

THE ROLE OF ROBOTIC SURGEONS IN CARDIOVASCULAR REPAIR

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Abstract: This article explores the evolving role of robotic surgeons in cardiovascular repair and highlights the pedagogical benefits of using interactive teaching methods, particularly the discussion method, in medical education. The study was conducted as a teaching experiment among two groups of medical students at Samarkand State Medical University. One group was taught using the traditional lecture method, while the other received instruction through active discussion on the topic of robotic-assisted cardiovascular surgery. Robotic surgical systems, such as the da Vinci Surgical System and CorPath GRX, offer precision, reduced invasiveness, and enhanced post-operative recovery in complex cardiovascular procedures. The results show that students who participated in the discussion-based lesson achieved a 19.43% higher performance rate compared to those taught through traditional means. The research confirms the dual benefit of robotic surgery as a medical innovation and as an engaging educational topic. It concludes that combining technological content with interactive methods leads to better comprehension and academic outcomes in medical training.

Keywords: Robotic surgeon, reconstruction, stent, 3D camera, traditional surgery, interactive educational methods.

The discussion method is a training method that is conducted in the form of a discussion and exchange of ideas with students on a topic. Discussions are held in the form of students exchanging ideas on a topic by dividing groups into two or more small groups.

In the subject of information technologies in medicine,

- The topic of the role of robotic surgeons in cardiovascular diseases was conducted as an experiment and test for the participants of the circle organized at the Department of Informatics and Information Technologies of Samarkand State Medical University in 2 groups.
- The number of students in the first group was 13.

The lesson was conducted in the traditional way.

- In the second group, the number of students was 15, and the lesson was conducted using the discussion method.

Let's start our lesson by giving a brief introduction to the debate method and dividing the participants into 2 groups.

Robotic surgeons are advanced technologies used in modern medicine to perform surgical operations. They provide high accuracy, quality and safety in complex surgical operations. Robotic surgeons are currently used in orthopedics, cardiology, oncology and other fields. Their development provides new opportunities in medicine, for example, remote-controlled operations. The inclusion of robots in medicine will help to further improve the quality of surgical operations and perform surgical procedures in a precise and controlled manner.

Robotic surgery The most prominent application of robots in medicine is robotic surgery. Robotic surgical systems have allowed surgeons to perform minimally invasive procedures with greater precision and control. These systems consist of robotic arms controlled by the surgeon, providing greater dexterity and maneuverability than traditional surgical instruments. Robotic surgery can reduce the risk of complications, shorten recovery times, and improve surgical outcomes for patients. Robotic surgery has helped surgeons perform operations through smaller incisions without stopping the heart. Simple classical heart surgeries of up to 15-20 cm can be performed with robotic heart surgery through incisions as small as 3-5 cm. This shortens the recovery period for patients and reduces the risk of complications. Robots allow surgeons to work in comfortable and awkward spaces.

Robotic surgeons perform the treatment of the disease in several stages.

Robotic systems use diagnostics to identify problems in the heart and blood vessels and analyze the data.

The surgeon enters the surgical plan and its guidelines into the robot. The system automatically creates a surgical drawing.

Robots can perform blood vessel dilation, stent placement, or other reconstruction work with precise and delicate movements.

During the operation, the robot reports and monitors the condition of the surgical field.

After the operation, the robot can monitor and study the patient's rehabilitation process.

Robotic surgeons perform a number of important functions in cardiovascular surgery, namely, operations performed by robotic surgeons are less invasive than traditional surgical methods, which speeds up the patient's recovery. Robots can move with high precision, which reduces errors in bridge, stent implantation or other complex surgical procedures. During the procedure, the robotic system can be used to monitor the complex capabilities and asbestos in real time. Some robotic surgeons offer remote control functions, which makes it easier to perform surgical procedures in remote areas. Also, robotic surgeons provide an effective and safe solution for cardiovascular surgery, which is very beneficial for patients.

A robotic surgeon carries a complex array of equipment to perform a heart transplant.

Robotic devices are often manned platforms that are connected to cameras and sensors to hold and manipulate the product. High-resolution cameras provide real-time monitoring of the surgical site and provide guidance to the surgeon. Robotic systems are designed to provide control and control over the surgical process, with stents, catheters, and other precision robots designed to enter the hospital. These robots are equipped with special robots to provide simulation and modeling programs to help plan and simulate the treatment in advance.

Together, these devices allow robotic surgeons to perform cardiovascular surgeries with high efficiency and safety.

There are also a number of robotic surgeons for cardiovascular surgeries, among which the da Vinci Surgical System is one of the most common robotic surgical systems. It is designed for minimally invasive surgery and operates with high precision. The CorPath GRX system is specifically designed for coronary angioplasty and stenting operations. It provides high precision in the placement of catheters and stents.

Robotic-assisted Cardiac Surgery Systems are systems from different manufacturers that help perform traditional cardiac surgery operations. The NAVIO Surgical System is a robotic system for orthopedic surgery, but can also be used in cardiovascular surgeries, and the Mako Robotic Arm System is widely used in orthopedic surgery, but offers innovative opportunities for solving heart problems.

Future Robotic surgery The development of the latest equipment in medicine and the introduction of new technologies will allow for further improvements in surgical procedures in the future. Robotic cardiovascular surgery represents a transformative approach to the treatment of heart disease, offering many advantages over traditional surgical methods. As technology continues to advance, the scope and effectiveness of robotic cardiac procedures are expected to expand, further improving patient care in the field of cardiothoracic surgery. As with any medical intervention, it is important to have a full discussion with healthcare professionals to determine the most appropriate treatment plan for individual patients.

Result: In the first group, the positive results obtained by explaining the role of robotic surgeons in cardiovascular diseases in the traditional way were as follows.

Proportion 13- 100

1 - x ,

$$X=100/13=7.69$$

$$7.69\% * 13 = 99.97 \text{ mastery}$$

(3 students 5th grade, 4 students 4th grade, 5 students 3rd grade, 1 student 2nd grade) with the result.

$$7.69 \% * 3 \text{ students} = 23.07 \%$$

$$7.69 \% * 4 \text{ students} = 30.76 \%$$

$$7.69 \% * 5 \text{ students} = 49.98 \%$$

$$7.69 \% * 1 \text{ student} = 8.33\%$$

99.97 % mastery is like achieving a positive indicator of 53.83%

The positive results obtained by presenting the interactive teaching methods – Discussion – to the students of the second group were as follows.

Proportion 15 - 100

1 - x ,

$$X=100/15=6.66$$

$$6.66\% * 15 = 99.9\% \text{ mastery}$$

(5 students 5- grade, 6 students 4- grade, 4 students 3- grade,) with the result.

$$6.66 \% * 5 \text{ students} = 33.3 \%$$

$$6.66\% * 6 \text{ students} = 39.96 \%$$

$$6.66\% * 3 \text{ students} = 26.64 \%$$

With 99.9 % mastery, it is like achieving a positive indicator of 73.26 %

The chosen method was successful because there was a lot of discussion and debate about the role of robotic surgery in cardiovascular diseases, and the students' discussion of the topic led to a better understanding of the topic. At the same time, the students' correct answers to the test questions given after the presentation of the topic can be seen as an example of this.

Conclusion: In addition to presenting the topic of the role of robotic surgery in cardiovascular diseases using interactive educational methods - Discussion, we will achieve positive results if we know which type of method is suitable for the topic being taught and are ready for it. When conducting pilot tests in two groups of the Faculty of Medicine of Samarkand State Medical University, we were convinced that the effectiveness of the lesson using the Discussion method was 19.43% higher than that of the traditional method.

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