жизни и формирование приверженности к медицинским рекомендациям. При этом профилактическая функция медицинской сестры не ограничивается выполнением назначений врача: она предполагает активное участие в повышении медицинской грамотности пациента и развитии навыков самоконтроля. Таким образом, повышение эффективности сестринской профилактики является важным условием раннего выявления факторов риска, предупреждения сердечно-сосудистых осложнений и сохранения качества жизни пациентов.

Анализ литературы и методология

Анализ научной литературы показывает, что профилактика сердечно-сосудистых заболеваний наиболее эффективна при комплексном воздействии на модифицируемые факторы риска. В современных исследованиях особое внимание уделяется контролю артериального давления, уровня глюкозы и липидов крови,

массы тела, физической активности, характера питания, курения и психоэмоциональной нагрузки. Существенное значение имеет не только своевременное выявление этих факторов, но и способность пациента длительно соблюдать профилактические рекомендации. Отдельное направление исследований посвящено роли среднего медицинского персонала. Медицинская сестра рассматривается как важное связующее звено между пациентом и системой здравоохранения. Регулярный сестринский контроль позволяет своевременно выявлять неблагоприятные изменения показателей здоровья, оценивать соблюдение назначенной терапии и индивидуально корректировать профилактическое обучение пациента. Особую ценность представляет сестринское консультирование, поскольку доступное объяснение факторов риска и способов их коррекции способствует формированию осознанного отношения пациента к собственному здоровью. Методология исследования основана на аналитическом и сравнительном подходах. Проведён обзор научных публикаций, посвящённых профилактике сердечно-сосудистых заболеваний и организации сестринской помощи. Материалы систематизированы по основным направлениям профилактической деятельности: выявление факторов риска, мониторинг состояния пациента, санитарно-просветительная работа, обучение самоконтролю и повышение приверженности к лечению. Сравнительный анализ позволил определить наиболее значимые направления деятельности медицинской сестры и оценить их место в комплексной профилактике сердечно-сосудистых заболеваний.

Результаты

Проведённый анализ показал, что участие медицинской сестры в профилактике сердечно-сосудистых заболеваний имеет наибольшее значение при систематическом наблюдении за пациентами с повышенным риском. Основными направлениями сестринской деятельности являются контроль артериального давления и частоты пульса, наблюдение за массой тела, выявление поведенческих факторов риска, оценка соблюдения назначенной терапии и проведение индивидуального профилактического консультирования. Установлено, что регулярное взаимодействие медицинской сестры с пациентом способствует повышению его информированности о причинах и факторах риска сердечно-сосудистых заболеваний. Особую роль играет обучение практическим навыкам самоконтроля: правильному измерению артериального давления, ведению дневника показателей, соблюдению режима приёма лекарственных средств и своевременному обращению за медицинской помощью при ухудшении состояния. Анализ также показал, что профилактическая работа становится более

результативной при индивидуальном подходе с учётом возраста, образа жизни и имеющихся факторов риска пациента. Таким образом, сестринское сопровождение представляет собой важный компонент профилактики, способствующий коррекции управляемых факторов риска, повышению приверженности пациентов к рекомендациям и снижению вероятности развития сердечно-сосудистых осложнений.

Обсуждение

Полученные результаты подтверждают, что роль медицинской сестры в профилактике сердечно-сосудистых заболеваний выходит за рамки традиционного ухода за пациентом. Постоянный контакт с пациентами позволяет медицинской сестре своевременно выявлять изменения факторов риска и формировать устойчивые навыки профилактического поведения. Особенно важным является индивидуальный подход, поскольку эффективность рекомендаций во многом зависит от возраста, состояния здоровья, образа жизни и готовности пациента изменить привычки. Значимым аспектом сестринской деятельности является повышение приверженности к лечению. Даже при наличии эффективной медикаментозной терапии нерегулярный приём препаратов, отсутствие контроля артериального давления и сохранение нездорового образа жизни могут повышать вероятность осложнений. Поэтому обучение пациента должно сочетать медицинскую информацию с практическими рекомендациями, которые возможно применять в повседневной жизни. Вместе с тем эффективность сестринской профилактики зависит от профессиональной подготовки медицинского персонала, качества коммуникации и систематичности наблюдения. Расширение профилактической компетентности медицинских сестёр и применение индивидуализированного консультирования могут усилить раннюю профилактику и улучшить долгосрочный контроль сердечно-сосудистого риска.

Заключение

Профилактика сердечно-сосудистых заболеваний является важным направлением сестринской деятельности, в котором медицинская сестра выполняет не только контрольную, но и образовательную функцию. Своевременное выявление факторов риска, мониторинг артериального давления, формирование здорового образа жизни и повышение приверженности к лечению позволяют снизить вероятность развития осложнений. Индивидуальный подход и регулярное взаимодействие с пациентом делают сестринскую помощь особенно значимой в долгосрочной профилактике. Таким образом, повышение профессиональной компетентности медицинских сестёр и расширение их участия

в профилактических программах являются необходимыми условиями улучшения сердечно-сосудистого здоровья населения.

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БОЛАЛАРДА КЕЧАДИГАН АЛЛЕРГИК КОНЪЮНКТИВИТЛАРДА КЎЗ ЁШИНИНГ ИММУНО-БИОКИМЁВИЙ КЎРСАТКИЧЛАРИНИНГ ХУСУСИЯТЛАРИ

Тухтаева Матлаб Ашуровна
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Аннотация. Болаларда кечадиган аллергик конъюнктивитларда организм иммун тизими ҳолатини ўрганишда қон зардоби билан бир қаторда кўз ёшининг ҳам ўз ўрни бор. Шу сабабли тавсия этилган усуллар билан бир қаторда кўз ёши иммуно-биокимёвий кўрсаткичларини аниқлаш мақсадида келтирилган усуллар модификация қилинган. Ўтказилган тадқиқотга жами 90 нафар 3 ёшдан 18 ёшгача бўлган болалар жалб қилинган. Бунинг учун “Qihgdao Hightop Biotech Co.Ltd” компаниясининг (Кингдао, ХХР) тест-йўлакчаларидан фойдаланилган. Тест-йўлакча кўз ёшидаги 9 та кўрсаткични аниқлаш имконини берган.

Калит сўзлар: Болалар, аллергик конъюнктивит, кўз ёши, диагностика, иммуно-биокимёвий кўрсаткичлар

Долзарблиги. Аллергик конъюнктивит (АК) болаларда аллергик касалликларнинг энг кўп учрайдиган шаклларидан бири бўлиб, аллергенлар таъсирига тезкор турдаги ўта сезувчанлик реакцияси натижасида конъюнктиванинг яллиғланишли шикастланиши ҳисобланади. Касаллик кўпинча аллергик ринит, дерматит ва бронхиал астма каби ҳолатлар билан кечади, бу эса атопик жараённинг тизимли хусусиятини акс эттиради. ЖССТ маълумотларига кўра, болаларда аллергик конъюнктивит частотаси 10 дан 30% гача ўзгариб туради ва экологик вазиятнинг ёмонлашуви ҳамда ёш авлоднинг иммунитет ҳолатидаги ўзгаришлар туфайли ўсиш тенденциясига эга [1,5,6].

Тадқиқот мақсади: Болаларда кечадиган аллергик конъюнктивитларда кўз ёшининг иммуно-биокимёвий параметрларини аниқлаш

Материал ва усуллар. Ўтказилган тадқиқотга жами 90 нафар 3 ёшдан 18 ёшгача бўлган болалар жалб қилинган. Бунинг учун “Qihgdao Hightop Biotech Co.Ltd” компаниясининг (Кингдао, ХХР) тест-йўлакчаларидан фойдаланилган. Тест-йўлакча кўз ёшидаги 9 та кўрсаткични аниқлаш имконини берган. Бунинг учун кўз конъюнктивасининг пастки қисми очилиб, унга тест-йўлакчанинг биологик ашё томизиладиган қисми шиллиқ қаватга тегизилган, 5-6 секунддан сўнг намланган тест-йўлакча олиниб, текширишлар давом эттирилган.

Натижалар. Аниқланишича, бемор болалар кўз ёшида соғлом болаларга нисбатан оқсил ва нитритларнинг миқдори ишонарли даражада кўпайган - мос равишда оқсил 1,62 марта ҳамда нитритлар 1,63 мартага. Қоннинг шаклли элементлари миқдори 1,33 мартага статистик жиҳатдан аҳамиятли равишда ошган. Ушбу кўрсаткичга мос равишда кўз ёши намунасида лейкоцитлар сони ҳам кўпайди. Бу ошиш 1,82 мартани ташкил этган (P<0,001).

ЎАК билан бир қаторда САК ташҳисланган бемор болалар кўз ёши физик, биокимёвий ва маҳаллий иммунитет параметрларнини ўрганиш ҳам худди шу методика ёрдамида амалга оширилган ва 9-жадвал кўринишида ифодаланган. САК ва ЎАК кузатилганда қоннинг шаклли элементлари соғлом болалар кўрсаткичларидан ишонарли даражада юқори бўлган - мос равишда 1,33 ва 1,89 мартага, лейкоцитлар назорат гуруҳи параметрларига нисбатан 1,82 ва 5,21 мартага кўп бўлган. Бу эса лейкоцитларнинг яллиғланиш жараёнида миқдорий ошишини кўрсатган. САК ва ЎАК мавжуд болалар кўз ёшидаги оқсил параметри САК ва ЎАК да соғлом болаларга нисбатан 2,77 ва 1,62 мартага ишонарли ошган (P<0,001). Ўзгаришлар тенденцияси бир хил бўлса ҳам, ўзгаришлар интенсивлиги сурункали кўринишда юқори бўлган.

Хулоса. САК ва ЎАК да патологик ҳолатлар оғирлик даражаси, касаллик якуни ва аллергик жараённинг ўткирдан сурункали кўринишга ўтишининг биологик маркёрлари сифатида ўрганилган тест-йўлакчалар орқали аниқланган кўз ёшидаги қоннинг шаклли элементлари, лейкоцитлар, оқсил, кетон, глюкоза концентрацияларини аниқлаш тавсия этилади.

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UZUMNING ISTIQBOLLI NAVLARINI TANLASH VA ULARNING TUPROQ-IQLIM SHAROITLARIGA MOSLASHUVCHANLIGINI BAHOLASH

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Annotatsiya. Maqolada O‘zbekiston Respublikasining turli tuproq-iqlim sharoitlarida uzumning istiqbolli navlarini tanlash mezonlari va ularning moslashuvchanligini baholash usullari yoritilgan. Mahalliy va introduksiya qilingan navlarning agrobiologik xususiyatlari, hosildorligi, kasalliklarga chidamliligi, qurg‘oqchilik va sho‘rlanishga bardoshliligi tahlil qilingan. Tuproqning mexanik tarkibi, yer osti suvlari chuqurligi, sho‘rlanish darajasi hamda iqlim omillarining nav tanlashdagi ahamiyati asoslab berilgan. Tadqiqotlar natijasida Husayni, Qora kishmish, Nimrang, Pushti toyfi, Rizamat, Kattaqo‘rg‘on kabi navlarning turli mintaqalarga mosligi va istiqbolliligi belgilangan.

Kalit so‘zlar: uzum, istiqbolli navlar, tuproq-iqlim sharoiti, moslashuvchanlik, tanlash mezonlari, hosildorlik, chidamlilik, agrobiologik baholash, seleksiya.

Abstract. The article discusses the criteria for selecting promising grape varieties and methods for assessing their adaptability to various soil and climatic conditions of the Republic of Uzbekistan. Agrobiological characteristics, yield, disease resistance, drought and salinity tolerance of local and introduced varieties are analyzed. The importance of soil mechanical composition, groundwater depth, salinity level and climatic factors in variety selection is substantiated. Based on research results, the suitability and prospects of varieties such as Husayni, Black Kishmish, Nimrang, Pink Tayfi, Rizamat and Kattaqo‘rg‘on for different regions are determined.

Keywords: grape, promising varieties, soil-climatic conditions, adaptability, selection criteria, yield, resistance, agrobiological evaluation, breeding.

Kirish. Uzumchilik O‘zbekiston qishloq xo‘jaligining muhim va serdaromad tarmoqlaridan biri hisoblanadi. Respublikaning qulay tabiiy-iqlim sharoitlari uzumning xo‘raki, kishmishbop va sharobbop navlarini muvaffaqiyatli yetishtirish imkonini beradi. Hozirgi kunda global iqlim o‘zgarishlari, suv resurslarining kamayishi va tuproq sho‘rlanishining kuchayishi sharoitida navlarni to‘g‘ri tanlash va ularning moslashuvchanligini baholash alohida ahamiyat kasb etmoqda.

Istiqbolli navlarni tanlash – bu nafaqat yuqori hosildorlik va mahsulot sifatini ta’minlash, balki noqulay abiotik va biotik omillarga chidamlilikni oshirish demakdir. O‘zbekistonning turli mintaqalarida (Toshkent, Samarqand, Farg‘ona, Surxondaryo, Xorazm, Qashqadaryo va boshqalar) tuproq-iqlim sharoitlari sezilarli darajada farq qiladi. Shu bois har bir hudud uchun mos navlarni ilmiy asosda tanlash zarurati mavjud.

Asosiy qism. Uzum o‘simligi (Vitis vinifera L.) o‘zining biologik xususiyatlari bilan boshqa mevali ekinlardan farq qiladi. U uzoq umr ko‘radi, kuchli o‘sish quvvatiga ega va turli tuproq-iqlim sharoitlariga nisbatan moslashuvchanlik darajasi yuqori. Biroq har bir nav o‘ziga xos talablarga ega. Shuning uchun nav tanlashda mintaqaning mikroiqlimi, tuproq boniteti, sug‘orish imkoniyatlari va bozor talablari birgalikda hisobga olinishi lozim.

Ushbu maqolada uzumning istiqbolli navlarini tanlash mezonlari, ularning tuproq-iqlim sharoitlariga moslashuvchanligini baholash usullari va O‘zbekiston sharoitida tavsiya etiladigan navlar tahlil qilinadi. Tadqiqot natijalari asosida amaliy tavsiyalar ishlab chiqilgan.

Uzum navlarini tanlashda quyidagi asosiy mezonlar hisobga olinadi. Birinchidan, hosildorlik – bir tupdan yoki gektardan olinadigan hosil miqdori. O‘zbekiston sharoitida istiqbolli navlar o‘rtacha 150–250 s/ga va undan yuqori hosil berishi kerak. Ikkinchidan, mahsulot sifati – qand miqdori (TSS, °Brix), kislotalilik, ta’m, tashqi ko‘rinish, saqlash va tashishga yaroqlilik muhim ahamiyatga ega. Xo‘raki navlar uchun g‘ujumning yirikligi va tashqi ko‘rinishi, kishmishbop navlar uchun urug‘sizlik va qand to‘plash qobiliyati, sharobbop navlar uchun esa qand-kislota nisbati asosiy ko‘rsatkich hisoblanadi.

Uchinchi muhim mezon – kasallik va zararkunandalarga chidamlilikdir. Ayniqsa oidium (un shudring), mildyu va kulrang chirishga chidamli navlar afzal ko‘riladi. To‘rtinchidan, qurg‘oqchilikka va yuqori haroratga bardoshlilik,

beshinchidan sho‘rlanishga chidamlilik, oltinchidan sovuqqa chidamlilik (ayniqsa qishda past haroratli mintaqalarda) hisobga olinadi. Nihoyat, pishish muddati – erta, o‘rta yoki kech pishar navlarning mintaqaga mosligi muhimdir.

Tanlash jarayonida navning o‘sish kuchi ham muhim. Kuchli o‘suvchi navlarga Kattaqo‘rg‘on, Nimrang, Toyfi, Xusayni, Qora kishmish, Baxtiyoriy kabilar; o‘rtacha o‘suvchilarga Chillaki, Charos, Aleatiko, Saperavi, Rkatsiteli; kuchsiz o‘suvchilarga Risling, Pino cherniy kabilar kiradi. Ekish sxemasi ham o‘sish kuchiga qarab belgilanadi: kuchli o‘suvchilar uchun 3×2,5–3 m, o‘rtacha va sust o‘suvchilar uchun 3×2 m tavsiya etiladi.

Moslashuvchanlikni baholash kompleks yondashuvni talab qiladi. Tuproq omillari muhim ahamiyatga ega. Tok uchun eng qulay tuproqlar – mexanik tarkibi yengil (qumloq, o‘rtacha qumloq), unumdor, sug‘oriladigan yerlardir. Meliorativ holati yaxshilangan sho‘rlangan, yer osti suvi yuzada bo‘lgan, tosh-shag‘al, daryo o‘zanlariga yaqin bo‘z va o‘tloq tuproqlar ham maxsus agrotexnika bilan tok o‘stirish uchun yaroqli hisoblanadi.

Yer osti suvlarining chuqurligi kamida 2,5–3 m bo‘lishi tavsiya etiladi. Agar yer osti suvi 0,5–1 m chuqurlikda bo‘lsa, maxsus zovurlar yordamida zaxni qochirish kerak. Tuproq qatlami 40–50 sm bo‘lgan tosh-shag‘alli yerlarda organik o‘g‘itlar solish, ko‘kat o‘g‘itlardan foydalanish va yerni chuqur ag‘darib haydamaslik kabi tadbirlar qo‘llaniladi.

Sho‘rlanish darajasi 0,3–1 % gacha (xlor 0,01 % dan kam) bo‘lgan tuproqlar kuchsiz sho‘rlangan hisoblanib, tok uchun nisbatan xavfsizdir. Agar tuzlar miqdori 1–3 % va xlor 0,01–0,2 % bo‘lsa, tuproq kuchli sho‘rlangan deb baholanadi va o‘simlik uchun xavflidir. «Saperavi», «Bihishti», «Rizling», «Toyfi», «Qora kishmish» kabi navlar sho‘rga chidamliroq; «Husayni», «Chillaki», «Oq kishmish», «Venger muskati» esa sezgirroq hisoblanadi.

Iqlim omillari ham muhim. O‘zbekiston sharoitida yozning issiq va quruq ob-havosi, qishning nisbatan yumshoqligi ko‘pchilik navlar uchun qulaydir. Biroq iqlim o‘zgarishi sharoitida qurg‘oqchilikka va ekstremal haroratlarga chidamli navlarga e’tibor kuchaymoqda. Fenologik kuzatuvlar (kurtak yozilishi, gullash, pishish muddatlari) navning mahalliy sharoitga mosligini aniqlashda muhim ahamiyatga ega. Har bir fenologik faza davomiyligi tashqi sharoitlar, nav xususiyatlari va tup yoshiga bog‘liq.

