



## Embracing the Future with Research

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### Editorial

Medical and Surgical specialties are going through an exciting phase in the present time. Technology is a major factor behind this rapidly evolving scenario and we have witnessed a drastic change in the surgical modalities available to the patient. Within a short phase of training my generation of surgeons has witnessed a rapid shift from the conventional open surgery to laparoscopic surgery, single port surgery and now to robotic surgery. Open surgery has been practiced for over 1000s of years and laparoscopic surgery is about 45-50 years old [1]. Single port surgery is about 30 years old and robotic surgery is has just completed two decades [2]. The latter half of this century has offered more than the preceding millenniums in terms of surgical modalities and there are a few noteworthy points in this regard. Every advancement was initially ridiculed and poorly accepted before it became the gold standard, every advancement has been widely embraced and amalgamated in current practice like it was always existing since the beginning and every advancement brought with it a vast opportunity for research. Research papers that first reported these breakthroughs have become legendary and so have those articles that supported and helped in the percolation of these advancements to the roots of clinical practice.

I guess the message that history tries to give us is that newer developments are the avenue of future research and an opportunity to help the fraternity by portraying the real picture. The sea of literature that is available to us needs to be as close to reality as possible and the sooner we are able to generate evidence of use, the better and faster these advancements can be accepted and benefits provided to the patients. There has also been a steady increase in the number of journal and research articles to supplant technological progress. In the era when laparoscopy hit the scientific stage, there was a slow rise in the number of articles sharing experience regarding laparoscopic management of surgical cases. The acceptance of laparoscopy as an established modality of surgery seems to be in proportion to the scientific literature published. Since the first case of laparoscopic cholecystectomy for instance, in 1985 it took a decade to declare it the gold standard for management of gall stone disease [3]. Robot assisted radical prostatectomy was first performed over a decade ago in 2000 but it is still struggling to make it to the gold standard [4,5]. Today 80-90% of the radical prostatectomies are being performed using robotic assistance in the United States [6]. For Roux-en-Y gastric bypass and anti-reflux surgery, the robot offers no advantages over laparoscopy [7]. Also in colorectal surgery there is no superiority of a robotically assisted laparoscopic procedure over the standard laparoscopic procedures [8]. The upcoming literature is proving helpful in finding the right place for the robot.

Robotically assisted laparoscopy employs motion scaling that smoothens movement and eliminates tremor. There is no fulcrum effect and the degrees of freedom are enhanced multifold. Visualization

is superb and due to the ergonomically designed console surgical fatigue is greatly reduced. Disadvantage of the robotic procedure is the high cost which can be recovered only by increasing healthcare expenses and patient load. There is no tactile feedback and surgical training is limited to fewer centers due to economic concerns [9]. Robotic surgery fairs well in non-inferiority studies compared to laparoscopy but clear superiority is yet to be proven. In this clinical scenario long term results of surgery and costs are awaited and will be deciding factors to direct the future of robotic surgery across the globe. Research is needed from all regions of the world and this is another aspect that future research has to cover. We can never run short of research and avenues are ever increasing. Scope always remains for research that targets innovations, supports innovations and replicates these studies in other parts of the globe.

Presently robotic surgery and nanotechnology are the most researched concerns and their amalgamation that is speculated to bring nanorobots into surgical therapeutics is the most awaited event. While this breakthrough happens robotic surgery continues to overcome the resistance offered by economic constraints, aided by market forces that have been working constantly trying to bring the robot as a winner. A large portion of the surgical fraternity still believes in an operating room without the robot and considers the whole addendum a boon of the commercial sector. In this situation well laid clinical studies can be the deciding factor. The robot offers advantages in terms of greater dexterity, spatial resolution but comes with its own disadvantages as mentioned above [10]. Keeping in mind the purview of technological advancements there is much more needed in terms of single port robotic surgery, tactile feedback, integration with other medical technologies like ultrasound, energy sources, lasers and imaging modalities and reducing the size of robotic apparatus to make it portable, storable and more widely applicable. There is also a need to establish healthy market competition so that costs can be cut and an economically viable option can be created.

While newer advances are uncovered and newer ones become old and part of regular practice, the avenue of research always exists. Research is the biggest support to delivering the latest in healthcare to our patients. At present only a small fraction of the ground work is reflected in literature due to which it is taking longer for the community to march ahead using the latest innovations. Research is not only to innovate but also to support innovations that are worthy of acceptance, it is not only to explore but also expand what we already know. In order to bring future closer a collective effort is needed to testify, embrace and find place for new innovations. In this exciting time there is need to bring forth the researcher amongst us and contribute so that we can deliver better faster.

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