UTILIZATION OF ARTIFICIAL INTELLIGENCE IN ECHOCARDIOGRAPHY

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Relevance. Artificial intelligence promises to revolutionize medicine, giving us a better understanding of health and disease and the ability to make more decisions based on data. Artificial intelligence is now widely used in medicine, including echocardiography (EchoCG), which plays a critical role in the diagnosis and treatment of cardiovascular diseases. Accurate and reliable echocardiographic assessment is essential for clinical decision making. Even with the development of new technologies (3-dimentional echocardiography, speckle-tracking, semi-automated analysis, etc.), the final decision on analysis largely depends on the experience of the operator [1, 2].

Diagnostic errors are a major unsolved problem. Artificial intelligence has the potential to take medical image analysis and interpretation to new levels beyond previous algorithms. A number of publications have highlighted that artificial intelligence can improve the accuracy of diagnosis, clinical management and patient care. In the future, cardiologists will need to adapt their daily practice to incorporate AI into this new phase of EchoCG [3, 4].

Research objectives. To conduct a quantitative analysis of the publication activity of scientists from the world community on the problem of using artificial intelligence in EchoCG in the diagnosis of cardiovascular diseases.

Research methods. To search for information, the English-language text database of medical and biological publications PubMed was used (https://pubmed.ncbi.nlm.nih.gov). The time range of this study is from 1982 (the first publication identified in the database) to December 2023 inclusive.

Key words: artificial intelligence, echocardiography.

Results and its discussion. For the above time range, 1,025 scientific publications were identified on the research topic, while 842 publications (82% of the total) were carried out over the last ten-year period (Table).

The data presented in the table indicates high publication activity of authors in the last decade compared to previous periods. A significant increase in the number of publications on the research topic (75) has been noted since 2019 and progressively increases to 187 in 2023.

Table – Dynamics of publication activity on the research topic for the period 2014-2023.

Years	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Number of articles	24	18	26	27	32	75	122	155	176	187

Availability of identified publications in the database for the entire research period: abstracts – 936, full-text versions – 941, including free access – 480, associated data – 166.

870 articles published on MEDLINE, which is the largest bibliographic database of articles in the medical sciences, created by the US National Library of Medicine. Covers about 75% of the world's medical publications.

By type of publication they are divided as follows: bibliography – 1, clinical trial – 39, meta-analysis – 1, randomized controlled trial – 15, review – 133, systematic review – 4. 1,001 articles (98%) published in English.

Conclusion. Based on the quantitative analysis of scientific publications on the research topic, it can be stated that over the past decade, the publication activity of scientists from the world community has significantly increased on various aspects of the development and use of artificial intelligence in EchoCG and its varieties in clinical practice, which significantly improves the quality of CVDs diagnostics [5].

Artificial intelligence solutions have been developed for both diagnostic and prognostic tasks in echocardiography.

Quantitative assessment of left ventricular function was most often performed. The performance of automatic image classification, image enhancement, cardiac function assessment, disease classification, and cardiac event prediction was generally good.

State-of-the-art artificial intelligence solutions for analysis, reporting and imaging are designed for their respective tasks and have promising performance. In the future, the main benefit of artificial intelligence in echocardiography is expected to be improved automated analysis and interpretation, reducing workload and improving clinical outcomes [6].

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