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Coronary Arto Bypass Using an Artificial Blood Circulator: Standards and Innovations

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ABSTRACT

This article discusses modern standards and innovations in the field of coronary artery bypass grafting (CABG) using artificial blood circulation. Coronary bypass surgery remains the gold standard for the treatment of patients with coronary artery disease, especially in cases of multivessel disease. The use of artificial blood circulation allows for stable and controlled blood supply to the body during surgery, which significantly improves results and reduces the risk of complications. The article presents the latest achievements in artificial blood circulation technologies, including new types of oxygenators, improved pumping systems and innovative methods for monitoring blood circulation parameters. Special attention is paid to safety and efficacy standards, as well as clinical results achieved using these technologies. The advantages and disadvantages of various approaches are analyzed, as well as prospects for further development in this area. The article is intended for cardiology surgeons, anesthesiologists and all specialists involved in performing and researching coronary artery bypass surgery.

KEYWORDS: Coronary Bypass surgery (CABG), Artificial blood circulation, Coronary heart disease, Oxygenators, Pumping systems, Security, Efficiency, Innovations, Clinical results, Heart surgery.

Relevance. Coronary artery bypass grafting (CABG) using a cardiopulmonary bypass (CPB) continues to be the gold standard in cardiac surgery for the treatment of severe coronary artery disease. This method allows the surgeon to work on a completely stopped and bloodless heart, which ensures maximum accuracy when applying coronary bypass grafts and minimizes the risk of technical errors. This is especially important for patients with multiple and complex coronary artery lesions.

The use of AIC allows one to achieve a high level of safety and efficiency of operations, which is confirmed by numerous clinical studies and many years of experience in using this technique. However, the use of AIC is not without risks. Major complications include systemic inflammatory response, renal failure, cognitive impairment, and prolonged recovery time. Modern innovations are aimed at reducing these risks by improving AIC technologies, miniaturizing devices and introducing new methods of organ protection.

CABG using bypass is also the preferred method for patients with comorbidities such as diabetes

and chronic renal failure, where control of perfusion and oxygen supply to vital organs is critical. The introduction of new technologies and methods in the field of cardiac surgery continues to improve surgical results and expands the indications for the use of CABG with bypass for a wider range of patients.

During CABG with bypass, the patient's heart stops and circulation is maintained by a heart-lung machine. This allows the surgeon to work on a stationary and bloodless heart, which improves the accuracy of shunt placement and reduces the risk of unexpected complications during surgery.

Conclusions: CABG using an AIK provides the surgeon with the most controlled conditions for performing accurate and reliable bypasses, which is especially important in complex anatomical conditions and multiple lesions. This method makes it possible to operate on patients with severe concomitant diseases and multiple coronary lesions that are difficult to treat with other methods. Despite its high effectiveness, the use of AICs can lead to a number of complications, such as a systemic inflammatory response, cognitive impairment, and prolonged recovery. Modern innovations, such as the miniaturization of heart-lung machines and new methods of organ protection, are aimed at reducing risks and improving surgical outcomes, making this method even safer and more effective for patients

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