Agrobiologik baholashda M.V. Melkonyan metodikasi keng qo‘llaniladi. Bu metodika asosida navlarning o‘sish kuchi, hosilli novdalar foizi, uzumboshi va g‘ujum o‘lchamlari, shakar to‘plash qobiliyati, mexanik tarkib (po‘st, eti, urug‘ nisbati) kabi ko‘rsatkichlar aniqlanadi. Uzoq muddatli kuzatuvlar (3–5 yil) natijasida navning barqarorligi va turli yillarda hosil berish qobiliyati baholanadi. Statistik tahlil (ANOVA va boshqalar) farqlarning ishonchliligini tasdiqlashda qo‘llaniladi.

Xo‘raki navlar orasida Husayni (Oq xusayni), Go‘zal qora, Qora janjal, Nimrang, Pushti toyfi, Kattaqo‘rg‘on, Rizamat, Parkent, Muskat aleksandrskiy kabilar keng tarqalgan. Ushbu navlar yirik g‘ujumli, yaxshi ta’mli va eksport uchun yaroqli. Husayni navi kuchli o‘sadi, hosildorligi yuqori, lekin sovuqqa nisbatan sezgir. Rizamat navi yirik g‘ujumli va yuqori sifatli mahsulot beradi. Pushti toyfi navi erta pishishi va yuqori hosildorligi bilan ajralib turadi.

Mintaqalar bo‘yicha tavsiyalar. Toshkent viloyati uchun: Surxak Kitabskiy, Qora kishmish, Pushti kishmish, Oq kishmish, Husayni, Go‘zal qora, Qora janjal, Nimrang, Pushti toyfi, Parkent. Farg‘ona vodiysi uchun: Andijon qorasi, Go‘zal qora, Husayni,

Nimrang, Pushti toyfi. Samarqand va Qashqadaryo viloyatlari uchun kishmishbop navlar (Qora kishmish, Sultoni) va yirik mevali xo‘raki navlar afzal. Xorazm va Qoraqalpog‘iston uchun sho‘rga chidamliroq navlar tanlanadi.

So‘nggi yillarda Avatar, Sogdiana, Preobrazheniye kabi yangi navlar joriy etilmoqda. Ular yuqori hosildorlik, kasalliklarga chidamlilik va uzoq muddat saqlash imkoniyati bilan ajralib turadi. Mahalliy genofonddan foydalanib yaratilgan yangi navlar iqlim o‘zgarishi sharoitida istiqbolli hisoblanadi.

Xulosa.Uzumning istiqbolli navlarini tanlashda tuproq-iqlim sharoitlariga moslashuvchanlikni kompleks baholash muhim ahamiyatga ega. Hosildorlik, mahsulot sifati, biotik va abiotik omillarga chidamlilik mezonlari asosida tanlangan navlar barqaror hosil olishni ta’minlaydi. O‘zbekistonning turli mintaqalari uchun mahalliy sharoitga moslashgan Husayni, Qora kishmish, Nimrang, Pushti toyfi, Rizamat, Kattaqo‘rg‘on kabi navlar tavsiya etiladi.

Kelgusida mahalliy genofonddan foydalanib, qurg‘oqchilikka, sho‘rlanishga va kasalliklarga chidamli yangi navlar yaratish, shuningdek, introduksiya qilingan navlarni mahalliy sharoitda sinovdan o‘tkazish ishlarini kengaytirish lozim. Bu esa uzumchilik tarmog‘ining barqaror rivojlanishiga, eksport salohiyatining oshishiga va iqlim o‘zgarishiga moslashuvchanlikni ta’minlashga xizmat qiladi.

Shuningdek, seleksiya ishlarini kuchaytirish, yangi duragaylarni yaratish va ularni ishlab chiqarishga joriy etish orqali O‘zbekiston uzumchiligining raqobatbardoshligini oshirish mumkin.

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COMPARATIVE DIAGNOSTIC PERFORMANCE OF TRANSVAGINAL ULTRASONOGRAPHY AND MAGNETIC RESONANCE IMAGING IN ADENOMYOSIS: AN EVIDENCE-INTEGRATED REVIEW OF ACCURACY, REAL-WORLD EVIDENCE, AND CLINICAL IMPLEMENTATION

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Abstract

Background: Adenomyosis is a heterogeneous uterine disorder characterized by endometrial-like tissue within the myometrium. Diagnostic uncertainty has consequences for pain management, heavy menstrual bleeding, infertility counselling, and selection of uterus-sparing therapy. Objective: To critically compare transvaginal ultrasonography (TVUS) and magnetic resonance imaging (MRI), and to establish a rigorous framework for evaluating diagnostic performance in routine care. Methods: This integrative evidence review prioritizes comparative diagnostic meta-analyses, the revised Morphological Uterus Sonographic Assessment (MUSA) consensus, clinical guidance, and relevant methodological and regulatory publications. We distinguish published empirical findings from proposed analytical protocols; no original patient cohort, new meta-analysis, or causal treatment-effect analysis was performed. Results: In a 2023 head-to-head meta-analysis encompassing six studies and 595 women undergoing both modalities before hysterectomy histopathology, pooled sensitivity and specificity were 75% and 81% for TVUS versus 69% and 80% for MRI, without statistically significant modality differences (P = 0.7509); between-study heterogeneity and selection bias limit universal extrapolation. Revised MUSA terminology separates direct signs, including intramyometrial cysts, echogenic islands, and subendometrial lines or buds, from indirect myometrial responses. MRI improves anatomical mapping when sonography is technically constrained or complex coexisting pathology requires clarification, but junctional-zone thickness thresholds alone are insufficiently robust across physiological contexts. Routine-care datasets may assess diagnostic pathways, interval to treatment, and downstream outcomes, provided verification bias, indication bias, missingness, and treatment changes are addressed. Emerging machine-learning systems remain investigational until externally validated and clinically calibrated. Conclusions: TVUS

should generally be the first-line examination when acceptable and feasible; MRI is a targeted second-line or problem-solving modality. Standardized feature reporting, reference-standard transparency, prospective multicentre validation, and careful governance of imaging artificial intelligence are more consequential than reliance on a single pooled accuracy estimate.

Keywords: adenomyosis; transvaginal ultrasonography; magnetic resonance imaging; MUSA; junctional zone; sensitivity; specificity; diagnostic accuracy; real-world evidence; artificial intelligence; histopathology; clinical decision support; women's health.

1. Introduction

2. Materials and Methods

1.1 Clinical and biological rationale

Adenomyosis encompasses multiple spatial phenotypes rather than a single homogeneous anatomical lesion. Myometrial glandular elements and accompanying smooth-muscle remodelling may be localized or diffuse; disease may coexist with leiomyomas, pelvic endometriosis, prior cesarean scars, and uterine enlargement. These combinations complicate the attribution of heavy menstrual bleeding, dysmenorrhea, chronic pelvic pain, and subfertility to any single finding. Clinical suspicion should therefore remain a hypothesis requiring contextualized imaging rather than a binary diagnosis based on symptoms alone. [1–4]

The historical reliance on hysterectomy histopathology created a particular evidence problem: women receiving a definitive reference-standard diagnosis were disproportionately older, symptomatic, and finished with childbearing. Contemporary fertility-preserving practice necessarily relies on imaging-based probability estimates, where the target condition may be detected without subsequent hysterectomy. The change expands access to diagnosis but also makes the apparent sensitivity and specificity dependent on what investigators call disease and how they verify it. [1–4]

The relevant clinical question is not whether one image modality is intrinsically superior in every setting. It is whether each modality provides the information needed for a specific management decision: recognition of direct myometrial signs, exclusion of alternative structural pathology, description of disease extent, and planning of conservative treatment. A first-line choice should consider availability, patient

preference, contraindications, cost, downstream tests, and the consequences of false reassurance. [2–5]

1.2 Real-world data and evidence as distinct concepts

Real-world data (RWD) are observations generated in the ordinary provision of healthcare and daily life, including electronic health records, administrative claims, disease registries, imaging archives, electronic prescriptions, laboratory databases, wearable-device signals, and patient-reported information. Real-world evidence (RWE) arises only when such data are analysed with a prespecified question, defensible design, and transparent assumptions. A large imaging archive is not itself evidence that MRI improves outcomes; it becomes informative only if eligibility, comparator, reference standard, follow-up, and confounding are specified. [6–10]

For adenomyosis, RWD can document the actual sequence of TVUS, MRI, medical treatment, and surgery, thereby revealing circumstances excluded from narrowly selected accuracy studies. Such datasets can also introduce substantial error: a diagnosis code may represent suspected rather than verified disease; an MRI order may identify clinically complex patients; histology is available principally in those selected for surgery; and absence of a coded symptom cannot be equated with absence of that symptom. These pitfalls make causal identification and data provenance essential. [6–10]

1.3 Randomized trials, efficacy, and effectiveness

Randomized controlled trials (RCTs) reduce confounding for randomized interventions under specific inclusion criteria and protocols. Diagnostic-accuracy research, in contrast, generally compares an index test with a reference standard in a clinically relevant spectrum of patients; routine randomized treatment trials cannot be substituted for paired diagnostic evaluations. Randomization of diagnostic strategies may be useful when the endpoint is patient benefit, such as time to appropriate management, rather than merely the accuracy of an image. [11–13]

Efficacy denotes performance under carefully controlled conditions, whereas effectiveness denotes performance under real-world implementation. A levonorgestrel-releasing intrauterine system, hormonal regimen, or surgical strategy might show efficacy in an RCT but achieve different symptom control in routine practice because of adherence, costs, coexisting fibroids, disease phenotype, and changing reproductive goals. Imaging effectiveness likewise includes operator availability, scan quality, interpretation consistency, referral delays, and whether an imaging result changes care. The distinction is not semantic: it determines the estimand and the interpretation of a clinical study. [7–10]

1.4 Regulation and artificial intelligence

The FDA's RWE program addresses appropriate use of routinely collected data for regulatory decisions, while the European Medicines Agency's DARWIN EU initiative facilitates studies using observational healthcare databases. Their relevance to adenomyosis is methodological, not a claim that either agency has approved an adenomyosis-specific RWD diagnostic algorithm. The World Health Organization's artificial-intelligence guidance emphasizes autonomy, safety, accountability, equity, and protection of health information. [6–10,14]

Artificial intelligence (AI) may help segment the junctional zone, identify MUSA features, and extract imaging findings from narrative reports. However, datasets may contain silent labels that merely reproduce sonographers' opinions; systems trained on hysterectomy-selected cohorts can miscalibrate in younger or fertility-seeking populations. A clinically useful tool needs external validation, subgroup performance reporting, reliable uncertainty quantification, human oversight, and surveillance after deployment. [14–17]

2.1 Review design and transparent source selection

This manuscript is an integrative critical review, not a prospectively registered systematic review. Its empirical anchors are published diagnostic meta-analyses, consensus criteria, and peer-reviewed clinical guidelines. Targeted searches were informed by PubMed-indexed literature, journal publications, and official WHO, FDA and EMA information available through October 2026. Embase, Scopus, Web of Science and the Cochrane Library are recommended sources for a future exhaustive review; independent complete searches of those subscription databases were not undertaken here. Consequently, no fabricated PRISMA flow counts, unpublished pooled estimates, or claims of comprehensive database coverage are supplied.

For a reproducible systematic update, candidate terms include "adenomyosis", "transvaginal ultrasound", "sonography", "magnetic resonance imaging", "junctional zone", "MUSA", "sensitivity", "specificity", "diagnostic test accuracy", and "real world evidence". Inclusion should prioritize women assessed with both index tests, explicit blinding, a stated and clinically defensible reference standard, extractable two-by-two data, and transparent sampling. Reviews, guidelines and methodological studies are included separately as contextual evidence; case reports and unverified claims should not contribute to pooled estimates. [1–5,11–13]

2.2 Risk of bias, extraction, and synthesis

Data abstraction for a future formal review should capture sample size, care setting, age and reproductive profile, imaging equipment, examiner expertise, MRI sequences, direct and indirect features, reference standard, reference-test interval, fibroid burden, imaging interpretation blinding, and the number of participants not verified by histology. QUADAS-2 is suitable for appraisal of patient selection, index testing, reference testing and flow/timing; applicability should be distinguished from internal bias. STARD supports complete reporting of diagnostic accuracy, while PRISMA-DTA is relevant to a systematic synthesis. [11–13]

Diagnostic performance should be reported with sensitivity, specificity, likelihood ratios, diagnostic odds ratios, confidence intervals and decision-specific predictive values. Sensitivity is the proportion of reference-positive cases recognized by the index test; specificity is the proportion of reference-negative cases correctly identified. Positive and negative predictive values depend on disease prevalence and must not be transferred without adjustment between referral clinics and community populations. A bivariate random-effects model or hierarchical summary ROC model may be appropriate when enough sufficiently comparable studies are identified. [1,4,11–13]

2.3 Causal inference and survival methodology

Propensity-score matching (PSM) balances measured baseline characteristics across groups receiving different diagnostic strategies; it cannot correct unmeasured indication bias. Inverse probability weighting (IPW) forms a pseudo-population in which treatment assignment is less associated with observed baseline covariates, but unstable weights arise under weak positivity. Target-trial emulation specifies a hypothetical clinical trial before analysing RWD: eligibility, treatment strategies, treatment assignment, time zero, follow-up, outcomes, causal contrast, and analysis plan. Failure to align time zero can create immortal-time bias. [18–21]

Kaplan–Meier curves describe observed time-to-event experience subject to censoring assumptions, while Cox proportional-hazards models estimate hazard ratios assuming proportional hazards and suitable covariate adjustment. For adenomyosis, potential endpoints include time from the initial suspected diagnosis to definitive treatment, symptom recurrence, or subsequent hysterectomy; a competing-risk model may be preferable when mutually exclusive reproductive or surgical events occur. These methods are described as tools for future studies, not as calculations conducted in this review. [20–22]

2.4 Artificial-intelligence analysis methods

Machine learning encompasses supervised prediction such as penalized regression, random forests, and gradient-boosted trees; deep learning includes convolutional and transformer architectures that process image textures and spatial patterns. Natural-language processing (NLP) structures free-text sonography and MRI reports; large language models (LLMs) may draft structured summaries but must not be permitted to invent features. Reinforcement learning might theoretically optimize sequential testing decisions, yet its reward specification, safety constraints and deployment evidence remain insufficient for routine adenomyosis care. [14–17]

A valid model development protocol should partition data by patient and preferably by hospital or calendar period, prevent leakage from downstream histology or treatment, prespecify thresholds, report sensitivity and calibration by subgroup, and test robustness across scanners. Explainable-AI heat maps are not evidence of causal reasoning; reader studies and prospective intervention trials are needed to establish improved decisions. [14–17]

3. Results: Critical Synthesis of Published Evidence

3.1 Comparative accuracy: paired evidence versus indirect comparisons

The most directly informative published comparison evaluated women who underwent both TVUS and MRI and then hysterectomy histology. Alcázar and colleagues synthesized six head-to-head studies including 595 women; pooled TVUS sensitivity and specificity were 75% and 81%, with positive and negative likelihood ratios of 3.9 and 0.31. MRI sensitivity and specificity were 69% and 80%, with positive and negative likelihood ratios of 3.5 and 0.39. The reported difference between the modalities was not statistically significant (P = 0.7509). These figures pertain to the selected studies rather than all patients with suspected adenomyosis. [1]

The key advantage of a paired design is that disease spectrum is shared between modalities. In an unpaired meta-analysis, an apparently superior MRI estimate might reflect referral patterns and a different prevalence of diffuse disease rather than diagnostic superiority. Even paired studies may favor either test if assessors see the other modality's results, if the interval to pathology is long, or if diagnostic thresholds differ. The underlying meta-analysis identified high patient-selection bias in several studies and substantial heterogeneity. Such limitations justify careful interpretation rather than an assertion of equivalence in every subgroup. [1]

Earlier structured reviews also concluded that TVUS and MRI perform similarly overall, while acknowledging variation by three-dimensional acquisition, operator proficiency and definitions of adenomyosis. Results must be reported by study and design rather than averaged indiscriminately from different publications. [3,4]

3.2 Sonographic MUSA criteria: what constitutes direct evidence

The revised MUSA consensus distinguished direct features reflecting ectopic endometrium within the myometrium from indirect changes that may arise through muscular or architectural responses. Direct features are myometrial cysts, hyperechogenic islands, and echogenic subendometrial lines and buds. Indirect features are globular uterine configuration, asymmetrical myometrial wall thickening, fan-shaped shadowing, translesional vascularity, and an irregular or interrupted junctional zone. [2]

This separation is clinically consequential. A globular uterus can occur with fibroids or other uterine distortion. Fan-shaped shadowing can be influenced by acquisition angle and fibrotic architecture. Conversely, a small direct intramyometrial cyst should not be dismissed merely because global uterine shape appears normal. Doppler imaging may distinguish a cyst from an intramyometrial blood vessel. In the absence of direct features, indirect features alone do not conclusively establish adenomyosis according to the revised MUSA consensus. [2]

Standardized reports should indicate which specific features are present, whether each is direct or indirect, the location and focality of abnormalities, coexisting fibroids, image limitations, and level of reader confidence. Dichotomous report labels without documented features impede later audits and machine-learning research. They also make disagreement difficult to resolve because the reason for the label is invisible. [2,5]

3.3 MRI morphology and junctional-zone interpretation

MRI demonstrates the endometrial–myometrial interface and broader pelvic anatomy using T2-weighted sequences, with selected T1-weighted imaging to detect hemorrhagic foci or characterize associated pelvic pathology. Thickening, irregularity, high-signal foci and distortion of the junctional zone can support adenomyosis, especially in focal posterior-wall or difficult-to-visualize lesions. However, a junctional-zone measurement is sensitive to hormonal state, transient contractions, menstrual phase and scanner technique; isolated numerical thresholds are not an adequate substitute for pattern recognition. [5]

MRI may add value in patients with a large or multifibroid uterus, poor acoustic access, ambiguity between adenomyoma and leiomyoma, or extensive concomitant endometriosis. It can also help the multidisciplinary team map disease prior to complex

uterine-sparing procedures. Yet an additional MRI does not automatically provide independent information if the ultrasound is already high quality and the clinical decision would be unchanged. [1,5]

Reports should note uterine dimensions, lesion location, extent of myometrial involvement, image sequences used, competing diagnoses, and examination limitations. When reporting junctional-zone measurements, radiologists should describe technical and physiological context rather than interpret an isolated cutoff as a universal gold standard. [2,5]

3.4 Dynamic TVUS and anatomical mapping

Dynamic TVUS has a distinctive clinical advantage: the examiner can link focal probe tenderness with uterine anatomy, assess organ mobility and visualize vascular patterns in real time. This cannot prove that a specific lesion is the sole pain generator, but it contributes to a contextual diagnostic assessment. In experienced hands, combined two- and three-dimensional visualization may clarify the coronal plane and junctional-zone continuity. [2,5]

Access to expert sonography remains uneven. A low-cost transvaginal study may be low value if the operator lacks training in direct MUSA features or stores no reviewable cine loops. Conversely, expert TVUS may obviate more expensive cross-sectional imaging for a substantial group with characteristic disease and no management-changing uncertainty. The appropriate comparative outcome is therefore not simply equipment cost but the full diagnostic pathway, including return appointments and unresolved symptoms. [1,2,5]

Patient-centred limitations deserve explicit attention. Transvaginal examination may be declined, contraindicated in a specific situation, distressing, or technically impossible. Transabdominal sonography and MRI then become context-dependent alternatives without implying that a patient must undergo an invasive examination to qualify for investigation. [5]

3.5 Differential diagnosis and mixed pathology

Adenomyosis frequently coexists with leiomyomas and endometriosis. A focal adenomyoma may resemble a fibroid, but diffuse margins, lack of a discrete capsule, translesional rather than circumferential vascularity, and junctional-zone disruption can favor adenomyosis. These are probabilistic features rather than individually definitive signs. Fibroids may distort the uterus and reduce confidence in measuring myometrial thickness or interpreting shadows. [2,5]

Other differential considerations include physiological myometrial contractions, postprocedural changes, scarring and rare malignant pathology when clinical or imaging red flags appear. A suspicious mass, atypical rapid change after menopause, or unexplained abnormal bleeding requires evaluation according to clinical oncology and endometrial-sampling pathways rather than automatic attribution to adenomyosis. Neither TVUS nor MRI alone should be treated as a histologic cancer-exclusion test.

