Література:

1. Дзевульська І. В., Камінський Р. Ф., Самборська І. А., Ігнатіщев М. Р. «Субмікроскопічні та біохімічні зміни в серці старих щурів за умов гіпергомоцистемії». *Матеріали Всеукраїнської науково-практичної конференції Морфогенез та регенерація.* 3-ті Жутаєвські читання. Полтава, 20–21 квітня 2023 р. С. 24–25.

2. Kaminsky R. F. «Electronic-microscopic changes of the heart of old rats with hyperhomocystemia». *Вісник Вінницького національного медичного університету.* 2022. Т. 26. № 3. С. 365–368.

3. Пентюк О. О. Луцюк О. О. Метаболізм гомоцистеїну та його роль в патології. *Український біохімічний журнал.* 2003. 775 № 1. С. 5–17.

ARTIFICIAL INTELLIGENCE IN THE DIAGNOSIS AND TREATMENT OF ACUTE INTESTINAL OBSTRUCTION

ШТУЧНИЙ ІНТЕЛЕКТ В ДІАГНОСТИЦІ ТА ЛІКУВАННІ ГОСТРОЇ КИШКОВОЇ НЕПРОХІДНОСТІ

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Acute intestinal obstruction (AIO) is one of the most serious acute diseases in abdominal surgery due to the peculiarities of the course of clinical manifestations, the difficulties of diagnosis, a significant number of complications and high postoperative mortality. The diagnosis and treatment of AIO with the introduction of innovative generation of artificial intelligence (AI) tools can be more accurate, efficient and fast.

The primary and very important action is the choice of diagnostic methods, determining the severity of the patient's condition and the urgency of surgical intervention. Great help in this process can be provided by clinical decision support systems (CDSS) based on artificial intelligence. By combining various data obtained from examining patients, including physical, laboratory, instrumental and ultrasound examinations, as well as radiologic, computed tomography, magnetic resonance imaging and other methods, CDSS analyzes the data obtained and helps to establish the correct diagnosis and prescribe appropriate treatment. This system allows to evaluate the effectiveness of treatment and provides personalized guidance that allows to optimize establishing the diagnosis, conservative and surgical treatment plans in patients with AIO.

AI technology allows to collect and express the learned knowledge content by generating suggestions in solving the medical problem and helps make reasonable and safe decisions in clinical practice to ensure safety, quality and efficiency [1, p. 2]. After years of development, the CDSS has played an important role in disease management, radiation dose calculation, image analysis, blood bank systems, guidance for doctors, nursing, allied health professionals and other fields, that very important in patients with AIO [2, p. 1].

Artificial Intelligence holds significant potential in revolutionizing the diagnostics and treatment of acute intestinal obstruction through various innovative approaches. These include enhancing imaging analysis, predicting patient outcomes, personalizing treatment plans, and optimizing surgical procedures in patients with AIO. Computer decision support systems (DSS) based on algorithms developed with the use of the methods of intellectual analysis of medical data, are very helpful at the stage of establishing the correct dianosis, which is very important in cases of acute surgical pathology. It is known that when making medical decisions, there are such problems as lack of knowledge, limited time resources, inability to attract a large number of competent experts, incomplete information about the patient's condition, etc. There is an urgent need to use different methods of computer decision support in emergency surgery and AIO. DSS can enable a surgeon to check his own prognostic and diagnostic assumptions in emergency and to use artificial intelligence in complex urgent clinical cases [3, p. 2].

AI has shown promise in improving diagnostics and treatment in various acute conditions, including intestinal obstructions and related abdominal emergencies such as acute appendicitis, demonstrating high accuracy in distinguishing between complicated and uncomplicated cases based on clinical data and CT images. Furthermore, AI models have been developed for predicting the severity of acute pancreatitis using blood serum

indicators, outperforming traditional scoring systems. These models can also predict hospital length of stay, organ failure, and mortality with significant accuracy. Such applications highlight AI's potential in enhancing decision-making, early diagnosis, and personalized treatment planning in acute intestinal obstructions [4, p. 2].

