

## The Role of Robotic Surgery in Minimally Invasive Surgery

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Robotic devices developed by companies, such as computer motion (Santa Barbara, CA) and integrated surgical systems (Davis, CA), have the potential to revolutionize surgery and the operating room. They provide surgeons with precision and dexterity, necessary to perform the complex, minimally invasive surgical (MIS) procedures, such as beating-heart single or double-vessel bypass, neurological, orthopedic, and plastic surgery. Robot will also broaden the scope and increase the effectiveness of MIS, improve patients' outcome and create a safer and more efficient procedure (1). Today robots are used to perform high tech precise procedures and dangerous tasks in industry and research fields, which were previously not possible by a human work force alone. Robots are routinely used to manufacture microprocessors, used in computers, explore the dangerous areas of earth, and work in hazardous environment that are not possible for human being to step in. However, robots has progressively entered the field of medicine (2). Karel Capek, the Czech Republic writer, created an artificial human; named "Robot" that was his brother's name and means "forced labor". Robotic system and other voice activations are the methods by which these surgical robots are controlled. Computer controlled machinery can mimic the awareness, adaptability and knowledge of a human surgeon. With the help of Robot a surgeon can control the procedure from thousands of kilometers away. Other advantages of Robotic surgery include 3D vision, motion scaling, fluid movement, wrist articulation capability, remote sensing technology, tremor filtering, ergonomically intuitive sensing, 25 times more magnification, multiple instruments entrance system, haptic feedback and

tele-surgery with tele-proctoring (3). The first minimally invasive surgery was laparoscopic cholecystectomy performed in 1987 and number of laparoscopic procedures have been increasing afterwards by improvement of technology and experience of surgeons. Robotic surgery is an important issue in medicine. With robotic the intra-abdominal access, the wrist movement, intra corporeal suturing and dissection of pelvic region will be easier than other surgical methods. The advantages of robotic surgery include restoring proper hand-eye coordination, ergonomic position, and improved visualization. However, the robotic surgery has some limitations, including disability to use qualitative information, absence of surgeons' judgment, absence of tactile or haptic information and the high expenses. In our country minimally invasive surgery, especially bariatric surgery is being performed widely. Considering the fact that the literacy rate of our society is above 90% and most of our population is wealthy, performing the best surgical service is a right for our people and minimally invasive surgery is a great revolution in surgical field Robotic surgery is increasing day after day on the other hand. Unfortunately we cannot import Robot to our country due to unjustified sanctions and without Robotic procedure; the progress in minimally invasive surgery will also be under question. This is a right of our nation to have access to the best surgical services. As a professional we expect to exclude the Davinci Robot from list of the sanctions (4).

### Authors' Contributions

Dr Alibeigi supervised; Dr Abdolhosseini reviewed; Dr Imran Abbas wrote the manuscript.

### Implication for health policy/practice/research/medical education:

Robotic devices developed by companies, such as computer motion (Santa Barbara, CA) and integrated surgical systems (Davis, CA), have the potential to revolutionize surgery and the operating room. Robots are routinely used to manufacture microprocessors, used in computers, explore the dangerous areas of earth, and work in hazardous environment that is not possible for humans to step in. Therefore, robots has progressively entered the field of medicine. They provide the surgeons with precision and dexterity, necessary to perform the complex, minimally invasive surgical (MIS) procedures, such as beating-heart single or double-vessel bypass, neurological, orthopedic, and plastic surgery. Robot will also broaden the surgeons' scope and increase the effectiveness of MIS, Improve patients' outcome and create a safer and more efficient procedure. Today robots are used to perform high tech precise procedures, and dangerous tasks in industry and research field, which were previously not possible by the human's work force alone.

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