The most useful report identifies coexisting structural abnormalities and explicitly distinguishes confident adenomyotic signs from features potentially explained by another condition. A negative scan cannot always exclude early, mild or focal disease because sensitivity is imperfect and histopathology is not routinely obtained in conservatively managed patients. [1,2]

3.6 The effect of disease spectrum on diagnostic estimates

Diagnostic accuracy is a property of the test operating in a defined population, not an immutable characteristic of the device. Studies of hysterectomy specimens may overrepresent advanced diffuse disease and symptomatic uterine enlargement, making both modalities appear more sensitive than they would be for early or small-volume disease in infertility clinics. At the same time, severe concurrent fibroid disease may reduce the readability of either modality and complicate histological attribution. [1,3,4]

Diagnostic sensitivity can therefore shift with age, parity, hormonal therapy, lesion location and the proficiency of the imaging expert. Subgroup-specific confidence intervals and information about inconclusive scans should be included. Excluding indeterminate examinations from a study may inflate apparent accuracy and conceal the real clinical cost of repeated imaging. [11–13]

Sensitivity and specificity must not be substituted for predictive values. In populations with a low pre-test probability, a positive result for a nonspecific indirect feature may warrant careful review rather than immediate high-intensity therapy. Conversely, a negative result in a patient with strongly suggestive pain and bleeding does not eliminate the need for follow-up and alternative diagnoses. [1,2]

3.7 Clinical decision pathway and resource allocation

A pragmatic diagnostic algorithm begins with clinical history, pregnancy-related considerations when relevant, bleeding assessment, fertility intentions and physical examination as appropriate. TVUS performed using a standardized feature checklist is generally the first imaging choice. When direct MUSA features and the clinical context agree, a working diagnosis may be sufficiently supported for shared management

decisions. MRI is reserved for indeterminate TVUS, complex uterine anatomy, discordant clinical findings, or mapping likely to alter treatment. [2,5]

The value of imaging should be measured by management consequences: whether treatment is changed appropriately, repeat imaging is avoided, preventable procedures are reduced and patient outcomes improve. A modality with slightly higher technical accuracy may be less effective when inaccessible or slow; a cheaper modality may be insufficient when uncertainty causes repeated referrals or inappropriate procedures. Local resource analysis should include reader training, maintenance, scheduling and data interoperability. [6–10]

Fertility-preservation counselling adds another layer. Imaging may characterize extent and concurrent pathology but cannot determine reproductive prognosis with certainty for an individual. Decision-making should balance symptoms, coexisting infertility factors, treatment preference and evolving evidence rather than a single ultrasound or MRI score. [5]

3.8 Real-world data sources for adenomyosis

Electronic medical records can yield presenting symptoms, obstetric history, prior procedures, imaging referrals, pathology results and treatment decisions. Electronic prescription systems provide medication exposure proxies, but a filled prescription does not establish adherence. Laboratory datasets can contribute hemoglobin and anemia assessments in heavy bleeding, while national registries can follow hysterectomy and subsequent healthcare use. Pharmacovigilance reports can describe suspected adverse drug reactions but generally cannot calculate incidence without reliable denominators. [6–10]

Insurance claims are useful for utilization and cost analyses but have imprecise phenotyping and may omit important care outside the insured system. Wearable devices and mobile applications may prospectively capture pain, bleeding, medication reminders and quality-of-life trajectories; missingness may be associated with worse symptoms or disengagement, creating bias. Imaging archives and structured MUSA reports are particularly valuable when images can be independently reread. [6–10]

A linked registry should employ patient-level pseudonymization, standardized diagnostic vocabulary, procedure timestamps, explicit indication for MRI, and documentation of certainty. Data governance must distinguish clinical service provision, research use, and algorithm development permissions. A registry that merely aggregates unverified diagnostic codes cannot resolve disputed imaging accuracy. [6–10]

3.9 RWE and comparative effectiveness of diagnostic strategies

A future target trial could compare “expert TVUS first, MRI only if predefined uncertainty remains” with “routine MRI after TVUS” among newly evaluated patients who meet specified criteria. Time zero must be the initial imaging decision rather than the date of MRI completion. Outcomes might include time to an actionable diagnosis, appropriate change in management, unplanned surgery, patient-reported symptom burden and total direct cost. Important baseline confounders would include disease severity, fibroids, fertility goals, age, facility type and access to imaging. [18–21]

Propensity-score matching and IPW may help handle measured differences, but MRI often follows inconclusive sonography, making confounding by indication particularly severe. Instrumental variables are not automatically valid: facility access to MRI could also affect specialist care, invalidating exclusion assumptions. An observational estimate should present the causal diagram, estimand, positivity diagnostics, weight distributions, balance plots and sensitivity analyses. [18–21]

Kaplan–Meier and Cox methods are appropriate only for correctly defined time-to-event endpoints; they do not estimate ultrasound sensitivity. Competing risks and time-varying interventions may be essential when patients transition between medical and surgical treatment. Results cannot be described as causal merely because a multivariable model returns a statistically significant coefficient. [20–22]

3.10 Machine learning, deep learning, NLP, and LLMs

Machine-learning approaches can integrate MUSA-feature checklists, patient symptoms, hemoglobin levels and ultrasound images to predict the probability of clinically meaningful adenomyosis. Deep-learning models may attempt segmentation of the uterine contours and junctional zone or classification of T2-weighted MRI patterns. Such tasks have distinct ground truths: identifying a reader-labelled feature, reproducing a pathology diagnosis and predicting symptom burden should not be conflated. [14–17]

Natural-language processing can identify direct signs, uncertain language and coexisting fibroids from clinical reports. LLMs can support structured report conversion and patient-facing explanations, but hallucination and loss of negation can produce serious misclassification. Human validation, explicit uncertainty markers and protected clinical data flows are necessary. Reinforcement learning, sometimes proposed for sequential testing, is currently better regarded as a research framework than a clinically validated method for selecting MRI in individual patients. [14–17]

Robust evaluation would require patient-level and site-level separation, external validation on different machines, calibration, subgroup analysis and prospective testing

of whether AI assistance improves expert decisions. A model trained only on MRI studies from tertiary centres may fail on low-resource ultrasound datasets. A high internal AUROC without prospective generalizability does not establish clinical effectiveness. [14–17]

3.11 Treatment forecasting and cross-specialty generalizability

Cross-specialty predictive medicine illustrates possibilities but provides no automatic evidence for adenomyosis treatment response. In diabetes, algorithms may model glucose outcomes; in cardiovascular disease, event risks; in oncology, treatment response; in infectious diseases, resistance; and in neurology, longitudinal disability or relapse. These prediction tasks vary in data-generating process, competing risks and treatment selection, and their performance cannot be transferred to gynecology without independent validation. [14–17]

Within adenomyosis, clinically relevant prediction targets include response to a levonorgestrel-releasing intrauterine system, hormonal therapy discontinuation, recurrent bleeding after conservative intervention, and eventual hysterectomy. Candidate predictors may include baseline symptom severity, age, parity, imaging phenotype, fibroid co-occurrence and treatment adherence. Neither a mechanistic biomarker nor a single MRI measurement currently justifies a universal precision-treatment algorithm. [5]

The methodological priority is defining an actionable decision and evaluating incremental benefit over simpler clinical models. Reporting should quantify calibration, net benefit, fairness and the burden of false treatment predictions, rather than relying exclusively on discrimination metrics. [14–17]

3.12 Safety surveillance, pharmacovigilance, and precision care

Medical management can involve hormonal agents, analgesics and interventions with different safety profiles, so adverse drug reactions (ADRs), safety-signal detection and pharmacovigilance analytics are appropriate adjuncts to a longitudinal adenomyosis registry. Spontaneous reports are valuable for early signal generation but suffer from underreporting, stimulated reporting, duplicate submissions and absent exposure denominators. A signal is a prompt for verification, not a causal effect estimate. [8–10]

Precision medicine would ideally incorporate reproductive goals, bleeding burden, pain phenotype, structural imaging distribution, comorbid conditions and treatment tolerability. Pharmacogenetics or pharmacogenomics could eventually inform drug metabolism or response, but no validated routine pharmacogenomic test currently selects TVUS versus MRI for adenomyosis. Candidate biomarkers must demonstrate reproducibility and clinical utility beyond correlations. [5]

Clinical pharmacology services can help maintain consistent coding of medication exposures, contraindications, adverse events and follow-up. In safety analyses, new-user active-comparator designs and well-defined risk windows are usually more informative than unadjusted comparisons of all treated and untreated patients. [18–21]

3.13 Uzbekistan: actionable digital-health research pathway

A national or multicentre Uzbekistan adenomyosis program should be constructed as a prospective clinical-imaging registry rather than assuming that a complete interoperable national dataset already exists. The Ministry of Health, regional gynecology services, ultrasound departments and radiology specialists could jointly define a minimal data dictionary covering presenting symptoms, ultrasound MUSA signs, MRI indication, imaging outcome, treatment, longitudinal quality-of-life assessment and referral delay. Anonymized imaging archives would enable periodic expert audit.

Existing and planned electronic-health and electronic-prescription initiatives are relevant for linking care episodes and treatment utilization, but operational coverage, data standards and legal authorizations must be checked institution by institution. A phased pilot should first assess data completeness and reader agreement, then diagnostic agreement, and only later comparative strategy effectiveness. Where resources are limited, investments in sonographer training, standardized reports and audit infrastructure may deliver greater early benefit than an indiscriminate expansion of MRI ordering.

Locally developed AI should follow ethical review, cybersecurity evaluation, patient consent or another legitimate legal basis, external validation, monitoring and clearly defined clinical responsibility. Research collaboration across tertiary and district facilities is essential to avoid a model that works only at a well-equipped referral institution. Hospital-specific estimates should not be presented as national disease prevalence. [14–17]

3.14 Heterogeneity, missing data and ethical safeguards

Missing data can be missing completely at random, at random conditional on observed covariates, or not at random; patients with greater symptom burden may have more intense follow-up and disproportionately complete diagnostic labels. Multiple imputation may be reasonable under a defensible missing-at-random model but cannot recover an inaccessible reference standard by assumption. Complete-case analysis should be justified, and sensitivity analyses should test plausible informative missingness. [18–21]

Observer disagreement matters as much as automated classification error. Direct MUSA features can be subtle, and MRI junctional-zone boundaries may vary with acquisition or physiological state. Reader agreement needs prespecified assessment,

while uncertain cases should be retained and reported rather than silently excluded. Structured reporting should capture the complete spectrum of quality and uncertainty. [2,11–13]

Ethical AI requires representativeness, data minimization, transparent performance by demographic subgroup, a mechanism for clinician challenge, and governance against secondary uses of sensitive reproductive information. Explainability should support clinician review but cannot replace demonstrated clinical safety. When the algorithm disagrees with a radiologist or sonographer, the pathway must specify who adjudicates and what additional evidence is required. [14–17]

Table 1. Head-to-head accuracy in histology-verified populations

Index test	Sensitivity	Specificity	LR+	LR−
TVUS	75%	81%	3.9	0.31
MRI	69%	80%	3.5	0.39

Source: Alcázar et al., 2023, six paired studies (n = 595); between-test P = 0.7509. These are published pooled estimates, not calculations performed in this review. [1]

Table 2. Evidence-informed clinical roles

Dimension	TVUS	MRI
Initial examination	Usually preferred first-line	Typically second-line
MUSA feature assessment	Dynamic direct/indirect signs	Complementary morphology and mapping
Complex fibroids	May be technically limited	Can clarify full pelvic anatomy
Patient factors	Transvaginal approach may be declined	MRI access and contraindications matter
Clinical interpretation	Operator expertise critical	Reader expertise and acquisition critical

Interpretive synthesis based on [1,2,5]; this is not a quantitative head-to-head resource-use analysis.

4. Discussion

4.1 What comparison studies prove—and what they cannot prove

The central finding is that the best paired diagnostic synthesis did not identify a statistically significant difference between TVUS and MRI in women selected for

histopathological verification. Absence of a statistically significant difference is not proof of formal equivalence: equivalence requires prespecified margins and a design with adequate precision to exclude clinically important differences. The observed point estimates and confidence around them must be interpreted together with heterogeneity and the differing clinical purposes of each modality. [1]

A policy that reflexively replaces ultrasound with MRI would disregard the imaging expertise that underlies good TVUS performance and the additional logistical costs of cross-sectional imaging. An opposite policy that prohibits MRI even for inconclusive ultrasound could create diagnostic delays in anatomically complex cases. A targeted sequencing strategy reconciles comparable average accuracy with different strengths in diagnostic problem solving. [1,5]

4.2 Bias, verification, and the meaning of a gold standard

Histology remains important for confirmation when tissue is obtained, but hysterectomy sampling imposes a strong selection mechanism. Surgical patients may differ from conservatively managed patients in age, symptom severity, fertility goals and disease extent. This is partial-verification and spectrum bias, not an incidental limitation. Even meticulously conducted accuracy analyses cannot fully extrapolate to early disease if that population is absent from the source studies. [1,11–13]

Imaging-only labels are also imperfect because a second expert opinion may replicate correlated errors rather than deliver an independent reference standard. Better evidence will require longitudinal reference frameworks, expert imaging consensus, surgical pathology when clinically indicated and explicit sensitivity analyses that consider uncertainty in disease status. [2,11–13]

4.3 Explainable AI, regulatory science, and patient safety

WHO guidance requires that clinical AI respect autonomy, promote well-being, operate transparently, foster responsibility, ensure equity and remain sustainable. FDA publications on AI-enabled medical devices emphasize lifecycle risk management and the challenge of models modified after deployment; EMA observational evidence systems create opportunities for postmarket questions but do not replace prospective diagnostic validation. An AI classifier used to prioritize MRI referral would be a clinical decision support tool with potential patient harms if it systematically underestimates disease in underrepresented groups. [8–10,14–17]

Responsible deployment needs version control, predefined performance thresholds, human oversight, monitoring of diagnostic delays, documented escalation for uncertain cases and independent governance of secondary data uses. A saliency map may help audit

where a neural network attends, but it should not be described as a physiological explanation for adenomyosis. Clinical utility must be demonstrated through outcomes, not aesthetic plausibility of highlighted pixels. [14–17]

4.4 Translational and implementation priorities

The next generation of studies should combine representative prospective imaging cohorts, structured MUSA checklists and explicitly defined management endpoints. Separate analyses should examine women seeking fertility treatment, patients with fibroids, and patients whose TVUS is indeterminate. Head-to-head comparisons should include actual nondiagnostic test rates and incremental diagnostic yield after the first test, rather than only sensitivity and specificity among fully readable examinations. [1–5]

In Uzbekistan and similar settings, the most feasible initial improvement is a standardized sonography pathway coupled with access to expert MRI review for selected cases. Before implementing an AI triage system, health services should establish interoperable structured reports, quality review of stored images, informed data governance, and a reliable process for correcting inaccurate labels. These prerequisites are also necessary for credible RWE studies. [6–10,14]

5. Conclusion

TVUS and MRI are complementary, noninvasive modalities with similar aggregate diagnostic performance in available histology-verified head-to-head data. Expert TVUS using revised MUSA terminology is the appropriate first-line strategy for many patients, whereas MRI is most valuable for inconclusive imaging, complex coexisting pathology and treatment-relevant anatomical mapping. The priority for international and Uzbekistan-based research is prospective patient-centred validation, standardized interpretation, rigorous reference-standard reporting and causally defensible analysis of real clinical pathways. Neither RWD volume nor AI model complexity compensates for biased selection, poor labels or missing clinical outcomes.

Declarations: Study type: critical integrative literature review. Original human participants: none. New clinical dataset or statistical meta-analysis: none. Funding: not specified. Conflicts of interest: to be declared by the submitting authors. Data availability: all reported empirical numerical findings are drawn from cited publications.

