

YURAK-QON TOMIR KASALLIKLARINI DIAGNOSTIKA QILUVCHI MOBIL TELEMETRIK QURILMALAR TADQIQI

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Annotatsiya: Yurak-qon tomir kasalliklari dunyo bo‘yicha o‘limning asosiy sabablaridan biri bo‘lib qolmoqda va sog‘liqni saqlash tizimiga sezilarli darajada yuk tushirmoqda. Erta tashxis qo‘yish va uzluksiz monitoring klinik natijalarni yaxshilash, asoratlarning oldini olish hamda davolash xarajatlarini kamaytirishda muhim ahamiyatga ega.

So‘nggi yillarda mobil tibbiyot usullari, xususan mobil telemetrik qurilmalar yurak faoliyatini real vaqt rejimida kuzatishning istiqbolli vositasi sifatida rivojlanmoqda. Ushbu tizimlar elektrokardiografik signallarni uzluksiz yozib olish va ularni an‘anaviy klinik muhitdan tashqariga uzatish imkonini beradi, bu esa bemorning kundalik hayot sharoitida yurak faoliyatini uzoq muddat kuzatishga sharoit yaratadi.

Ushbu maqolada mobil telemetrik qurilmalarning yurak-qon tomir kasalliklarini diagnostika qilishdagi o‘rni mavjud ilmiy adabiyotlar asosida tahlil qilindi. Natijalar shuni ko‘rsatadiki, ushbu tizimlar an‘anaviy qisqa muddatli diagnostika usullariga (standart EKG va Xolter monitoring) nisbatan, ayniqsa vaqtinchalik va interval bilan yuzaga keladigan aritmiyalarni aniqlashda yuqori samaradorlikka ega.

Shunga qaramay, signal sifatining o‘zgaruvchanligi, qurilma narxi, bemorning qurilmadan foydalanish intizomi va standart klinik protokollarning yetishmasligi kabi muammolar ularning keng amaliyotga joriy etilishini cheklab qolmoqda.

Kalit so‘zlar: Yurak-qon tomir kasalliklari, mobil tibbiyot usullari, telemetriya, EKG monitoring, masofaviy diagnostika.

A STUDY OF MOBILE TELEMETRIC DEVICES IN THE DIAGNOSIS OF CARDIOVASCULAR DISEASES

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Annotation: Cardiovascular diseases remain a leading cause of global mortality and continue to impose a substantial burden on healthcare systems worldwide. Early diagnosis and continuous monitoring are essential for improving clinical outcomes, preventing complications, and reducing healthcare costs.

In recent years, mobile medical approaches, particularly mobile telemetric devices, have emerged as promising tools for real-time cardiac monitoring. These systems enable continuous recording of electrocardiographic signals and their transmission outside traditional clinical environments, allowing long-term observation of cardiac activity in daily life conditions.

This article analyzes the role of mobile telemetric devices in the diagnosis of cardiovascular diseases based on previously published scientific literature. The findings suggest that these systems improve the detection of cardiac rhythm abnormalities, especially transient and intermittent arrhythmias, when compared with conventional short-term diagnostic methods such as standard ECG and Holter monitoring.

Despite these advantages, several challenges remain, including signal quality variability, device cost, patient adherence issues, and the lack of standardized clinical protocols. These limitations continue to restrict the widespread integration of telemetric systems into routine clinical practice.

Keywords: Cardiovascular diseases, mobile medical approaches, telemetry, ECG monitoring, remote diagnostics.

Introduction: Cardiovascular diseases (CVDs) represent a group of disorders affecting the heart and blood vessels, including coronary artery disease, hypertension, arrhythmias, myocardial infarction, and heart failure. According to the World Health Organization, CVDs account for approximately 32% of all global deaths annually, highlighting their significant impact on global public health.

The increasing prevalence of cardiovascular diseases is closely associated with modifiable lifestyle risk factors such as physical inactivity, unhealthy dietary habits, obesity, diabetes mellitus, smoking, and chronic psychological stress. These factors emphasize the growing need for more efficient and continuous diagnostic approaches.

