

## Robotic Assisted Minimally Invasive Surgery, a Novel Innovation in Surgery

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Received: November 18, 2013; Accepted: November 18, 2013

**Keywords:** Robotics; Laparoscopy; Health

Over the last few decades, there has been a great turn in traditional surgical methods. Minimally invasive techniques have recently emerged, using endoscopic laparoscopic techniques instead of open incision in various fields, which has resulted in reduced organ damage, fewer complications, shorter hospital stay, and rarer morbidity and mortalities (1, 2). The rapid uptake of technology in surgery has introduced a new innovation in surgical techniques, firstly performed in 1980's, called robotic assisted laparoscopy surgery (3). This technique has been recently demonstrated by phase of clinical trials and widely used in gastrectomy, prostatectomy, nephrectomy, hysterectomy, cardiac surgery and many other fields (4). Nevertheless is this method considered as a novel innovation in some other fields and is reported as the first trial and its yearly increasing in all fields. This splendid advancement in surgery has various benefits for surgeons, patients and health care system.

Surgical robots - developed to facilitate minimally invasive surgery - assist surgeons in performing enhanced surgical procedures, having upgraded ergonomics, (ie. more comfort and less fatigue), and highly-defined three dimensional visualization and movement-enabled eye and hand, which result in improved surgical performance (4, 5). Several studies have compared the robotic-assisted procedures to open and laparoscopic-assisted operations, especially in complex operations and have found many undoubted technical and clinical advantages in robotic-assisted operations, including (6-8):

1. Shorter operative duration and shorter hospital stay
2. Reduced blood loss and blood transfusion volume
3. Fewer complications, such as lower urinary incontinence, reduced postoperative pain
4. Better cancer margin rates and lower mortality
5. Faster return to normal activities
6. Less conversion rates to open procedures

Evolving the robots in medicine for diagnosis and patient transfer can also comfort the health care system to enter and cure patients in contaminated areas (where it might be hazardous for the health care staff to appear), especially in war-affected areas, in various fields ranging from first aid to technical operations. In addition, a robot is able to enter specific areas that are hard to reach for human beings (as a result of earthquake or as its nature) and manage the injured patients. On the other hand, robots can fulfill the long-lasting dream of Justice in Health by eliminating surgeon's role, as human beings might be influenced by feelings, the environment and many other factors, but a robot can be easily programmed or remotely controlled to perform the operations and cure the patients equally.

Beside all of the aforementioned advantages of robotic assisted laparoscopy surgery, are the disadvantages of this method controversial, as significant issues are of great concern in this regard. Firstly, as many articles discuss the costly comparison of the above-mentioned methods with the robotic assisted laparoscopy surgery, are the issue of costs and economics a great concern. Although this method may reduce the hospitalization and transfusion expenses, this technique includes several charges of robotic equipment and supplements, reparation, programming and etc. (4). On the other hand, handling the robot, especially in complex operations, need extreme education and experience, which might necessitate a great learning curve. And similar to Laparoscopic assisted techniques, the operation results are widely based on surgeon's expertise. It seems altogether that robotic Assisted Laparoscopy surgery will play a significant role in the future of surgery in several fields. Therefore, it's recommended to facilitate all hospitals with this outstanding technique and also include this technique in the educational curriculum.

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

The rapid uptake of technology in surgery has introduced a new innovation in surgical techniques, called robotic assisted laparoscopy surgery and we intend to discuss the benefits and disadvantages in this editorial.

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## Acknowledgements

None declared.

## Financial Disclosure

There is no financial disclosure.

## Funding/Support

There is no funding or supports.

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