6. Supplementary Critical Analysis — Pretest probability, likelihood ratios, and decision thresholds

A diagnostic image does not exist outside the clinical context in which it was obtained. A patient with severe progressive dysmenorrhea, heavy menstrual bleeding, a tender enlarged uterus and suggestive previous imaging has a different pretest probability than a person without symptoms in whom a nonspecific myometrial change is noted incidentally. Even when published sensitivity and specificity appear stable, the positive predictive value declines as prevalence falls. A low-probability setting may therefore produce more false-positive labels than a tertiary referral clinic. This is particularly important for indirect MUSA features, which can be mimicked by fibroids or transient myometrial appearances. [1,2]

Likelihood ratios offer a more transportable way to update probability than predictive values, although the underlying ratios must still be appropriate for the target population. A positive likelihood ratio increases the odds of disease by multiplying pretest odds; a negative likelihood ratio reduces them. Because the meta-analytical likelihood ratios reported for both tests are moderate rather than conclusive, neither a positive nor a negative image uniformly settles all clinical decisions. The appropriate next action depends on whether the posterior probability crosses a threshold at which reassurance, additional investigation, symptom-directed treatment, or surgical consultation becomes worthwhile. [1]

Decision thresholds should be explicit in research. A low-risk symptomatic treatment may reasonably proceed without surgical verification, whereas a potentially irreversible intervention demands greater attention to alternative diagnoses and management preferences. An economic model should therefore compare outcomes of entire diagnostic strategies rather than a theoretical maximum of test accuracy. Such a model should avoid using the same study-derived sensitivity, specificity and prevalence as if they were independent, and should propagate uncertainty through probabilistic sensitivity analysis. [6–10]

6. Supplementary Critical Analysis — Disease morphology, menstrual phase, and technical acquisition

Adenomyosis does not have a single macroscopic distribution. Focal disease can create a localized mass-like area; diffuse disease may involve multiple uterine walls; outer-myometrial abnormalities may coexist with pelvic endometriosis. A reporting system that records only “adenomyosis present” erases information relevant to surgical mapping and to the evaluation of infertility and pain. It also obscures the mechanisms underlying

apparent disagreement between MRI and TVUS. When one modality reveals disease extent more clearly, the gain may concern mapping rather than binary disease classification. [2,5]

Image acquisition deserves as much scrutiny as diagnostic definitions. The appearance of the junctional zone changes with uterine contraction and hormonal environment. MRI performed during transient contraction may yield apparent thickening or asymmetry that changes on repeat sequences; ultrasound visualization can vary with insonation angle, probe pressure and the acoustic consequences of fibroids. These effects argue for a structured minimum image set and documentation of quality, not for inflexible use of a millimetre threshold. [2,5]

In comparative studies, investigators should document whether images were read prospectively or retrospectively and whether the radiologist knew the clinical indication or ultrasound findings. Blinding reduces interpretation bias but may be less reflective of actual practice, where clinical context can improve interpretation. Both approaches are valuable if their target question is explicit: blinded accuracy estimates address discrimination from imaging information, while pragmatic evaluations address clinical decision-making with contextual information. [11–13]

6. Supplementary Critical Analysis — Concordant and discordant test results

Clinical concordance is useful but not synonymous with truth. When both TVUS and MRI identify convincing direct signs, confidence may increase; however, their errors are correlated because they visualize related anatomical changes. Multiplying the likelihood ratios of both tests as though their results were statistically independent would overstate confidence. Conversely, disagreement may reflect differing thresholds, lesion visibility, technical constraints or reader expertise rather than an error in one modality. [1–5]

A structured discordance pathway should first re-examine the raw images and the definition of the reported feature. Was a supposed myometrial cyst truly intramyometrial or an obliquely imaged vessel? Was an MRI junctional-zone irregularity caused by a contraction? Did a large fibroid obscure the endometrial–myometrial interface? Expert second review can be preferable to reflexive repeat acquisition where the original images are adequate. If uncertainty persists, follow-up decisions should be guided by symptoms, fertility goals, planned interventions and alternative diagnoses. [2,5]

Future paired investigations can classify discordances by feature type and technical quality and prospectively test whether MRI changed decisions after an inconclusive expert ultrasound. A report that MRI identified more lesions without showing changes in management or patient outcomes would not alone establish a superior clinical pathway.

Similarly, an apparently low discordance rate may conceal exclusion of difficult cases. All indeterminate examinations should be enumerated and analysed to preserve real-world relevance. [1,11–13]

6. Supplementary Critical Analysis — Patient-reported outcomes and longitudinal clinical benefit

The measurement of diagnostic usefulness is incomplete without outcomes that matter to patients. Pain severity, functional interference, bleeding impact, fatigue related to anemia, sexual wellbeing and fertility-related concerns may respond differently to an imaging-informed intervention. Standardized patient-reported outcome measures can complement clinician records, but their timing, recall period and missingness require deliberate design. A single postoperative report may be influenced by the indication for treatment and cannot be attributed solely to the imaging modality used.

A prospective cohort should capture symptom baseline before the index scan and follow participants at clinically meaningful intervals using consistent instruments. Prespecified endpoints could include change in bleeding burden, time to appropriate treatment, need for a second modality, reconsultations and decisional regret. For people seeking pregnancy, pregnancy-related outcomes require separate consideration and adjustment for major fertility determinants. An imaging diagnosis may aid counselling without being a sufficient predictor of reproductive success. [5]

Pragmatic strategy trials could investigate whether expert TVUS with conditional MRI shortens time to meaningful care compared with prevailing referral practice. Randomization should take place at the decision node, not after clinicians have selected a subgroup for MRI based on undocumented reasons. Such trials would answer a different and more clinically useful question than comparisons against hysterectomy pathology alone. RWE studies may complement trials by examining access and adoption in populations that would not meet strict trial criteria. [6–10,18–21]

6. Supplementary Critical Analysis — Data linkage, vocabulary, and reproducibility

Interoperability is not achieved merely by storing images and text in the same electronic folder. An analysis-ready dataset needs stable patient identifiers protected by pseudonymization, trustworthy examination timestamps, modality identifiers, equipment characteristics and consistent feature labels. Reports should distinguish negative findings from features that were not evaluated and from technically uninterpretable regions. A missing MUSA assessment cannot legitimately be converted into an absent feature when training an AI classifier.

Disease codes can be provisional, especially when used for referral and reimbursement. Linkage to imaging narratives and, where available, pathology or longitudinal specialist review can improve phenotyping. An adjudication protocol should document how contradictory records are handled and should permit revisions without overwriting the original clinical record. Version control is necessary because improvements to diagnostic terminology can alter the apparent incidence of adenomyosis even when the underlying population risk remains unchanged. [2,6–10]

Reproducible RWE research benefits from prespecified protocols, transparent data dictionaries, shared analytical code when legally permissible and explicit definitions of exposure windows and follow-up. Independent replication across institutions is particularly valuable for ultrasound studies because operator expertise is not encoded reliably in conventional administrative datasets. Model-development publications should identify the number of unique patients as well as examinations, ensuring that repeated scans from the same person do not contaminate both training and test sets. [14–17]

6. Supplementary Critical Analysis — Statistical uncertainty and research priorities

The interpretation of comparative accuracy depends on the uncertainty surrounding pooled estimates. Confidence intervals express sampling uncertainty under the chosen synthesis model, while prediction intervals, when estimable, communicate the expected range of effects in a new clinical setting. High between-study heterogeneity suggests that a single summary sensitivity cannot replace examination of different imaging protocols and patient populations. A nonsignificant comparison can arise from imprecision rather than evidence that the technologies are interchangeable under all conditions. [1,3,4]

Future systematic reviews should prospectively register their methods, present complete search strings and deduplication rules, document excluded full-text studies, and assess whether threshold differences or clinical populations explain heterogeneity. Meta-regression should be limited to interpretable prespecified modifiers, especially when the number of studies is small. Selection of a subgroup solely because it yields significance invites overfitting and exaggerated certainty. Where publication-level data are too heterogeneous, a structured narrative synthesis is preferable to false precision. [11–13]

The most consequential research gaps include mild adenomyosis in reproductive-age populations, performance in the presence of fibroids, patient acceptance of TVUS, comparative cost effectiveness, diagnostic uncertainty, and inter-reader agreement using revised MUSA definitions. For MRI, standardized sequence acquisition and assessment of physiological confounders merit priority. For AI, multicentre external validation,

calibration, subgroup fairness and prospective effect on clinical decisions should precede marketing claims of superior diagnostic accuracy. [2,5,14–17]

6. Supplementary Critical Analysis — Cross-disease AI models and limits of pharmacological analogies

Methods that predict drug efficacy from RWD in diabetes, cardiovascular disease, oncology, infection and neurology share broad computational tools with gynecological research but not necessarily transferable predictors or clinical causal structures. A glucose time series, tumor mutation signature and uterus image convey different kinds of biological information. Accordingly, benchmarking a gynecologic imaging model against high-performing classifiers in another specialty says little about whether the resulting score changes an adenomyosis management decision. [14–17]

A patient-specific pathway may ultimately combine imaging phenotype with symptom progression and treatment history to forecast benefit from medication or conservative intervention. However, associations between imaging severity and treatment outcome may be confounded by clinician treatment selection. Patients with the most extensive lesions may be preferentially offered surgery, while those with mild symptoms may receive less intense medical therapy. Causal methods can reduce measured confounding but are not a substitute for careful study design or randomization when feasible. [18–21]

Pharmacovigilance analytics require comparable caution. Increased adverse-event reports following a newly publicized therapy may arise from stimulated reporting rather than elevated biological risk. Linkage of prescriptions to documented exposure windows and outcomes can improve interpretation, yet clinical adjudication and sensitivity analyses remain necessary. Precision treatment claims should therefore be reserved for validated decisions that improve patient outcomes, not merely correlations generated by flexible algorithms. [6–10]

6. Supplementary Critical Analysis — Responsible implementation in regional health systems

Any implementation plan must begin with a realistic mapping of available equipment and personnel. High-quality TVUS depends on specialist training, sufficient examination time, storage of reproducible images and periodic case review. MRI may be concentrated at regional or tertiary sites. A tiered referral network should specify clinical situations that trigger secondary imaging so that access is based on uncertainty and management consequences rather than informal influence or ability to pay.

An Uzbekistan pilot could adopt revised MUSA templates at participating clinics, train readers using anonymized case libraries and measure structured-report completion and

interobserver agreement before comparing clinical outcomes. A second phase could link imaging referrals with clinical symptoms and electronic prescriptions, provided institutional authorization and privacy safeguards are established. A third phase could assess whether referral criteria decrease low-value repeat testing without increasing delayed diagnoses. None of these phases should be represented as an existing completed national study without actual data. [2,5–10]

Quality indicators should avoid creating perverse incentives. A very low MRI referral rate may appear cost-effective but could reflect missed complex disease; a high sonography positivity rate might indicate overdiagnosis rather than excellent detection. Balanced metrics should include indeterminate study frequency, second-reader disagreement, interval to appropriate treatment, patient satisfaction and adverse outcomes. Only sustained monitoring can distinguish a genuinely improved diagnostic system from a shift in coding or referral behavior.

An operational diagnostic-accuracy study should prespecify a consecutive or randomly sampled cohort, ensure both modalities are performed within an appropriate interval, mask independent readers to the competing index test, and record every nondiagnostic examination. If histology is available for a selected subset only, investigators should describe the selection mechanism and consider verification-bias analyses. Imaging adjudication is not a perfect substitute for pathology, but longitudinal composite standards can be clearly specified and evaluated with sensitivity analyses. Confidence intervals for each diagnostic statistic and reader-agreement estimates should accompany point estimates. A protocol that retrospectively excludes the most difficult cases may produce an attractive figure while failing to represent clinical decision-making. [1,11–13]

Prospective economic evaluation should capture direct scan expenses, staffing, transport, appointment delays, repeat investigations and downstream treatment decisions. The primary analysis may compare total costs and patient-centred outcomes over a fixed follow-up window, with subgroup analyses for referral-centre access, presence of coexisting leiomyomas, and reproductive intention. Assumptions about test prevalence and pathway adherence should be varied systematically. Better characterization of disease on MRI may be beneficial in a subset without implying that MRI should replace initial ultrasound for all patients. A transparent implementation study should record reasons for exceptions to the pathway and accept patient refusal of transvaginal imaging without penalizing access to care. [1,2,5]

The resulting evidence hierarchy should distinguish a validated diagnostic feature, a pooled test statistic, an association between imaging and outcome, and a claim that modifying the diagnostic pathway improves health. Each step requires different study

designs and assumptions. Clinical investigators, radiologists, sonographers, epidemiologists and patient representatives should participate in the prespecification of outcomes and meaningful decision thresholds. This collaborative approach reduces the chance that success is defined by algorithmic performance alone while clinically important uncertainty remains unresolved.

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THE ROLE OF IMMUNE CHECKPOINT INHIBITORS IN CANCER TREATMENT

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Abstract: Immune checkpoint inhibitors have become an important approach in cancer treatment by enhancing the immune system’s ability to recognize and destroy tumor cells. This review examines the mechanisms of PD-1, PD-L1, CTLA-4, and LAG-3 inhibition, their clinical applications, predictive biomarkers, immune-related adverse events, and treatment resistance. Despite promising results, treatment effectiveness depends on tumor characteristics and individual patient factors. Further research may improve patient selection and treatment outcomes.

Keywords: Cancer, immunotherapy, immune checkpoint inhibitors, PD-1, PD-L1, CTLA-4, biomarkers, treatment resistance.

1.Introduction

Cancer remains a major global public health challenge and is associated with substantial

morbidity and mortality. Traditional cancer treatment methods, including surgery, chemotherapy, and radiotherapy, have improved outcomes for many patients. Nevertheless, treatment resistance, disease recurrence, metastasis, and treatment-related toxicity remain important clinical challenges.

In recent decades, cancer immunotherapy has emerged as a significant development in oncology. Unlike conventional treatments that primarily target malignant cells directly, immunotherapy aims to strengthen or redirect the body's immune response against cancer. One of the most important advances in this field has been the development of immune checkpoint inhibitors (ICIs). These drugs block inhibitory signals that cancer cells can exploit to evade immune surveillance. By interfering with these pathways, ICIs may restore the antitumor activity of T lymphocytes and promote tumor control. Immune checkpoint inhibitors have changed the treatment landscape for several malignancies. However, their effectiveness varies among patients, and not every tumor responds to treatment. Therefore, understanding their mechanisms of action, clinical indications, predictive biomarkers, and adverse effects is essential for their appropriate use.

The aim of this review is to examine the biological basis, clinical applications, limitations, and future prospects of immune checkpoint inhibitors in cancer treatment.

2. Biological Basis of Immune Checkpoint Inhibition

The immune system can recognize and eliminate abnormal cells through a process known as immune surveillance. T lymphocytes play a central role in this process by identifying antigens presented by cells and initiating immune responses against potentially harmful targets.

However, immune activity must be carefully regulated to prevent excessive inflammation and damage to healthy tissues. Immune checkpoint pathways help maintain this balance by limiting T-cell activation and function. Cancer cells may exploit these regulatory mechanisms to avoid immune destruction. Tumors can express checkpoint ligands or create an immunosuppressive tumor microenvironment that reduces the effectiveness of antitumor immune responses.

Immune checkpoint inhibitors interfere with these inhibitory pathways. As a result, T cells may regain the ability to recognize and attack malignant cells. The principal immune checkpoint targets currently used in cancer immunotherapy include PD-1, PD-L1, and CTLA-4. LAG-3 is another important target, and its inhibition has become part of selected treatment strategies.

3. Major Types of Immune Checkpoint Inhibitors

3.1 .PD-1 Inhibitors

Programmed cell death protein 1 (PD-1) is an inhibitory receptor expressed on activated T cells and certain other immune cells. Its interaction with PD-L1 or PD-L2 can reduce T-cell activity.

Tumor cells and cells within the tumor microenvironment may express PD-L1, thereby suppressing antitumor immune responses.

PD-1 inhibitors block the interaction between PD-1 and its ligands, helping restore T-cell function.

Examples include:

Pembrolizumab

Nivolumab

Cemiplimab

These agents are used in selected malignancies according to tumor type, disease stage, treatment setting, and applicable clinical indications.

3.2. PD-L1 Inhibitors

PD-L1 inhibitors target programmed death-ligand 1 (PD-L1), preventing it from interacting with PD-1.

Examples include:

Atezolizumab

Durvalumab

Avelumab

These drugs are used in specific clinical settings, including selected cases of lung cancer, urothelial carcinoma, and other malignancies, depending on the agent and applicable treatment guidelines.

PD-L1 expression may help guide treatment decisions in certain cancers. However, its interpretation depends on the tumor type, testing method, and therapeutic indication. PD-L1 expression alone does not reliably predict response in every patient.

3.3. CTLA-4 Inhibitors

Cytotoxic T-lymphocyte-associated protein 4 (CTLA-4) is an inhibitory receptor that regulates T-cell activation, particularly during the early stages of the immune response. CTLA-4 competes with the costimulatory receptor CD28 for binding to CD80 and CD86 on antigen-presenting cells. By blocking this pathway, CTLA-4 inhibitors can enhance T-cell activation.

Ipilimumab is a well-established CTLA-4 inhibitor used in selected cancer treatment regimens.

CTLA-4 inhibition may be combined with PD-1 inhibition to improve treatment

outcomes in certain malignancies. However, combination therapy can also increase the risk of immune-related adverse events.

3.4. LAG-3 Inhibitors

Lymphocyte-activation gene 3 (LAG-3) is an inhibitory immune receptor that can contribute to reduced T-cell function in the tumor microenvironment. Relatlimab, a LAG-3 inhibitor, is used in combination with nivolumab in a specific treatment regimen for advanced melanoma. Targeting LAG-3 alongside PD-1 may enhance antitumor immune activity in selected patients. Nevertheless, its clinical role depends on the specific indication and approved treatment regimen.

4. Clinical Significance of Immune Checkpoint Inhibitors

Immune checkpoint inhibitors have become important treatment options for several malignancies. Their use depends on factors such as histological diagnosis, disease stage, previous treatments, molecular characteristics, and patient fitness.

4.1. Melanoma

Melanoma is one of the malignancies in which immune checkpoint inhibitors have demonstrated substantial clinical benefit.

PD-1 inhibitors and CTLA-4 inhibitors may be used as monotherapy or in combination in selected patients. Combination treatment can improve outcomes in appropriate clinical settings, although it is generally associated with a higher risk of toxicity.

4.2. Non-Small Cell Lung Cancer

Non-small cell lung cancer (NSCLC) is another major area of application for immune checkpoint inhibitors.

Depending on the clinical setting, these drugs may be used alone or in combination with chemotherapy or other systemic treatments. Decisions may depend on PD-L1 expression, tumor molecular characteristics, disease stage, and the presence of actionable genetic alterations.

Immunotherapy is not appropriate for every patient with NSCLC, and treatment selection requires an individualized assessment.

4.3. Urothelial Carcinoma

Immune checkpoint inhibitors have an established role in selected patients with urothelial carcinoma, including certain treatment settings involving advanced disease. The choice of treatment depends on disease characteristics, previous therapy, contraindications, and current clinical recommendations.