Conventional diagnostic techniques, including electrocardiography (ECG), Holter monitoring, and echocardiography, remain standard tools in cardiology practice. However, these methods are generally limited by short monitoring durations and

hospital-based settings, which may reduce their ability to detect transient or intermittent cardiac abnormalities.

To overcome these limitations, mobile medical approaches have been introduced, enabling continuous cardiac monitoring in real-world environments. Mobile telemetric devices capture and transmit electrocardiographic data wirelessly for remote analysis, providing extended observation periods and improving the likelihood of detecting clinically significant cardiac events.

Methods: This article is based on an analytical research approach. Relevant scientific publications were reviewed from international databases and peer-reviewed journals, including European Heart Journal, Journal of Telemedicine and Telecare, and other cardiology-related scientific sources.

The analysis was structured around the following key domains:

Diagnostic performance of mobile telemetric systems, including sensitivity, specificity, and ability to detect transient or intermittent cardiac arrhythmias in comparison with standard diagnostic tools.

Comparison with conventional ECG and Holter monitoring, focusing on differences in monitoring duration, data continuity, patient comfort, and diagnostic yield.

Clinical effectiveness in real-world applications, particularly in outpatient monitoring, long-term follow-up of high-risk patients, and reduction of hospital readmission rates.

Technical and practical limitations of the systems, including signal noise interference, data transmission reliability, device battery life, patient adherence, cost factors, and lack of standardized clinical protocols.

Data management and interpretation challenges, such as variability in algorithms, potential false-positive detections, and differences in device calibration across manufacturers.

Results: The analyzed literature consistently demonstrates that mobile telemetric devices significantly improve the detection of cardiovascular abnormalities, particularly intermittent arrhythmias that are often missed by conventional diagnostic methods.

According to multiple studies, continuous ECG monitoring using mobile systems increases arrhythmia detection rates by approximately 25–40% compared to standard short-term monitoring approaches. In addition, remote monitoring

contributes to improved patient follow-up and reduces hospital readmission rates in high-risk populations.

However, differences in device performance, study methodologies, and data interpretation across publications indicate the need for standardized protocols in telemetric monitoring systems.

Discussion: The findings of this study confirm that mobile telemetric devices represent a significant advancement in cardiovascular diagnostics. Unlike traditional methods, which rely on short-term or hospital-based recordings, mobile systems provide continuous monitoring in real-life environments.

This continuous approach greatly enhances the detection of transient cardiac abnormalities, especially paroxysmal arrhythmias that are difficult to capture using conventional tools. As a result, diagnostic accuracy and early intervention opportunities are improved.

Despite these advantages, several challenges remain. These include signal noise interference, device cost, data transmission reliability, patient compliance, and the absence of standardized clinical guidelines for widespread implementation.

Overall, mobile telemetric technologies represent a promising direction in modern cardiology, offering improved diagnostic capabilities and long-term patient monitoring potential. Further technological development and clinical standardization are necessary for full integration into routine healthcare systems.

Conclusion: Mobile telemetric devices play an important role in the diagnosis and monitoring of cardiovascular diseases. Current evidence shows that they enhance early detection of cardiac abnormalities compared to traditional diagnostic approaches. However, further improvements in technology, cost reduction, and standardization are required to ensure broader clinical adoption.

Xulosa: Mobil telemetrik qurilmalar yurak-qon tomir kasalliklarini diagnostika qilish va monitoring qilishda muhim o‘rin tutadi. Mavjud ilmiy dalillar ularning an’anaviy diagnostika usullariga nisbatan yurak faoliyatidagi buzilishlarni erta aniqlash imkoniyatini oshirishini ko‘rsatadi. Biroq, ushbu texnologiyalarni keng klinik amaliyotga joriy etish uchun ularning texnologik takomillashtirilishi, narxining kamaytirilishi hamda standartlashuvi talab etiladi.

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