Artificial intelligence presents a key opportunity for radiologists to improve quality of care and enhance the value of radiology in patient care and population health. The potential opportunity of AI to aid in triage and interpretation of conventional radiographs (X-ray images) is particularly significant, as radiographs are the most common imaging examinations performed in most radiology departments. Image analysis obtained during preoperative studies is important for quickly establishing the correct diagnosis, especially in conditions of providing urgent care to a patient. Therefore, automated radiological interpretation using artificial intelligence algorithms, can analyze X-rays, CT scans and MRI images with high accuracy. They can detect signs of intestinal obstruction, such as dilated intestinal loops with air-fluid levels, narrowing or tumor-like growths in the intestine, potentially allowing for faster and more accurate detection of obstruction than traditional methods. By recognizing subtle patterns in images that may go unnoticed by the human eye, AI can help in early detection of intestinal obstruction, leading to timely surgery and reduced complications. [5; 6, p. 3].

Monitoring and follow-up using the advantages of artificial intelligence are of significant importance in the final results of surgical treatment, early detection and elimination of postoperative complications. AI systems can monitor patients with AIO vital signs and other health data to detect early signs of complications after treatment. This allows surgeons to intervene quickly if problems arise. Recovery tracking using AI-powered applications can help track a patient's with AIO recovery process, offering personalized rehabilitation recommendations and alerting healthcare professionals to any alarming events. By analyzing patterns in the collected data, such as irregular heart rhythms, abrupt spikes or drops in vital signs, and sudden changes in activity levels, AI can identify potential signs of health deterioration that might otherwise go unnoticed.

While the potential of AI in managing acute intestinal obstruction is significant, challenges remain, including data privacy concerns, the need for large annotated datasets for training AI models, and ensuring that these technologies are accessible across different healthcare settings.

Conclusions. Healthcare AI systems ananalyze patterns in a patients with AIO medical history and current health data can help to establish the correct diagnosis and prescribe appropriate conservative and surgical treatment plans, predict potential postoperative complications and health

risks. This predictive capability enables physicians to offer additional corrective measures and preventative care, leading to better patient outcomes.

Future research and development will likely focus on improving the accuracy and usability of AI tools, and integrating them into clinical work on patients with AIO. As AI continues to evolve, it is expected to play an increasingly central role in the diagnosis and treatment of AIO, leading to improved patient outcomes and more efficient healthcare delivery to the patients with this dangerous disease.

Bibliography:

1. Artificial intelligence in clinical decision support systems for oncology.

2. Lu Wang, Xinyi Chen, Lu Zhang, at all. *Int J Med Sci.* 2023. № 20(1). C. 79–86. Published online 2023 Jan 1. doi: 10.7150/ijms.77205

3. Mebrahtu TF, Skyrme S, Randell R, Keenan AM, Bloor K, Yang H. et al. Effects of computerised clinical decision support systems (CDSS) on nursing and allied health professional performance and patient outcomes: a systematic review of experimental and observational studies. *BMJ* Open. 2021;11:e053886.

4. Rimmer L, Howard C, Picca L, Bashir M. The automaton as a surgeon: the future of artificial intelligence in emergency and general surgery [published online ahead of print, 2020 Jul 26]. *Eur J Trauma Emerg Surg.* 2020. URL: https://doi.org/10.1007/s00068-020-01444-8

5. Andrey Litvin, Sergey Korenev, Sophiya Rumovskaya et al. WSES project on decision support systems based on artificial neural networks in emergency surgery *World Journal of Emergency Surgery* volume 16, Article number: 50 (2021).

6. Artificial Intelligence Solutions for Analysis of X-ray Images. Scott J. Adams, Robert D. E. Henderson, Paul Babyn at all. *Canadian Association of Radiologists Journal*, Vol. 72, Is. 1. URL: https://doi.org/10.1177/0846537120941671

7. Artificial Intelligence Solutions for Analysis of X-ray Images. Scott J Adams, Robert D E Henderson, Xin Yi , Paul Babyn. *Assoc Radiol J*, 2021. Feb. № 72(1). C. 60–72. doi: 10.1177/0846537120941671.