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LETTER TO THE EDITOR

Structured Robotic Training Programs for Colorectal Trainees: is it Time?

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Dear Editor,

The past few decades have seen a paradigm shift from a conventional open approach to minimally invasive surgery (MIS) for abdominal surgery. The concept of MIS has made its way into various specialties where it provides an alternative to the open approach for various indications. The benefits of MIS for colorectal resections have been recognized and gradually accepted over time. As published evidence has shown better short-term outcomes and oncological equivalence compared with open surgery, MIS has taken a central role in the management of colon and rectal surgery. This concept was further validated by several landmark randomized controlled trials;[1-4] currently, laparoscopy is considered and offered as the first option to most patients for both benign and malignant conditions in colorectal surgery. However, this transition is marked by resistance from the surgical community, which is largely due to the longer learning curve, skill gap, and increased capital cost. Bridging the skill gap requires various initiatives from both health departments and industry-funded fellowships for senior trainees to improve the skills of practicing colorectal surgeons. The LAPCO program in the United Kingdom (UK) was a government initiative that led to the increased uptake of laparoscopy in many laparoscopic colorectal units throughout the country. The adoption of laparoscopic resections in the UK remains at approximately 72%.[5] These figures drop when rectal cancer surgery is considered due to the obvious perceived technical difficulties associated with rectal cancer surgery. Various factors can be identified as causes of the limited uptake of laparoscopy, even after the country-wide and government-sponsored training program. The main reason is likely a steep learning curve, which puts established open surgeons off the idea of MIS. Other factors and limitations reported include a lack of tactile feedback, issues with exposure, and difficulty working in confined spaces. These concerns are mostly secondary to the lack of proper training and assessment before laparoscopic resections are undertaken.

Robot-assisted MIS was introduced approximately two decades ago, and surgeons in various specialties were able to report significant benefits of the newer technology. The innovative system had the advantage of a stable three-dimensional magnified view, with the arms allowing 7 degrees of movement, 180 degrees of articulation, and 540 degrees of rotation in confined spaces. Although these advantages made robot-assisted MIS the preferred choice for surgeons, the presence of certain disadvantages hindered its wider acceptance. The lack of a structured training program, financial implications, and the selective availability of the technology to a limited group of surgeons are the main reasons for the reduced uptake of this modality in surgical practice.

The European Association of Urologists and the British Association of Urology Surgeons, followed by the Society of

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Gynaecology Robotic Surgeons, were the first to formulate a structured curriculum and objective assessment before the certification of the surgeons to undertake procedures. These structured training pathways lead to improved outcomes, and the respective specialties were able to show the significant gains of robot-assisted MIS for certain disorders. Although marginal benefits have been reported by expert hands, especially in high-risk patients, training in robotic colorectal surgery remains in its infancy. However, it is anticipated that the introduction of structured training programs in robotic colorectal surgery will bring the necessary changes by proving the significant benefits of robot-assisted MIS for colorectal disorders.

At present, the Fundamentals of Robotic Surgery in the United States and the European Association of Robotic Colorectal Surgery in Europe are evaluation-based training programs.[6-8] A structured training curriculum for modular training using a dual robotic console for added patient safety is recommended. This is followed by an objective assessment using the Global Assessment Score across different variables, including robot docking, colonic dissection, total mesorectal excision, resection, and anastomoses.[9] The evidence supports that the transition from open to robotic surgery has a shorter learning curve than the transition to laparoscopic surgery and is safe and effective.[10] Moreover, it has been established that 10 cases through structured training are sufficient to perform robotic rectal resection competently, which is very unlikely with lap-assisted MIS.

Before a candidate enters a structured training program, it should be mandatory for them to have attained some non-technical and technical skills. The non-technical skills revolve around leadership, teamwork, and communication skills. An operating surgeon oversees the robotic surgery theatre and is responsible for communicating effectively with other medical and non-medical personnel present. The scrub nurse, bedside assistant, and anesthetist work in coordination with the operating surgeon, who is away from the patient cart, and each relies on commands from their team members. This theatre setup minimizes the risks to others, and having effective control of the situation in case of an emergency requires other attributes to be learned before surgical skills.

Technical skills, including e-learning about the robotic system, simulation-based training, attendance at short courses to learn safe docking and undocking, and case observations, are always helpful in the training process. The curriculum should be designed according to the needs of the individual, as it involves two tiers of trainees, i.e., practicing consultant surgeons and trainee registrars.

The common training opportunities available in robotic colorectal surgery include various global short-term courses and some cadaver courses, which are mainly offered by the industry. The issue with the short-term courses is that the candidates experience simulator-based training in dry labs for a couple of days in a robotics institute, watch highly edited videos over the duration of the course, and then return to a real-world environment in which there is no opportunity to practice the skills they have learned. The issue with the cadaver courses run by the industry is that there is limited availability, the selection of the candidates is recommendation-based, and the course is expensive. These courses aim to provide insight into the philosophy of operating a robotic machine over a period of one to two days. Fellowships in robotic colorectal surgery constitute the most popular platform for senior trainees who are awaiting consultant appointments. After 6 months to 1 year of training in robotic colorectal surgery, an appointment in an institute where a robot is available is not guaranteed. Importantly, these courses and fellowships lack an objective assessment and certification.

There may be a place for training pathways in which trainee surgeons will be placed in centers where robotic systems are available to give trainees adequate practical experience at the beginning of their surgical training. The learning process of these trainees may be followed by teaching the use of tools such as Kolb's learning cycle, which is based on concrete experience, reflective observation, abstract conceptualization, and active experimentation. This cycle repeats itself at every training module of robotic colorectal surgery and continues during the entire training. The process may be a way forward for developing surgeons of the future with competence in robot-assisted surgery.

Robotic colorectal surgery may seem like a novelty at present, but it is believed that the marginal gains that have been observed after robot-assisted colorectal surgery, especially in high-risk patients, will become more pronounced, making it a necessity of the future. Laparoscopy will no doubt retain its place in colorectal surgery, but difficulties encountered with straight instruments and a steep learning curve will likely shift the balance toward robot-assisted MIS.

It remains the responsibility of the colorectal surgical faculty to provide structured, assessment-based training pathways to help train surgeons wishing to learn robotic colorectal surgery. It should be done independently from and uninfluenced by the industry, with quality being the focus of skill acquisition.

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