4.4. Other Malignancies

Immune checkpoint inhibitors may also be used in selected patients with other cancers, including certain cases of renal cell carcinoma, hepatocellular carcinoma, head and neck cancer, and colorectal cancer.

In some malignancies, treatment eligibility depends on specific molecular features, such as MSI-H or dMMR status. Other indications are based on tumor type, disease stage, treatment history, and validated clinical criteria.

Therefore, immune checkpoint inhibitors should not be considered universally effective for all cancers. Their benefits are strongly influenced by tumor biology and the clinical context.

5. Biomarkers for Predicting Treatment Response

Although immune checkpoint inhibitors can produce durable responses in some patients, others experience limited benefit or no response. Biomarkers are used to help estimate the likelihood of treatment response in specific clinical settings.

5.1. PD-L1 Expression

PD-L1 expression can be assessed using immunohistochemistry. In certain cancers, PD-L1 levels help determine whether a patient may benefit from a particular immune checkpoint inhibitor.

However, PD-L1 expression is an imperfect predictive biomarker. Some patients with low or undetectable expression may respond, while others with high expression may not.

5.2. Microsatellite Instability-High and Deficient Mismatch Repair

Microsatellite instability-high (MSI-H) and deficient mismatch repair (dMMR) are molecular features associated with impaired DNA repair.

These abnormalities can increase the number of mutations in tumor cells, potentially generating neoantigens that make the tumor more recognizable to the immune system.

In appropriately selected patients, MSI-H or dMMR status can support the use of immune checkpoint inhibitors, including in certain tumor-agnostic treatment settings.

5.3. Tumor Mutational Burden

Tumor mutational burden (TMB) refers to the number of somatic mutations detected in a tumor, usually expressed relative to the amount of DNA analyzed.

A higher TMB may be associated with an increased likelihood of response to immunotherapy in some settings. However, its predictive value varies by cancer type, assay, threshold, and clinical indication.

5.4. Other Predictive Factors

Additional factors under investigation include tumor-infiltrating lymphocytes, gene-expression signatures, circulating tumor DNA, and characteristics of the tumor microenvironment.

No single biomarker can accurately predict treatment outcomes in every patient. Integrating molecular, pathological, and clinical information may improve patient selection.

6. Immune-Related Adverse Events

Immune checkpoint inhibitors enhance immune activity, but this effect may also lead to inflammation and damage in healthy tissues. These complications are known as immune-related adverse events (irAEs).

The severity of adverse events ranges from mild symptoms to life-threatening complications.

Commonly affected organs and systems include:

Skin: rash, itching, and inflammatory skin reactions.

Gastrointestinal tract: diarrhea and colitis.

Endocrine system: thyroid dysfunction, hypophysitis, and, less commonly, adrenal insufficiency or type 1 diabetes.

Lungs: pneumonitis.

Liver: immune-mediated hepatitis.

Kidneys: interstitial nephritis.

Heart and nervous system: rare but potentially severe inflammatory complications. The onset of immune-related adverse events varies. They may occur during treatment or, in some cases, after treatment has ended.

Early recognition and appropriate management are essential. Depending on the severity and affected organ, management may include treatment interruption, corticosteroids, or other immunosuppressive therapy.

Patients receiving immune checkpoint inhibitors require clinical monitoring and should promptly report new or worsening symptoms. Severe breathlessness, chest pain, significant diarrhea, jaundice, or new neurological symptoms require urgent medical assessment.

Treatment decisions should follow established clinical guidelines and be made by the treating oncology team.

7. Mechanisms of Resistance to Immunotherapy

Despite their benefits, immune checkpoint inhibitors do not produce durable responses in every patient. Resistance may be classified as primary or acquired. Primary resistance occurs when a tumor fails to respond adequately from the beginning of treatment.

Acquired resistance develops when a tumor initially responds but subsequently progresses.

Potential mechanisms include:

1. Insufficient tumor antigen recognition: Tumor cells may lack suitable antigens or lose antigens recognized by the immune system.
2. Defective antigen presentation: Alterations in antigen-processing and presentation pathways may reduce the ability of T cells to recognize malignant cells.
3. Immunosuppressive tumor microenvironment: Regulatory T cells, suppressive myeloid cells, and inhibitory cytokines may limit antitumor immune activity.
4. Alternative immune checkpoint pathways: Tumors may exploit additional inhibitory pathways that are not blocked by the administered drug
5. Tumor heterogeneity: Different tumor cell populations may respond differently to treatment, allowing resistant cells to survive and proliferate.

A better understanding of these mechanisms may support the development of new therapeutic strategies, including rational combination treatments and more effective biomarkers.

8. Research and Clinical Perspectives in Uzbekistan

The development of cancer immunotherapy also has relevance for oncology research and clinical practice in Uzbekistan. Local research into tumor biology, immune responses, and the tumor microenvironment may contribute to a better understanding of cancer progression and potential therapeutic targets.

For example, Uzbek scientific literature has examined immunological factors associated with ovarian cancer metastasis. Such studies provide a local research context for investigating the relationship between tumor biology and immune mechanisms. However, research on tumor immunology should not automatically be interpreted as evidence of the clinical effectiveness of a particular checkpoint inhibitor. Demonstrating treatment efficacy requires appropriately designed clinical studies and reliable outcome data.

Further development of this field may benefit from:
Strengthening molecular and immunohistochemical diagnostic capacity.
Improving access to validated biomarker testing.
Conducting clinical research on the effectiveness and safety of immunotherapy.
Developing multidisciplinary collaboration among oncologists, pathologists, immunologists, and molecular biologists.

Evaluating treatment outcomes and adverse events in local patient populations.
Promoting evidence-based treatment decisions in accordance with current clinical

guidelines.

These priorities may help support the responsible integration of cancer immunotherapy into clinical practice.

9. Future Directions

Research into immune checkpoint inhibitors continues to evolve. Current areas of investigation include combination immunotherapy, personalized treatment selection, new immune checkpoint targets, and strategies to overcome resistance. Combining checkpoint inhibitors with chemotherapy, radiotherapy, targeted therapy, or other immunotherapeutic approaches may improve outcomes in selected cancers. However, combination strategies can also increase toxicity and should be evaluated according to evidence from clinical trials.

Artificial intelligence and advanced molecular profiling may eventually help identify patients most likely to benefit from immunotherapy. In addition, research into tumor microenvironment characteristics may reveal new ways to overcome immune suppression.

Future progress will depend on identifying reliable biomarkers, improving the management of immune-related adverse events, and developing safer and more effective treatment combinations.

10. Conclusion

Immune checkpoint inhibitors represent a major advancement in modern cancer treatment. By targeting inhibitory immune pathways such as PD-1, PD-L1, CTLA-4, and LAG-3, these agents can enhance antitumor T-cell activity and produce meaningful clinical benefits in selected patients.

Their effectiveness varies according to tumor type, disease stage, molecular characteristics, and individual patient factors. Biomarkers such as PD-L1 expression, MSI-H, dMMR, and TMB can help guide treatment decisions in specific clinical settings, although none is universally predictive.

Immune-related adverse events and treatment resistance remain important challenges. Consequently, careful patient selection, regular monitoring, early recognition of toxicity, and adherence to evidence-based clinical guidelines are essential. Continued research into tumor immunology, predictive biomarkers, and resistance mechanisms may improve the effectiveness of immunotherapy and expand its role in personalized oncology.

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SHARQ FALSAFASINING INSON MA'NAVIY KAMOLOTI VA ZAMONAVIY JAMIYAT TARAQQIYOTIDAGI O'RNI

Muallif: Mamatqulova Nilufar Xusanovna
Ta'lim muassasasi: Toshkent davlat tibbiyot universiteti Termiz filiali

Annotatsiya. Mazkur maqolada Sharq falsafasining shakllanishi, asosiy g'oyalari va inson ma'naviy kamolotidagi ahamiyati tahlil qilinadi. Shuningdek, Abu Nasr Forobiy, Abu Ali ibn Sino, Abu Rayhon Beruniy va Alisher Navoiy kabi mutafakkirlarning falsafiy qarashlari, ularning axloq, ilm-ma'rifat, adolat va komil inson tarbiyasiga oid ta'limotlari yoritiladi. Sharq falsafiy merosining bugungi globallashuv sharoitida yoshlar dunyoqarashini shakllantirish va jamiyat taraqqiyotini ta'minlashdagi ahamiyati asoslab beriladi.

Kalit so'zlar: Sharq falsafasi, ma'naviyat, axloq, komil inson, ilm-ma'rifat, Forobiy, Ibn Sino, Beruniy, Alisher Navoiy, insonparvarlik.

KIRISH

Sharq falsafasi insoniyat tafakkuri tarixida muhim o'rin egallagan ma'naviy va intellektual meroslardan biridir. U insonning borliq, tabiat, jamiyat, bilim, axloq va hayot mazmuni haqidagi qarashlarini o'zida mujassam etadi. Sharq falsafasining o'ziga xos jihati shundaki, unda insonning ichki dunyosi, ma'naviy kamoloti, axloqiy mas'uliyati va jamiyat oldidagi burchiga alohida e'tibor qaratiladi.

Sharq falsafiy tafakkuri turli tarixiy davrlarda Hindiston, Xitoy, Markaziy Osiyo, Eron va boshqa hududlarda rivojlangan. Uning tarkibida turli falsafiy maktablar, diniy-falsafiy qarashlar va axloqiy ta'limotlar mavjud. Markaziy Osiyoda esa IX–XV asrlarda ilm-fan, falsafa, mantiq, tibbiyot, astronomiya va adabiyotning yuksalishi natijasida jahon sivilizatsiyasiga katta hissa qo'shgan mutafakkirlar yetishib chiqqan.

Bugungi kunda Sharq falsafasini o'rganish nafaqat tarixiy merosni anglash, balki zamonaviy insonning ma'naviy ehtiyojlari, axloqiy qarashlari va ijtimoiy mas'uliyatini rivojlantirish nuqtayi nazaridan ham dolzarbdir.

ASOSIY QISM

1. Sharq falsafasining mohiyati va asosiy tamoyillari

Sharq falsafasi keng va ko‘p qirrali tushuncha bo‘lib, turli xalqlarning dunyoqarashi, diniy e’tiqodlari, axloqiy me’yorlari va ilmiy tafakkuri bilan chambarchas bog‘liq. Uning barcha yo‘nalishlarini yagona ta’limot sifatida baholash to‘g‘ri bo‘lmasa-da, ko‘plab Sharq falsafiy an’analarida inson va jamiyat uyg‘unligi, axloqiy yetuklik, bilimga intilish hamda o‘zini anglash masalalari muhim o‘rin tutadi.

Sharq falsafasining muhim yo‘nalishlaridan biri insonning o‘zini anglashi va takomillashtirishiga qaratilgan ta’limotlardir. Xitoy falsafasida Konfutsiy ta’limoti insoniy fazilatlar, oilaviy mas’uliyat va ijtimoiy tartibni qadrlaydi. Hind falsafiy an’analarida esa insonning ichki dunyosi, borliq mohiyati va ruhiy kamolot masalalari keng o‘rganilgan. Islom falsafasida aql, ilm, axloq, borliq va insonning ma’naviy mas’uliyati bilan bog‘liq muammolar muhim o‘rin egallaydi.

Ushbu falsafiy yo‘nalishlarning mazmuni va metodlari bir-biridan farq qilsa-da, ularni qiyosiy o‘rganish insoniyat tafakkurining rang-barangligini anglash imkonini beradi.

2. Abu Nasr Forobiy falsafasida fozil jamiyat va komil inson masalasi

Sharq falsafasining yirik namoyandalaridan biri Abu Nasr Forobiydir. Uning falsafiy qarashlarida inson kamoloti, bilim, axloq va jamiyat taraqqiyoti o‘zaro bog‘liq holda talqin etiladi. Mutafakkirning «Fozil odamlar shahri» asari siyosiy va ijtimoiy falsafa tarixida muhim manbalardan biri hisoblanadi.

Forobiy fikricha, inson o‘z baxt-saodatiga yolg‘iz holda emas, balki jamiyat bilan hamkorlik qilish orqali erishadi. Shu sababli jamiyatning vazifasi insonlarning yaxshi hayot kechirishi, bilim olishi va fazilatlarini rivojlantirishi uchun sharoit yaratishdan iborat. Fozil jamiyatda rahbarning donoligi, adolati va yuksak axloqiy fazilatlari muhim ahamiyat kasb etadi.

Forobiyning qarashlari zamonaviy jamiyat uchun ham muhim nazariy ahamiyatga ega. Xususan, ijtimoiy adolat, mas’uliyatli boshqaruv, ta’lim sifati va inson manfaatlarini e’zozlash kabi masalalar uning falsafiy merosi bilan hamohangdir. Mutafakkir ta’limotini o‘rganish jamiyat taraqqiyotida ma’rifat va axloqning o‘rnini chuqurroq anglashga yordam beradi.

3. Ibn Sino va Beruniy merosida ilmiy tafakkur hamda inson kamoloti

Abu Ali ibn Sino Sharq falsafasi va jahon ilm-fani taraqqiyotiga katta hissa qo‘shgan qomusiy olimdir. Uning falsafiy qarashlarida borliq, bilish, ruh, aql va inson tabiati masalalari muhim o‘rin tutadi. Ibn Sino aqliy bilish va mantiqiy fikrlashga alohida ahamiyat bergan. Uning ilmiy faoliyati falsafa bilan tabiiy fanlar o‘rtasidagi uzviy aloqani namoyon etadi.

Ibn Sino merosidan kelib chiqadigan muhim xulosalardan biri shuki, insonning kamoloti bilim olish, tafakkur qilish va o‘z imkoniyatlarini rivojlantirish bilan chambarchas bog‘liq. Bu g‘oya zamonaviy ta’lim tizimida mustaqil fikrlash, tahliliy yondashuv va ilmiy izlanish ko‘nikmalarini shakllantirish uchun ham ahamiyatlidir.

Abu Rayhon Beruniy esa ilmiy xolislik, kuzatish, tajriba va dalillarga asoslangan bilish usullari bilan ajralib turadi. Uning turli xalqlarning tarixi, urf-odatlari, diniy qarashlari va ilmiy yutuqlarini o‘rganganligi madaniyatlararo muloqotning ahamiyatini ko‘rsatadi. Beruniy merosi boshqa xalqlarning madaniyatiga hurmat bilan munosabatda bo‘lish, voqelikni imkon qadar xolis o‘rganish va xulosalarni dalillar asosida shakllantirish zarurligini eslatadi.

Shunday qilib, Ibn Sino va Beruniy merosi bugungi kunda ilmiy tafakkur, intellektual halollik, fanlararo yondashuv va madaniyatlararo hamkorlikni rivojlantirish uchun muhim nazariy asos bo‘lib xizmat qiladi.

4. Alisher Navoiy ijodida axloq, adolat va insonparvarlik

Alisher Navoiy Sharq ma’naviy tafakkuri tarixida insonparvarlik, adolat, ezgulik va komillik g‘oyalarini yuksak badiiy-falsafiy darajada ifodalagan mutafakkirdir. Uning asarlarida insonning qadri, jamiyat oldidagi mas’uliyati, ilm-ma’rifatning ahamiyati va axloqiy poklik masalalari keng yoritilgan.

Navoiy ijodida komil inson tushunchasi faqat bilimli bo‘lish bilan cheklanmaydi. U insonning halolligi, saxovati, adolatliligi, kamtarligi va boshqalarga mehr-muruvvat ko‘rsatishi bilan ham belgilanadi. Mutafakkirning axloqiy qarashlarida insonning jamiyatga foyda keltirishi muhim mezonlardan biri sifatida namoyon bo‘ladi.

Ushbu g‘oyalar yosh avlod tarbiyasida alohida ahamiyatga ega. Zamonaviy jamiyatda kasbiy bilim bilan bir qatorda, mas’uliyat, vijdonlilik, bag‘rikenglik va inson qadr-

qimmatini hurmat qilish kabi fazilatlarni rivojlantirish zarur. Navoiy merosi ana shu qadriyatlarning mazmunini anglashga ko‘maklashadi.

5. Sharq falsafiy merosining zamonaviy jamiyatdagi ahamiyati

Bugungi globallashuv davrida insoniyat texnologik taraqqiyot, axborot oqimining kuchayishi, madaniyatlararo munosabatlarning kengayishi va yangi axloqiy muammolar bilan yuzlashmoqda. Bunday sharoitda Sharq falsafasini o‘rganish tarixiy bilimlarni boyitish bilangina cheklanmay, insonning ma’naviy dunyosini rivojlantirishga ham xizmat qiladi.

Birinchidan, Sharq mutafakkirlarining ilm-ma’rifatga oid qarashlari zamonaviy ta’limda tanqidiy va mustaqil fikrlashni rivojlantirishga yordam beradi.

Ikkinchidan, adolat, halollik, insonparvarlik va mas’uliyat haqidagi falsafiy g‘oyalar ijtimoiy munosabatlarda axloqiy mezonlarni mustahkamlashga xizmat qiladi.

Uchinchidan, Sharq va G‘arb falsafiy merosini qiyosiy o‘rganish turli madaniyatlar o‘rtasidagi muloqotni rivojlantirish, fikrlar xilma-xilligini anglash va o‘zaro hurmatni kuchaytirish imkonini beradi.

To‘rtinchidan, yoshlar orasida milliy va umuminsoniy qadriyatlarga hurmatni shakllantirishda tarixiy-falsafiy merosning ta’limiy imkoniyatlaridan samarali foydalanish mumkin. Bunda mutafakkirlar asarlarini shunchaki yod olish emas, balki ularning g‘oyalarini zamonaviy muammolar bilan bog‘liq holda tahlil qilish muhimdir.

Demak, Sharq falsafiy merosini zamonaviy talqin qilish uchun tarixiy manbalarni chuqur o‘rganish, ularni ilmiy tahlil qilish va amaliy hayot bilan bog‘lash zarur.

XULOSA

Sharq falsafasi insoniyat tafakkurining boy va serqirra yo‘nalishlaridan biri bo‘lib, unda inson, jamiyat, bilim, axloq va ma’naviy kamolot masalalari muhim o‘rin egallaydi. Forobiy, Ibn Sino, Beruniy va Alisher Navoiy kabi mutafakkirlarning ilmiy-falsafiy merosi Sharq tafakkurining jahon sivilizatsiyasi rivojiga qo‘shgan ulkan hissasini namoyon etadi.

