



# The role of artificial intelligence in postoperative care after cardiac surgery

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## Dear Editor

Postoperative care after cardiac surgery is a complex and critical part of recovery that demands comprehensive management to ensure optimal patient outcomes. With technological advancements, artificial intelligence (AI) is becoming an integral tool for enhancing various aspects of postoperative care. This letter explores the significant contributions of AI in improving postoperative care for cardiac surgery patients, focusing on monitoring, patient management, and outcome optimization (1, 2, 3, 4).

### Enhanced Monitoring and Early Detection

AI technologies have caused considerable shifts in how healthcare professionals manage patients after surgery. Advanced AI algorithms analyze data from various sources like electronic health records (EHRs), wearable devices, and implantable sensors to provide real-time insights into patient health (5). For instance, healthcare professionals use AI systems to monitor patients' vital signs. As a result, it is more likely to detect a condition such as arrhythmias or an infection at an early stage than using the traditional ways of monitoring (6). An early diagnosis through AI can enable early actions, minimizing possible worsened postsurgical outcomes and benefiting patient results (7, 8).

### Personalized Medication Management

Patient compliance with the prescribed drugs and self-care is vital to avoid the development of complications and timely healing. AI can significantly enhance medication management by providing

personalized recommendations based on individual patient data. AI-powered tools can optimize dosing schedules, monitor adherence through Smart pill dispensers, and alert healthcare providers to potential drug interactions or side effects (9). This tailor-made approach assists in individualizing the treatments offered to the patient, may minimize adverse side effects linked to the treatment, and enhance therapeutic gains (10).

### Tailored Rehabilitation Programs

Today, the idea of using AI for rehabilitation is gradually emerging. Similar to how AI-powered platforms can serve as advisors from the data retrieved from activity trackers, such as physical activity, heart rates, and recovery rates, these systems play a significant role (7). The incorporated control systems adapt the exercise routines in actual time with pulse and other vital indicators of patients to facilitate effective and safe rehabilitation processes (5). AI in virtual rehabilitation allows healthcare professionals to provide patients with appropriate exercises and feedback. As a result, patients can understand the schedules and follow through with the exercise regimens tracked (11).

### Improved Nutritional Support

Nutritional management is a critical component of postoperative care. AI can assist in developing personalized nutrition prescriptions by considering various parameters, such as basal metabolism, chronic diseases, and history of surgery (12). AI algorithms can recommend dietary adjustments and

monitor adherence to nutritional guidelines, helping patients maintain appropriate fluid and nutrient levels essential for recovery (9). Moreover, AI in nutrition allows constant feedback and modification based on the current data promoting the effectiveness of dietary interventions (6).

### Enhanced Patient Education and Engagement

AI tools can improve patient awareness and engagement by providing tailored information and interactive resources. The patient-supporting technology, AI-based chatbots, and virtual assistants can provide evidence-based advice around the clock, addressing the patients' concerns based on their postoperative time, medications, and necessary lifestyle changes. These tools can also provide personalized educational materials and reminders, helping patients better understand and adhere to their postoperative care plans (10). The application of AI in patient engagement can result in enhanced treatment compliance among the patients and the enhancement of the general quality of the patient's health.

### Optimizing Follow-Up Care

AI makes follow up care convenient by predicting the patient's health risks from his data and offered follow up schedules. Healthcare management concerned with risk will find in predictive analytics a tool that can be used to recognize patients likely to develop complications that can be managed by altering follow-up care plans (13, 14, 15). Follow-up visits scheduling and coordinating is also made easier through AI systems so that patient get the right care at the right time and in the right manner (5).

### Postoperative Nursing Care

AI-powered robotic systems have been evaluated for their potential to assist in postoperative nursing care for thoracic surgery patients (16). These systems can help with various nursing tasks and potentially

improve the efficiency and quality of postoperative care (17). These technologies assist in risk assessment and decision-making, allowing for more personalized and efficient care (18). AI also supports the reduction of postoperative morbidity and mortality by providing actionable insights that help in the early detection of potential issues (19). Additionally, AI can streamline workflows, enabling nurses to focus more on direct patient care, thus enhancing the overall quality of postoperative recovery (20).

### The Future of AI in Postoperative Care

Future of AI in postoperative care looks promising, with ongoing advancements likely to bring even more innovative solutions. Emerging AI technologies, for example, deep learning, deep reinforcement learning, and AI-imaging techniques in a postoperative period, may improve the process of monitoring, prediction, as well as individualized care (9). It can be expected that as more attention is paid to the further development of AI, improvement of results of patients' treatment and the efficiency of their treatment remains a priority.

### Conclusion

Advanced technologies using AI are increasingly playing a transformative role in postoperative care after cardiac surgery. Intensive monitoring, individualized approach to administering medications, rehabilitation activities, meal plans, and patient involvement are areas that belong to AI which ultimately raises patients' quality of life and utilization of care services. In the given study, the focus is made on the role of AI technology in the sphere of postoperative care, which, as the technology development carries on, will gradually but significantly enhance the overall practices.

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