Tahlillar shuni ko‘rsatadiki, Forobiy ta’limotida fozil jamiyat va ijtimoiy adolat, Ibn Sino qarashlarida aqliy bilish va ilmiy tafakkur, Beruniy merosida xolislik va dalillarga tayanish, Navoiy ijodida esa insonparvarlik va axloqiy komillik masalalari alohida ahamiyat kasb etadi.

Mazkur falsafiy merosni zamonaviy ta’lim va tarbiya jarayoniga tatbiq etish yoshlarning mustaqil fikrlashi, ma’naviy dunyoqarashi va ijtimoiy mas’uliyatini rivojlantirishga xizmat qilishi mumkin. Shu bois Sharq falsafasini ilmiy asosda o‘rganish, uning tarixiy mazmunini to‘g‘ri anglash va umuminsoniy ahamiyatini ochib berish bugungi kunda ham dolzarb vazifalardan biri hisoblanadi.

FOYDALANILGAN ADABIYOTLAR

1. Abu Nasr Forobiy. *Fozil odamlar shahri*.
2. Abu Ali ibn Sino. *Donishnoma*.
3. Abu Rayhon Beruniy. *Qadimgi xalqlardan qolgan yodgorliklar*.
4. Alisher Navoiy. *Mahbub ul-qulub*.
5. G‘arb va Sharq falsafasi tarixiga oid oliy ta’lim darsliklari va ilmiy tadqiqotlar.
6. Markaziy Osiyo mutafakkirlarining falsafiy merosiga bag‘ishlangan ilmiy maqolalar va monografiyalar.

UDK: 618.214-006.36

BACHADON MIYOMASI BO‘LGAN AYOLLARDA HOMILADORLIK VA TUG‘RUQNING KECHISH XUSUSIYATLARI

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ANNOTATSIYA

Dolzarbligi. Bachadon miomasi reproduktiv yoshdagi ayollarda uchraydigan keng tarqalgan yaxshi sifatli o‘smalardan biri bo‘lib, uning homiladorlik va tug‘ruq jarayoniga ta’siri zamonaviy akusherlik va ginekologiyaning muhim masalalaridan hisoblanadi. Miomaning o‘lchami, soni, anatomik joylashuvi va yo‘ldoshga nisbatan munosabati homiladorlik natijalariga ta’sir ko‘rsatishi mumkin.

Maqsad. Bachadon miomasi bo‘lgan ayollarda homiladorlik va tug‘ruqning kechish xususiyatlarini zamonaviy ilmiy adabiyotlar asosida tahlil qilish, asosiy akusherlik asoratlarini aniqlash hamda klinik kuzatuvni takomillashtirish yo‘nalishlarini yoritish.

Materiallar va usullar. Termiz iqtisodiyot va servis universiteti “TISU Med Hub” klinikasi bazasida yotib davolangan bemorlarning kasallik tarixi retrospektiv tahlili olib borildi. Asosiy e’tibor miomaning o‘lchami, soni va joylashuvi, homiladorlik asoratlari, tug‘ruq usuli hamda tug‘ruqdan keyingi qon ketish bilan bog‘liq natijalarga qaratildi.

Natijalar. Adabiyotlar tahlili bachadon miomasi mavjud homilador ayollarda muddatidan oldin tug‘ruq, homilaning noto‘g‘ri joylashuvi, kesarcha kesish va tug‘ruqdan keyingi qon ketish xavfi ayrim tadqiqotlarda yuqoriroq ekanligini ko‘rsatadi. Ayniqsa, yirik miomalar va ularning anatomik joylashuvi klinik baholashda muhim ahamiyatga ega. Biroq barcha miomalar ham homiladorlikning noxush yakunlanishiga olib kelmaydi.

Xulosa. Bachadon miomasi bo‘lgan homilador ayollarni individual xavf omillari asosida kuzatish, ultratovush tekshiruvi orqali miomaning xususiyatlarini baholash va tug‘ruq taktikasini klinik vaziyatga muvofiq tanlash ona hamda homila salomatligini muhofaza qilishda muhimdir.

Kalit so‘zlar: bachadon miomasi, leiomioma, homiladorlik, tug‘ruq, akusherlik asoratlari, kesarcha kesish, tug‘ruqdan keyingi qon ketish, homila holati.

1. KIRISH

Bachadon miomasi yoki leiomioma bachadonning silliq mushak to‘qimasidan rivojlanadigan yaxshi sifatli o‘sma bo‘lib, reproduktiv yoshdagi ayollarda tez-tez uchraydi. Ultratovush diagnostikasining keng qo‘llanilishi natijasida ushbu patologiya homiladorlik davrida ham ko‘proq aniqlanmoqda. Bachadon miomasi mavjudligi har doim ham homiladorlikning asoratli kechishini anglatmaydi, biroq ayrim klinik holatlarda u ona va homila salomatligiga ta’sir ko‘rsatishi mumkin.

Miomaning homiladorlikka ta’siri uning faqat mavjudligi bilan emas, balki o‘lchami, soni, bachadon devoridagi joylashuvi va yo‘ldoshga nisbatan anatomik munosabati bilan ham belgilanadi. Xususan, bachadon bo‘shlig‘ini deformatsiyalovchi, pastki segmentda joylashgan yoki yo‘ldoshga yaqin miomalar alohida klinik e’tibor talab qiladi.

Li va hammualliflarining 2024-yilda e’lon qilingan meta-tahlilida 24 ta tadqiqot va 237 509 nafar ishtirokchining ma’lumotlari umumlashtirilgan. Natijalarda bachadon miomasi muddatidan oldin tug‘ruq, kesarcha kesish, yo‘ldoshning oldinda joylashuvi, yo‘ldoshning muddatidan oldin ko‘chishi va tug‘ruqdan keyingi qon ketish kabi ayrim noxush natijalar bilan bog‘liqligi qayd etilgan [1].

Shu bilan birga, Pritts tomonidan 2025-yilda chop etilgan sharhda homiladorlik natijalari bo‘yicha ayrim oldingi qarashlar yetarlicha ishonchli dalillar bilan tasdiqlanmaganligi ta’kidlangan. Muallifning tahliliga ko‘ra, spontan homila tushishi, kesarcha kesish va tug‘ruqdan keyingi qon ketish bilan bog‘liqlik haqidagi ma’lumotlar bir xil emas, muddatidan oldin tug‘ruq bilan bog‘liqlik esa ko‘proq qo‘llab-quvvatlanadi [2].

Mazkur qarama-qarshi natijalar bachadon miomasi bo‘lgan homilador ayollarni boshqarishda individual yondashuv zarurligini ko‘rsatadi.

2. TADQIQOTNING MAQSADI VA VAZIFALARI

Tadqiqotning maqsadi bachadon miomasi mavjud ayollarda homiladorlik va tug‘ruqning klinik xususiyatlarini zamonaviy ilmiy adabiyotlar asosida o‘rganish hamda akusherlik amaliyoti uchun muhim bo‘lgan xavf omillarini umumlashtirishdan iborat.

Tadqiqot vazifalari:

1. Bachadon miomasining homiladorlik davridagi klinik ahamiyatini yoritish.
2. Miomaning o‘lchami, soni va joylashuvining homiladorlik natijalariga ta’sirini tahlil qilish.
3. Asosiy akusherlik asoratlari va tug‘ruq natijalarini umumlashtirish.
4. Tug‘ruq usulini tanlash hamda tug‘ruqdan keyingi davrni boshqarish masalalarini baholash.
5. Bachadon miomasi bo‘lgan homilador ayollarni individual kuzatish bo‘yicha amaliy takliflarni ishlab chiqish.

3. MATERIALLAR VA USULLAR

Mazkur ish narrativ adabiyotlar sharhi shaklida tayyorlandi. Ilmiy ma’lumotlarni tahlil qilishda bachadon miomasi, homiladorlik, tug‘ruq natijalari va akusherlik asoratlariga bag‘ishlangan Termiz iqtisodiyot va servis universiteti “TISU Med Hub” klinikasi bazasida yotib davolangan bemorlarning kasallik tarixi retrospektiv tahlili olib borildi.

Qidiruv uchun quyidagi inglizcha kalit so‘zlar asos qilib olindi: *uterine fibroids, uterine leiomyoma, pregnancy outcomes, obstetric complications, preterm birth, cesarean delivery, postpartum hemorrhage*.

Tahlilda 2024-yilgi meta-tahlil [1], 2025-yilda chop etilgan reproduktiv natijalarga oid klinik sharh [2] hamda miomaning anatomik xususiyatlari va homiladorlik natijalarini o‘rgangan adabiyotlar sharhi [3] asosiy manbalar sifatida tanlandi.

Ushbu maqola yangi klinik ma’lumotlarni o‘z ichiga olmaydi. Unda bemorlar soni, laborator ko‘rsatkichlar yoki mustaqil statistik hisob-kitoblar taqdim etilmagan. Shuningdek, qidiruvning to‘liq sanalari, barcha tanlangan va chiqarib tashlangan maqolalar hamda ularni saralash jarayoni hujjatlashtirilmagani sababli ishni PRISMA talablariga muvofiq sistematik sharh deb baholash mumkin emas.

4. NATIJALAR VA MUHOKAMA

4.1. Bachadon miomasining homiladorlik davridagi klinik xususiyatlari

Homiladorlik davrida bachadon miomasi turlicha kechishi mumkin. Ayrim ayollarda u klinik belgilarsiz aniqlanadi, boshqalarda esa qorinning pastki qismida og‘riq, bachadon qisqarishlariga o‘xshash noqulaylik yoki qon ketish kuzatilishi mumkin.

Homiladorlik davrida mioma hajmi o‘zgarishi mumkin. Biroq barcha miomalar bir xil tarzda o‘smaydi: ayrimlarining o‘lchami ortishi, boshqalariniki esa o‘zgarmasligi yoki kamayishi mumkin. Miomada degenerativ o‘zgarishlar, jumladan, qizil degeneratsiya, o‘tkir og‘riqning muhim sabablaridan biridir.

Mioma bilan bog‘liq klinik xavfni baholashda quyidagilar hisobga olinadi:

- tugunning maksimal diametri;
- miomalar soni;
- submukoz, intramural yoki subseroz joylashuvi;
- bachadon bo‘shlig‘ining deformatsiyalanishi;
- yo‘ldosh bilan anatomik munosabati;
- homilaning joylashuvi va homiladorlik muddati.

Miomaning mavjudligi asosida homiladorlik natijasini oldindan qat’iy belgilab bo‘lmaydi. Xavf individual klinik holat va qo‘shimcha akusherlik omillari bilan birgalikda baholanishi kerak [2,3].

4.2. Miomaning o‘lchami, soni va joylashuvining ahamiyati

Miomaning anatomik xususiyatlari homiladorlik natijalarini baholashda muhim o‘rin tutadi. Yirik tugunlar bachadon bo‘shlig‘ining shakliga, homilaning joylashishiga va tug‘ruq yo‘llarining mexanik sharoitlariga ta’sir ko‘rsatishi mumkin.

2024-yilgi meta-tahlilda diametri 5 sm yoki undan katta miomalar kichik miomalar bilan taqqoslanganda homilaning noto‘g‘ri joylashuvi, yo‘ldoshning oldinda joylashuvi va tug‘ruqdan keyingi qon ketish bilan kuchliroq bog‘liqlik ko‘rsatgan [1]. Ushbu natijalar yirik miomalar klinik kuzatuvda alohida e’tibor talab qilishini ko‘rsatadi.

Submukoz miomalar bachadon bo‘shlig‘ini deformatsiyalashi mumkin. Intramural miomalar bachadon mushak qavati ichida joylashadi, subseroz miomalar esa bachadonning tashqi yuzasiga qarab o‘sadi. Ushbu anatomik turlar reproduktiv jarayonlarga turlicha ta’sir ko‘rsatishi mumkin.

Yo‘ldoshga yaqin joylashgan miomalar, ayniqsa, tugun yo‘ldoshning implantatsiya sohasi yoki bachadonning pastki segmentida joylashganda, homiladorlikni kuzatish va tug‘ruq usulini rejalashtirishda muhim hisoblanadi.

Shu bilan birga, miomalar sonining o‘zi barcha asoratlar uchun mustaqil xavf omili ekanligi ishonchli tarzda tasdiqlanmagan. Meta-tahlilda ko‘p sonli miomalar mavjudligi ayrim natijalar bilan barqaror bog‘liqlik ko‘rsatmagan [1]. Demak, tugunlar sonini ularning o‘lchami va joylashuvidan ajratib baholash maqsadga muvofiq emas.

4.3. Homiladorlik davrida kuzatilishi mumkin bo‘lgan asoratlar

Bachadon miomasi mavjud homilador ayollarda bir nechta noxush natijalar kuzatilishi mumkin. Ularning ehtimoli miomaning anatomik xususiyatlari, ona yoshi va boshqa klinik omillarga bog‘liq.

Muddatidan oldin tug‘ruq. Bachadon miomasi va muddatidan oldin tug‘ruq o‘rtasidagi bog‘liqlik zamonaviy sharhlarda qayd etilgan. Biroq ushbu bog‘liqlik har bir bemorda bir xil darajada namoyon bo‘lmaydi [1,2].

Homilaning noto‘g‘ri joylashuvi. Yirik yoki bachadonning pastki segmentida joylashgan miomalar homilaning bosh bilan kelishiga to‘sqinlik qilishi mumkin. Bu tug‘ruq taktikasini tanlashda muhim ahamiyatga ega.

Yo‘ldosh bilan bog‘liq asoratlar. Ayrim meta-tahlillarda mioma mavjudligi yo‘ldoshning oldinda joylashuvi va muddatidan oldin ko‘chishi bilan bog‘liq bo‘lgan. Biroq ushbu natijalar individual klinik omillarni hisobga olgan holda talqin qilinishi lozim [1].

Spontan homila tushishi. Miomaning homila tushishiga ta’siri bo‘yicha ilmiy ma’lumotlar bir xil emas. 2025-yilgi sharhda miomasi bo‘lgan va bo‘lmagan ayollar o‘rtasida spontan homila tushishi ko‘rsatkichlari o‘xshash bo‘lishi mumkinligi qayd etilgan [2].

Homilaning o‘sishi va holati. Ayrim tadqiqotlarda past tug‘ruq vazni va homila holati bilan bog‘liq noxush natijalar kuzatilgan. Biroq ushbu natijalarni faqat mioma bilan izohlash mumkin emas; boshqa ona va homila omillari ham hisobga olinishi zarur [1].

Umuman olganda, bachadon miomasi mavjudligi homiladorlikning albatta asoratli kechishini anglatmaydi. Klinik qarorlar individual xavf omillari va homiladorlikning real kechishiga asoslanishi kerak.

4.4. Tug‘ruqning kechishi va tug‘ruq usulini tanlash

Bachadon miomasi tug‘ruq jarayoniga mexanik va funksional ta’sir ko‘rsatishi mumkin. Yirik tugunlar, ayniqsa, bachadonning pastki segmentida yoki bachadon bo‘yniga yaqin joylashgan hollarda homilaning tug‘ruq yo‘llaridan o‘tishiga to‘sqinlik qilishi ehtimoli mavjud.

Mioma bachadon mushaklarining qisqarish faoliyatiga ta’sir qilishi mumkinligi sababli tug‘ruq faoliyatining sustligi va tug‘ruqning cho‘zilishi ehtimoli ham klinik baholashda e’tiborga olinadi. Biroq bu holatlarni barcha bemorlarga xos deb hisoblash noto‘g‘ri.

2024-yilgi meta-tahlil 24 ta tadqiqot va 237 509 ishtirokchini qamrab olgan. Unda mioma mavjudligi ayrim noxush akusherlik natijalari bilan bog‘langan, ammo kuzatuv tadqiqotlaridagi bog‘liqlik sababiy ta’sirni o‘z-o‘zidan isbotlamaydi.

2025-yilgi klinik sharhda muddatidan oldin tug‘ruq xavfi oshishi qayd etilgan, biroq kesarcha kesish va tug‘ruqdan keyingi qon ketish kabi boshqa natijalar bo‘yicha dalillar qarama-qarshi ekani ta’kidlangan. Bu tafovut maqolaning muhokama qismida ochiq yoritilishi kerak.

1. **Asosiy ilmiy dalillar jadvali**

Klinik natija	Ilmiy adabiyotlardagi xulosa	Klinik ahamiyati
Muddatidan oldin tug‘ruq	Xavf oshishi haqida dalillar mavjud	Homiladorlikni xavfga asoslangan kuzatish
Kesarcha kesish	Ayrim meta-tahlillarda ko‘rsatkich yuqori	Tug‘ruq usulini individual rejalashtirish
Homilaning chanoq bilan kelishi	Yirik miomalarda xavf yuqoriroq bo‘lishi mumkin	Homila joylashuvini baholash
Tug‘ruqdan keyingi qon ketish	Natijalar tadqiqotlar orasida farqlanadi	Qon ketish xavfini oldindan baholash
Spontan homila tushishi	Dalillar bir xil emas	Miomani yagona sabab deb hisoblamaslik

Shunga qaramay, bachadon miomasining mavjudligi o‘z-o‘zidan kesarcha kesishga mutlaq ko‘rsatma hisoblanmaydi. Tug‘ruq usuli homilaning joylashuvi, miomaning tug‘ruq yo‘llariga munosabati, yo‘ldoshning joylashuvi, oldingi operatsiyalar va boshqa akusherlik ko‘rsatmalariga asoslanib tanlanadi.

Vaginal tug‘ruq imkoniyati mavjud bo‘lgan holatlarda tug‘ruqni tabiiy yo‘llar orqali olib borish mumkin. Mexanik to‘siq, homilaning noto‘g‘ri joylashuvi yoki boshqa tegishli ko‘rsatmalar mavjud bo‘lsa, kesarcha kesish masalasi ko‘rib chiqiladi.

4.5. Tug‘ruqdan keyingi qon ketish xavfi

Bachadon miomasi bo‘lgan ayollarda tug‘ruqdan keyingi qon ketish muhim klinik masalalardan biridir. Bachadon mushak qavatining qisqarish faoliyati, tugunlarning hajmi va joylashuvi qon ketish xavfini baholashda e’tiborga olinadi.

Li va hammualliflarining meta-tahlilida mioma mavjudligi tug‘ruqdan keyingi qon ketish bilan bog‘liqlik ko‘rsatgan. Potensial chalkashtiruvchi omillar hisobga olingan tahlilda ham ushbu bog‘liqlik saqlangan [1]. Biroq boshqa ilmiy sharhlarda natijalar bir xil bo‘lmagan [2].

Shuning uchun qon ketish xavfini faqat mioma mavjudligiga qarab belgilash to‘g‘ri emas. Tug‘ruqdan oldin xavf omillarini aniqlash, tug‘ruq vaqtida klinik kuzatuv va tug‘ruqdan keyingi davrda qon ketish belgilariga tezkor javob berish muhimdir.

Mioma bilan bog‘liq xavf yuqori deb baholangan ayollarda tug‘ruq muassasasining qon ketishni boshqarish imkoniyatlari, zarur dori vositalari va qon komponentlaridan foydalanish sharoitlari oldindan hisobga olinishi kerak.

4.6. Bachadon miomasi bo‘lgan homilador ayollarni kuzatish

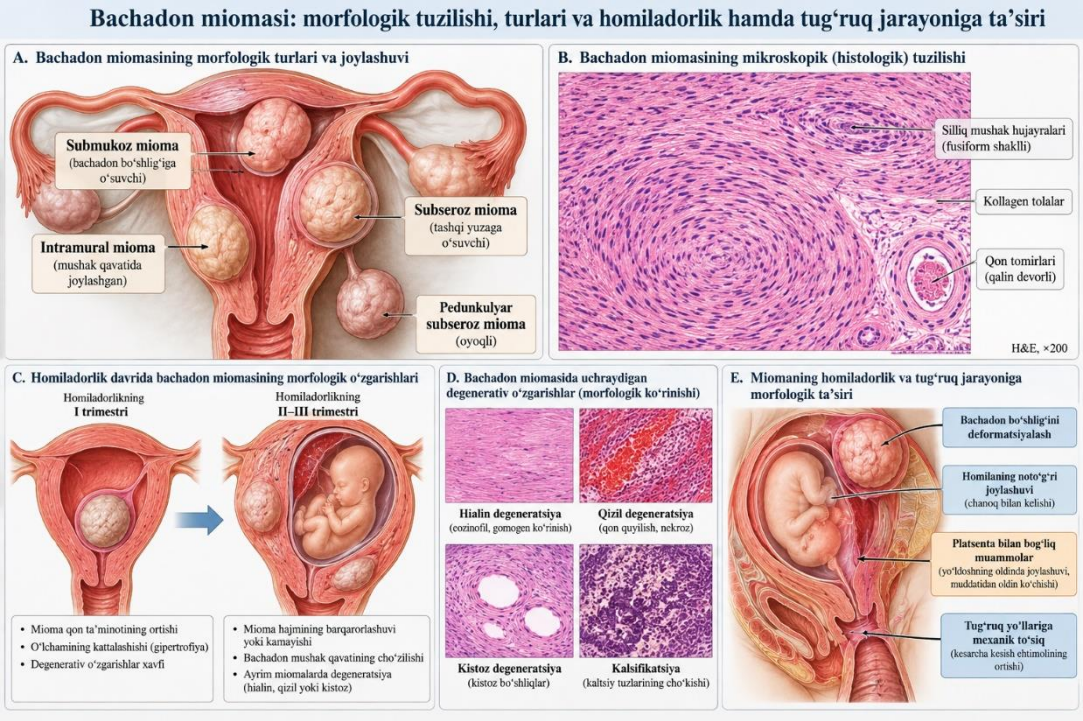
Homiladorlikni kuzatish individual xavfga asoslangan bo‘lishi kerak. Dastlabki baholashda ultratovush tekshiruvi orqali miomaning o‘lchami, soni, anatomik joylashuvi va yo‘ldoshga nisbatan munosabati aniqlanadi.

Keyingi kuzatuv homiladorlik muddati, simptomlar, homilaning rivojlanishi va miomaning xususiyatlariga qarab belgilanadi. Og‘riq, qon ketish yoki boshqa klinik belgilar paydo bo‘lganda tegishli differensial diagnostika o‘tkazilishi lozim.

Kuzatuvning asosiy yo‘nalishlari quyidagilardan iborat:

- miomaning anatomik xususiyatlarini hujjatlashtirish;
- homilaning o‘sishi va joylashuvini klinik ko‘rsatmalar asosida baholash;
- muddatidan oldin tug‘ruq va yo‘ldosh bilan bog‘liq asoratlar belgilarini aniqlash;
- tug‘ruq usulini oldindan rejalashtirish;
- tug‘ruqdan keyingi qon ketish xavfini baholash.

Mioma sababli barcha ayollarga bir xil qo‘shimcha tekshiruvlar yoki operativ davolashni tavsiya etish asosli emas. Klinik yondashuv har bir bemorning holatiga moslashtirilishi zarur.



1-rasm. Bachadon miomasi: tadqiqot olib borilgan bemorlar tahlilidan ramonovskiy-Gimza, Van-Gizon, Shik reaksiya usullarida buyalgan tahlil natijalari.

4.7. Tadqiqot natijalarining klinik ahamiyati va cheklovlari

Tahlil qilingan adabiyotlar bachadon miomasining homiladorlik natijalariga ta’siri murakkab va ko‘p omilli ekanligini ko‘rsatadi. Miomaning o‘lchami va joylashuvi, ona yoshi, hamroh kasalliklar hamda boshqa akusherlik omillari natijalarni izohlashda muhim o‘rin tutadi.

Ushbu sharhning asosiy klinik ahamiyati mioma mavjudligi bilan muayyan asorat o‘rtasida avtomatik sababiy bog‘liqlik o‘rnatmasdan, individual xavfni baholash zarurligini ta’kidlashdan iborat.

Maqolaning cheklovlari ham mavjud. Birinchidan, u mustaqil klinik tadqiqot emas. Ikkinchidan, barcha mavjud adabiyotlarni qamrab olgan sistematik qidiruv va formal sifat baholash amalga oshirilmagan. Uchinchidan, turli tadqiqotlarda miomaning ta’rifi, o‘lchami, joylashuvi va klinik natijalarni qayd etish usullari farq qilishi mumkin.

Kelgusida mahalliy klinik sharoitda bachadon miomasi bo‘lgan homilador ayollarning natijalarini o‘rganish, mioma xususiyatlarini standartlashtirilgan tarzda qayd etish va muhim chalkashtiruvchi omillarni statistik tahlilda hisobga olish maqsadga muvofiq.

5. XULOSA

Bachadon miomasi homiladorlik va tug‘ruq jarayonining kechishiga ta’sir ko‘rsatishi mumkin bo‘lgan muhim klinik omildir. Zamonaviy ilmiy adabiyotlar tahlili ushbu patologiya muddatidan oldin tug‘ruq, homilaning noto‘g‘ri joylashuvi, kesarcha kesish va tug‘ruqdan keyingi qon ketish kabi ayrim noxush natijalar bilan bog‘liq bo‘lishi mumkinligini ko‘rsatadi.

Miomaning diametri, soni va anatomik joylashuvi klinik xavfni baholashda muhim ahamiyatga ega. Ayniqsa, yirik va bachadonning pastki segmentida joylashgan tugunlar homiladorlikni kuzatish hamda tug‘ruq taktikasini rejalashtirishda alohida e’tibor talab qiladi.

Biroq bachadon miomasi mavjudligi barcha holatlarda asoratli homiladorlik yoki operativ tug‘ruqni anglatmaydi. Individual klinik baholash, ultratovush tekshiruvi natijalarini to‘g‘ri talqin qilish va tug‘ruq usulini akusherlik ko‘rsatmalariga muvofiq tanlash muhim hisoblanadi.

Kelgusidagi tadqiqotlarda miomaning o‘lchami va joylashuviga asoslangan xavf modellarini ishlab chiqish, mahalliy klinik ma’lumotlarni xalqaro natijalar bilan

taqqoslash va ona hamda homila natijalarini yaxshilashga qaratilgan kuzatuv strategiyalarini baholash tavsiya etiladi.

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OSHQOZON BEZLARINING TUZILISHI VA OVQAT HAZM QILISH JARAYONIDAGI AHAMIYATI

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Annotatsiya : Ushbu maqolada ovqat hazm qilish tizimining muhim a'zolaridan biri bo'lgan oshqozonning anatomik, gistologik va fiziologik xususiyatlari, ayniqsa, oshqozon bezlarining tuzilishi va ularning ovqat hazm qilish jarayonidagi ahamiyati keng yoritilgan. Oshqozon shilliq qavatida joylashgan bezlarning turlari, hujayralarning morfofunksional xususiyatlari tahlil qilingan. Jumladan, bosh hujayralar, pariyetal hujayralar, shilliq hujayralar va endokrin hujayralarning vazifalari, ular tomonidan ishlab chiqariladigan biologik faol moddalar va fermentlarning ovqat hazm qilishdagi ishtiroki haqida batafsil ma'lumot berilgan. Maqolada oshqozon bezlari tomonidan ishlab chiqariladigan oshqozon shirasining tarkibi, xlorid kislotaning hosil bo'lish mexanizmi, pepsinogenning faol pepsinga aylanishi va oqsillarning dastlabki parchalanish jarayonlari ilmiy jihatdan yoritilgan. Shuningdek, oshqozon shilliq qavatining himoya mexanizmlari, shilliq va bikarbonat qatlamining ahamiyati hamda oshqozon faoliyatini boshqarishda gastrin, gistamin va somatostatin kabi biologik faol moddalarning roli ko'rib chiqilgan. Bundan tashqari, ovqat hazm qilish jarayonining inson organizmi uchun biologik va fiziologik ahamiyati, oziq moddalarning mexanik va kimyoviy parchalanishi, ularning ichaklarda so'rilishi hamda organizmning energiya va qurilish materiallariga bo'lgan ehtiyojini ta'minlashdagi o'rni tahlil qilingan. Oshqozon faoliyatining buzilishi natijasida yuzaga kelishi mumkin bo'lgan ayrim patologik holatlar va ularning oldini olishda sog'lom ovqatlanish tartibining ahamiyatiga ham e'tibor qaratilgan. Mazkur maqola oshqozon bezlarining gistologik tuzilishi va fiziologik faoliyatini chuqurroq o'rganish, ovqat hazm qilish jarayonining mohiyatini anglash hamda oshqozon faoliyatining inson salomatligini saqlashdagi o'rnini tushunishga xizmat qiladi. Olingan ilmiy ma'lumotlar

tibbiyot va stomatologiya yo‘nalishida tahsil olayotgan talabalar uchun nazariy bilimlarni mustahkamlashda muhim ahamiyatga ega.

Kalit so’zlar : oshqozon, oshqozon bezlari, ovqat hazm qilish, gistologik tuzilish, shilliq qavat, bosh hujayralar, pariyetal hujayralar, xlorid kislota, pepsinogen, pepsin, gastrin, oshqozon shirasi, oqsillar parchalanishi, so‘rilish, fiziologik jarayonlar.

Kirish : Ovqat hazm qilish tizimi inson organizmida muhim fiziologik vazifalarni bajaruvchi tizimlardan biri hisoblanadi. Inson hayoti davomida iste’mol qiladigan oziq-ovqat mahsulotlari organizm tomonidan to‘g‘ridan-to‘g‘ri o‘zlashtirilmaydi. Ular murakkab mexanik va kimyoviy jarayonlar orqali oddiy moddalarga parchalanib, keyinchalik qon va limfa orqali hujayralarga yetkaziladi. Ovqat hazm qilish tizimining muhim a’zolaridan biri oshqozon bo‘lib, u ovqatni vaqtincha saqlash, aralashtirish, maydalash va kimyoviy qayta ishlash vazifalarini bajaradi. Oshqozonning asosiy funksiyalaridan biri uning shilliq qavatida joylashgan bezlar faoliyati bilan bog‘liq. Ushbu bezlar oshqozon shirasi tarkibiga kiruvchi xlorid kislota, pepsinogen, shilliq modda va boshqa biologik faol moddalarni ishlab chiqaradi. Oshqozon bezlarining normal faoliyati oqsillarning parchalanishi, mikroorganizmlarga qarshi himoya va oshqozon devorining yaxlitligini saqlashda katta ahamiyatga ega. Shu sababli oshqozon bezlarining gistologik tuzilishi va fiziologik faoliyatini o‘rganish tibbiyot fanida muhim o‘rin tutadi.

Asosiy qismi : Oshqozon ovqat hazm qilish kanalining kengaygan qismi bo‘lib, anatomik jihatdan kardial, fundal, tana va pilorik qismlardan tashkil topgan. Oshqozon devori to‘rtta qavatdan iborat: shilliq qavat, shilliq osti qavat, mushak qavati va seroz qavat. Oshqozonning ichki yuzasi bir qavatli silindrsimon epiteliy bilan qoplangan. Shilliq qavatda oshqozon chuqurchalari mavjud bo‘lib, ularga oshqozon bezlarining chiqaruv qismlari ochiladi. Oshqozon bezlari joylashishiga va tuzilishiga ko‘ra kardial, fundal va pilorik bezlarga bo‘linadi. Kardial bezlar oshqozonning qizilo‘ngach bilan tutashgan qismida joylashgan. Ularning asosiy vazifasi shilliq modda ishlab chiqarish orqali oshqozon shilliq qavatini himoya qilishdir. Fundal bezlar oshqozon tubi va tanasida joylashgan bo‘lib, oshqozon shirasi ishlab chiqarishda asosiy o‘rin egallaydi. Pilorik bezlar esa oshqozonning o‘n ikki barmoqli ichakka o‘tish qismida joylashgan. Ular shilliq modda va gastrin ishlab chiqaruvchi endokrin hujayralarga ega. Oshqozon bezlari tarkibida bir nechta maxsus hujayralar mavjud. Bosh hujayralar pepsinogen ishlab chiqaradi. Pepsinogen nofaol ferment bo‘lib, xlorid kislota ta’sirida faol pepsinga aylanadi. Pepsin esa oqsillarni kichik peptidlarga parchalaydi. Pariyetal hujayralar xlorid kislota va Kastlning ichki omilini ishlab chiqaradi. Xlorid kislota oshqozonda kislotali muhit hosil qiladi, oqsillarni denaturatsiyalaydi va pepsinogenning faollashishiga yordam

beradi. Kastlning ichki omili esa B12 vitaminining ingichka ichakda so‘rilishi uchun zarur hisoblanadi. Shilliq hujayralar shilliq modda va bikarbonat ishlab chiqaradi. Ushbu moddalar oshqozonning ichki yuzasida himoya qatlami hosil qilib, uni xlorid kislota va pepsin ta’siridan saqlaydi. Endokrin hujayralar esa oshqozon faoliyatini boshqaruvchi biologik faol moddalarni ishlab chiqaradi. Masalan, gastrin xlorid kislota sekretsiyasini rag‘batlantiradi, somatostatin esa ayrim sekretor jarayonlarni susaytiradi. Oshqozonda ovqat hazm qilish jarayoni mexanik va kimyoviy bosqichlardan iborat. Mushak qavatining ritmik qisqarishi natijasida ovqat oshqozon shirasi bilan aralashadi va yarim suyuq massa – ximus hosil bo‘ladi. Oshqozon shirasi tarkibidagi fermentlar va xlorid kislota oziq moddalarning parchalanishida ishtirok etadi. Oqsillar hazmi aynan oshqozonda faol boshlanadi. Pepsin fermenti oqsillarni peptidlarga parchalaydi. Uglevodlar hazmi dastlab og‘iz bo‘shlig‘ida boshlanadi va oshqozonda so‘lak amilazasi ta’sirida qisqa muddat davom etishi mumkin. Yog‘larning oshqozondagi hazmi nisbatan cheklangan bo‘lib, ularning asosiy parchalanishi ingichka ichakda amalga oshadi. Oshqozondan o‘n ikki barmoqli ichakka o‘tgan ovqat massasi oshqozon osti bezi fermentlari va o‘t suyuqligi yordamida yanada chuqur parchalanadi. Oziq moddalarning asosiy qismi ingichka ichakda so‘rilib, qon va limfa orqali organizmning turli to‘qimalariga yetkaziladi. Shu sababli to‘g‘ri ovqatlanish, ovqatlanish tartibiga rioya qilish, zararli odatlardan voz kechish va oshqozon salomatligini asrash muhim profilaktik choralardan hisoblanadi.

Xulosa: Xulosa qilib aytganda, oshqozon bezlari ovqat hazm qilish tizimining ajralmas va muhim tarkibiy qismi hisoblanadi. Ularning murakkab gistologik tuzilishi va o‘zaro muvofiqlashgan faoliyati ovqatning kimyoviy qayta ishlanishini ta’minlaydi. Oshqozon bezlari tomonidan ishlab chiqariladigan xlorid kislota, pepsinogen, shilliq modda va biologik faol moddalar ovqat hazm qilish jarayonining me’yorida kechishida muhim rol o‘ynaydi. Ayniqsa, bosh hujayralar, pariyetal hujayralar, shilliq hujayralar va endokrin hujayralarning faoliyati bir-biri bilan chambarchas bog‘liq. Ularning har biri alohida vazifani bajarsa-da, umumiy maqsad – ovqatning hazm bo‘lishi va oshqozon shilliq qavatining himoyalanishiga xizmat qiladi.

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2. Tibbiy bologiya va gistalogiya fanlariga oid ilmiy- uslubiy manblar
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OVQAT HAZM QILISH SISTEMASINING ASOSIY ORGANLARINING GISTOLOGIK XUSUSIYATLARI

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ANNOTATSIYA

Oshqozon ovqat hazm qilish traktining asosiy organlaridan biridir. U biz foydalanadigan barcha mahsulotlarni qayta ishlaydi. Bu oshqozonda mavjud bo'lgan xlorid kislotasi bilan bog'liq. Ushbu kimyoviy birikma maxsus hujayralar tomonidan chiqariladi. Oshqozonning tuzilishi bir necha turdagi to'qimalar bilan ifodalanadi. Bundan tashqari, xlorid kislota va boshqa biologik faol moddalarni chiqaradigan hujayralar butun organda joylashmaydi. Shuning uchun anatomik jihatdan oshqozon bir nechta bo'limlardan iborat. Ularning har biri funktsional qiymatida farqlanadi.

Kalit so'zlar: Oshqozon, ingichka ichak, sumkasimon organ, epiteliy, kubsimon epiteliy, silindrsimon epiteliy.

KIRISH

Oshqozon: organning gistologiyasi. Oshqozon ichi bo'sh, sumkasimon organdir. Kimyoviy ishlov berishdan tashqari, u oziq-ovqatning to'planishi uchun zarurdir. Ovqat hazm qilish qanday amalga oshirilishini tushunish uchun siz oshqozon gistologiyasi nima ekanligini bilishingiz kerak. Bu fan organlarning tuzilishini to'qimalar darajasida o'rganadi. Ma'lumki, tirik materiya ko'plab hujayralardan iborat. Ular, o'z navbatida, to'qimalarni hosil qiladi. Tananing hujayralari tuzilishi jihatidan farq qiladi. Shuning uchun matolar ham bir xil emas. Ularning har biri ijro etadi muayyan funktsiya. Ichki

organlar bir necha turdagi matolardan tashkil topgan. Buning yordamida ularning faolligi ta'minlanadi.

Oshqozon ham bundan mustasno emas. Gistologiya bu organning 4 qatlamini o'rganadi. Ulardan birinchisi, oshqozonning ichki yuzasida joylashgan. Keyingi - submukozal qatlam. U qon va limfa tomirlarini, shuningdek nervlarni o'z ichiga olgan yog 'to'qimasi bilan ifodalanadi. Keyingi qatlam mushak qavatidir. Uning yordamida oshqozon qisqarishi va bo'shashishi mumkin. Oxirgisi seroz membranadir. U qorin bo'shlig'i bilan aloqa qiladi. Ushbu qatlamlarning har biri birgalikda to'qima hosil qiluvchi hujayralardan iborat.

Oshqozon shilliq qavatining gistologiyasi

Oshqozon shilliq qavatining normal gistologiyasi epitelial, glandular bilan ifodalanadi va qo'shimcha ravishda bu membrana silliq mushaklardan iborat mushak plastinkasini o'z ichiga oladi. Oshqozon shilliq qavatining o'ziga xos xususiyati shundaki, uning yuzasida ko'plab chuqurchalar mavjud. Ular turli xil ajraladigan bezlar orasida joylashgan biologik moddalar. Keyin epiteliy to'qimalarining qatlami mavjud. Undan keyin oshqozon bezi joylashgan. Limfoid to'qimalar bilan birgalikda ular shilliq qavatning bir qismi bo'lgan o'z plastinkasini hosil qiladi.

Muayyan tuzilishga ega. U bir nechta shakllar bilan ifodalanadi. Ular orasida:

- oddiy bezlar. Ular quvurli tuzilishga ega.
- Tarmoqlangan bezlar.

Sekretsiya bo'limi bir nechta ekzo- va endokrinotsitlardan iborat. Shilliq parda bezlarining chiqarish kanali to'qima yuzasida joylashgan chuqurchaning tubiga boradi. Bundan tashqari, ushbu bo'limdagi hujayralar ham shilimshiq ajratishga qodir. Bezlar orasidagi bo'shliqlar qo'pol biriktiruvchi tolali to'qimalar bilan to'ldirilgan.

Lamina propriada limfoid elementlar bo'lishi mumkin. Ular diffuz holda joylashgan, ammo butun sirt. Keyinchalik mushak plitasi keladi. U 2 qatlamli dumaloq tolalarni va 1 - uzunlamasını o'z ichiga oladi. U oraliq pozitsiyani egallaydi.

Oshqozon epiteliysining gistologik tuzilishi

Oziq-ovqat massalari bilan aloqada bo'lgan shilliq qavatning yuqori qatlami oshqozon epiteliyasidir. Oshqozon-ichak traktining ushbu bo'limining gistologiyasi ichakdagi to'qimalarning tuzilishidan farq qiladi. Epiteliya nafaqat organning sirtini shikastlanishdan himoya qiladi, balki sekretsiya funktsiyasini ham bajaradi. Ushbu to'qima oshqozonning ichki qismini qoplaydi. U shilliq qavatning butun yuzasida joylashgan. Istisno yo'q va oshqozon chuqurlari.

Organning ichki yuzasi bir qavatli prizmatik bezli epiteliy bilan qoplangan. Ushbu to'qimalarning hujayralari sekretordir. Ular ekzokrinotsitlar deb ataladi. Bezlarning chiqarish kanallarining hujayralari bilan birgalikda ular sir hosil qiladi.

Oshqozon tubining gistologiyasi

Oshqozonning turli qismlarining gistologiyasi bir xil emas. Anatomik jihatdan tana bir necha qismlarga bo'linadi. Ular orasida:

• Yurak bo'limi. Bu vaqtda qizilo'ngach oshqozonga o'tadi.

• Pastki. Boshqacha qilib aytganda, bu qism fundus bo'limi deb ataladi.

• Tana oshqozonning katta va kichik egriligi bilan ifodalanadi.

• Antral bo'lim. Bu qism oshqozonning o'n ikki barmoqli ichakka o'tishidan oldin joylashgan.

• Pilor bo'limi (pilorus). Bu qismda oshqozonni o'n ikki barmoqli ichak bilan bog'laydigan sfinkter mavjud. Darvozabon bu organlar orasidagi oraliq pozitsiyani egallaydi.

Oshqozon tubi katta fiziologik ahamiyatga ega. Ushbu hududning gistologiyasi murakkab. Fundusning o'ziga xos oshqozon bezlari bor. Ularning soni 35 millionga yaqin. Fundik bezlar orasidagi chuqurlarning chuqurligi shilliq qavatning 25% ni egallaydi. Ushbu bo'limning asosiy vazifasi xlorid kislota ishlab chiqarishdir. Ushbu moddaning ta'siri ostida biologik faol moddalar (pepsin) faollashadi, oziq-ovqat hazm qilinadi va organizm bakterial va virusli zarralardan himoyalanadi. O'z (fundal) bezlar 2 turdagi hujayralardan - ekzo- va endokrinotsitlardan iborat.

Oshqozon osti shilliq qavatlarining gistologiyasi

Barcha organlarda bo'lgani kabi, oshqozon shilliq qavati ostida yog 'to'qimalarining qatlami mavjud. Uning qalinligida qon tomir (venoz va arterial) pleksuslar joylashgan. Ular oshqozon devorining ichki qatlamlarini qon bilan ta'minlaydi. Xususan, mushak va submukozal membranalar. Bundan tashqari, bu qatlamda limfa tomirlari tarmog'i va nerv pleksusi mavjud. Oshqozonning mushak qavati mushaklarning uchta qatlami bilan ifodalanadi. Bu tananing o'ziga xos xususiyati. Tashqarida va ichida uzunlamasına mushak tolalari joylashgan. Ular qiyshiq yo'nalishga ega. Ularning orasida dumaloq mushak tolalari qatlami yotadi. Submukozada bo'lgani kabi, nerv pleksusi va limfa tomirlari tarmog'i mavjud. Tashqarida, oshqozon seroz qatlam bilan qoplangan. Bu visseral qorin pardasi va ichaklar: gemangioma gistologiyasi

Yaxshi neoplazmalardan biri gemangiomadir. Ushbu kasallikda oshqozon va ichakning gistologiyasi zarur. Axir, ta'lim yaxshi bo'lishiga qaramay, uni saraton kasalligidan ajratish kerak. Gistologik jihatdan gemangioma qon tomir to'qima bilan ifodalanadi. Ushbu o'simtaning hujayralari butunlay farqlanadi. Ular tananing arteriyalari

va tomirlarini tashkil etuvchi elementlardan farq qilmaydi. Ko'pincha oshqozonning gemangiomasi submukozal qatlamda hosil bo'ladi. Ushbu benign neoplazma uchun odatiy lokalizatsiya pilorik mintaqadir. Shish turli o'lchamlarda bo'lishi mumkin.

Oshqozondan tashqari, gemangiomalar ingichka va katta ichaklarda lokalizatsiya qilinishi mumkin. Ushbu shakllanishlar kamdan-kam hollarda o'zlarini his qilishadi. Shunga qaramay, gemangioma tashxisi muhim ahamiyatga ega. Katta o'lchamlar va doimiy travma (ximus, najas bilan) bilan jiddiy asoratlar paydo bo'lishi mumkin. Asosiysi, ko'p miqdorda oshqozon-ichak qon ketishi. Yaxshi neoplazmaga shubha qilish qiyin, chunki ko'p hollarda klinik ko'rinishlar yo'q. Endoskopik tekshiruvda shilliq qavat ustida ko'tarilgan to'q qizil yoki mavimsi yumaloq nuqta aniqlanadi. Bunday holda gemangioma tashxisi qo'yiladi. Oshqozon va ichakning gistologiyasi hal qiluvchi ahamiyatga ega. Kamdan kam hollarda gemangioma malign transformatsiyaga uchraydi.

Oshqozon regeneratsiyasi: yarani davolashda gistologiya ko'rsatkichlardan biri oshqozon yarasi. Ushbu patologiya bilan biopsiya bilan endoskopik tekshiruv (FEGDS) amalga oshiriladi. Oshqozon yarasining malignligiga shubha qilingan taqdirda gistologiya talab qilinadi. Kasallikning bosqichiga qarab, hosil bo'lgan to'qimalar boshqacha bo'lishi mumkin. Oshqozon yarasi tuzalgach, oshqozon yarasi tekshiriladi. Bunday holatda gistologiya faqat to'qimalarning malign degeneratsiyasiga shubha qilish mumkin bo'lgan alomatlar mavjud bo'lganda kerak bo'ladi. Agar malignite bo'lmasa, tahlilda qo'pol biriktiruvchi to'qimalarning hujayralari topiladi. Oshqozonning malign yaralari bilan gistologik rasm boshqacha bo'lishi mumkin. To'qimalarning hujayra tarkibining o'zgarishi, ajratilmagan elementlarning mavjudligi bilan tavsiflanadi.

Oshqozon gistologiyasining maqsadi nima?

Ovqat hazm qilish traktining organlaridan biri, unda neoplazmalar tez-tez rivojlanadi, bu oshqozondir. Har qanday shilliq qavat o'zgarishi mavjudligida histologiya o'tkazilishi kerak. Quyidagi kasalliklar ushbu tadqiqot uchun ko'rsatma hisoblanadi:

• atrofik gastrit. Ushbu patologiya shilliq qavatning hujayra tarkibini yo'qotish, yallig'lanish va xlorid kislotasi sekretsiyasini kamaytirish bilan tavsiflanadi.

• Gastritning kam uchraydigan shakllari. Bularga limfotsitik, eozinofil va granulomatoz yallig'lanish kiradi.

• Oshqozon va o'n ikki barmoqli ichakning surunkali oshqozon yarasi.

• Savitskiyga ko'ra "kichik belgilar" ning rivojlanishi. Bularga umumiy zaiflik, tuyadi va ishlashning pasayishi, vazn yo'qotish, qorin bo'shlig'ida noqulaylik hissi kiradi.

• Oshqozon poliplarini va boshqa benign neoplazmalarni aniqlash.

• keskin o'zgarish klinik rasm uzoq muddatli oshqozon yarasi bilan.

Bularga og'riq sindromi intensivligining pasayishi, go'shtli ovqatdan nafratlanishning rivojlanishi kiradi. Ushbu patologiyalar prekanser kasalliklar sifatida tasniflanadi. Bu bemorda malign shish borligini anglatmaydi va uning lokalizatsiyasi oshqozondir. Gistologiya organ to'qimalarida qanday o'zgarishlar kuzatilganligini aniq aniqlashga yordam beradi. Xatarli degeneratsiyaning rivojlanishiga yo'l qo'ymaslik uchun imkon qadar tezroq tadqiqot o'tkazish va choralar ko'rish kerak.

Oshqozon gistologiyasi natijalari

Gistologik tekshiruv natijalari boshqacha bo'lishi mumkin. Agar organ to'qimasi o'zgarmasa, u holda mikroskopda oddiy prizmatik bir qavatli bezli epiteliy aniqlanadi. Chuqurroq qatlamlarning biopsiyasini olayotganda siz silliq mushak tolalarini, adipotsitlarni ko'rishingiz mumkin. Agar bemorda cho'zilgan yaradan chandiq bo'lsa, unda qo'pol tolali biriktiruvchi to'qima topiladi. Yaxshi shakllanishlar bilan gistologiya natijalari boshqacha bo'lishi mumkin. Ular shish paydo bo'lgan to'qimalarga (tomir, mushak, limfoid) bog'liq. Yaxshi shakllanishlarning asosiy xususiyati hujayralarning etukligidir. Gistologiya uchun oshqozon to'qimalaridan namuna olish: o'tkazish usuli Oshqozon to'qimalarining gistologik tekshiruvini o'tkazish uchun organning biopsiyasini o'tkazish kerak. Ko'p hollarda endoskopiya orqali amalga oshiriladi. Oshqozon bo'shlig'iga FEGDSni o'tkazish uchun moslama joylashtiriladi va organ to'qimalarining bir nechta bo'laklari kesiladi. Biopsiya namunalarini bir nechta uzoq joylardan olish kerak. Ba'zi hollarda jarrohlik paytida gistologik tekshirish uchun to'qimalar olinadi. Shundan so'ng, laboratoriyada biopsiyadan yupqa bo'laklar olinadi, ular mikroskop ostida tekshiriladi.

Oshqozon to'qimalarining gistologik tahlili qancha vaqtni oladi?

Agar saraton kasalligiga shubha bo'lsa, oshqozon gistologiyasi zarur. Ushbu tahlil qancha vaqt oladi? Bu savolga faqat davolovchi shifokor javob berishi mumkin. O'rtacha, gistologiya taxminan 2 hafta davom etadi. Bu, masalan, polipni olib tashlashda rejalashtirilgan tadqiqotlar uchun amal qiladi.

Operatsiya paytida to'qimalarni shoshilinch gistologik tekshirish kerak bo'lishi mumkin. Bunday holda, tahlil yarim soatdan ko'proq vaqtni oladi.

Gistologik tahlil qaysi klinikalarda o'tkaziladi?

Ba'zi bemorlarni qiziqtiradi: oshqozon gistologiyasini zudlik bilan qayerda qilishim mumkin? Ushbu tadqiqot barcha klinikalarda zarur asbob-uskunalar va laboratoriyalarda amalga oshiriladi. Shoshilinch gistologiya onkologik dispanserlarda, ayrim jarrohlik shifoxonalarida amalga oshiriladi.

XULOSA

Qorin bo'shlig'idagi yo'g'on ichak, xuddi ingichka ichakning ilmoqlari atrofida "ramka" hosil qiladi. Yo'g'on ichak ovqat hazm qilish tizimining oxirgi bo'limi bo'lib, tuzlar (asosan natriy tuzlari) va suvning so'rilishi uchun javobgardir. U umumiy soni va xilma-xilligi bo'yicha juda ko'p miqdordagi mikroorganizmlarni o'z ichiga oladi. Yo'g'on ichakning uzunligi taxminan 150 sm Ingichka ichak ko'richak gumbaziga oqib o'tuvchi ileotsekal qopqoq yoki Bauxin qopqog'i bilan tugaydi. Koʻr ichak oʻng yonbosh chuqurchasida, undan keyin koʻtariluvchi, koʻndalang, tushuvchi va sigmasimon ichaklar joylashgan. Sigmasimon ichak to'g'ri ichakka o'tib, anus bilan tugaydi. Yo'g'on ichak To'g'ri ichak va anal kanaldan tashqari butun yo'g'on ichak deyiladi. Rektum ham anatomiyada, ham funksiyada bir qator xususiyatlarga ega va uni alohida ta'riflash yaxshiroqdir.

Ko'ndalang yo'g'on ichak chap va o'ng egilish bilan aniq chegaralangan (mos ravishda taloq va jigar burchaklari). Umuman olganda, operatsiya vaqtida yo'g'on ichakning bo'limlarini aniqlash juda qiyin, chunki ular hajmi jihatidan farq qilmasligi mumkin. Ammo yo'g'on ichak ingichka ichakdan sezilarli darajada farq qiladi. Siz faqat uning anatomik xususiyatlarini bilishingiz kerak.

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таҳрири остида Тўхтаев Қ.Р. Азизова Ф.Х. -Абдурахманов М. Турсунов Э.А. Рахматова МХ.

МЕДИЦИНА, ПЕДАГОГИКА И ТЕХНОЛОГИЯ: ТЕОРИЯ И ПРАКТИКА
ISSN: 3030-3001
Том 4, Выпуск 10, Октябрь

МЕДИЦИНА, ПЕДАГОГИКА И ТЕХНОЛОГИЯ: ТЕОРИЯ И ПРАКТИКА ТОМ-4, ВЫПУСК-10 (31 Октябрь)

ОГЛАВЛЕНИЕ

1	**РОЛЬ МЕДИЦИНСКОЙ СЕСТРЫ В ПРОФИЛАКТИКЕ СЕРДЕЧНО СОСУДИСТЫХ ЗАБОЛЕВАНИЙ** Ахунова Нилуфар, Убайдуллоева Барно	6-10
2	**FEATURES OF IMMUNO-BIOCHEMICAL INDICATORS OF TEARS IN ALLERGIC CONJUNCTIVITIS IN CHILDREN** Matlab Tukhtaeva	11-12
3	**SELECTION OF PROMISING GRAPE VARIETIES AND ASSESSMENT OF THEIR ADAPTABILITY TO SOIL-CLIMATIC CONDITIONS** Yadgorova Charos Sobir qizi	13-17
4	**COMPARATIVE DIAGNOSTIC PERFORMANCE OF TRANSVAGINAL ULTRASONOGRAPHY AND MAGNETIC RESONANCE IMAGING IN ADENOMYOSIS: AN EVIDENCE-INTEGRATED REVIEW OF ACCURACY, REAL-WORLD EVIDENCE, AND CLINICAL IMPLEMENTATION** Xolboyeva Mashhura	18-42
5	**THE ROLE OF IMMUNE CHECKPOINT INHIBITORS IN CANCER TREATMENT** Murodova Gulasal, Rasulov Jo‘rabek, Murodov Diyorbek, Po‘latov Samandar, Tojiddinov Davronbek	43-51
6	**SHARQ FALSAFASINING INSON MA’NAVIY KAMOLOTI VA ZAMONAVIY JAMIYAT TARAQQIYOTIDAGI O‘RNI** Mamatqulova Nilufar	52-56
7	**BACHADON MIYOMASI BO‘LGAN AYOLLARDA HOMILADORLIK VA TUG‘RUQNING KECHISH XUSUSIYATLARI** Murodova Maftuna, Sultonov Ravshan	57-65
8	**OSHQOZON BEZLARINING TUZILISHI VA OVQAT HAZM QILISH JARAYONIDAGI AHAMIYATI** Mahmudova Gulsanam, O’rinova Noila, Xolboyev Nuriddin	66-68
9	**OVQAT HAZM QILISH SISTEMASINING ASOSIY ORGANLARINING GISTOLOGIK XUSUSIYATLARI** Allayorova Jongul, Yusupboyeva Maftuna, Botirova Hayotxon	69-74
	ОГЛАВЛЕНИЕ	75