Position statement from Association of Laparoscopic Surgeons of Great Britain and Ireland (ALSGBI) on Robotic Surgery
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Summary:

Association of Laparoscopic surgeons of Great Britain and Ireland (ALSGBI) has been in the forefront of the development in minimal access surgery in the United Kingdom. ALSGBI provides a structure for training to promote safe practice of multi-professional minimal access surgery. Robotics in surgery has been in clinical use for some time and the association fully understands the need to embrace robotics in surgery but feel a cautious approach in the introduction to clinical practice based on the clinical and cost evidence with training for surgeon and the team to perform the procedure competently. There should be a strong clinical governance arrangements locally and NHS should adopt the technology appraisal guidance provided by National institute for health and clinical excellence (NICE). The cost of the current robotic system is a huge financial challenge however, ALSGBI believes in establishing high volume centres which will enable establishing and sustaining high quality service and also provide centres of excellence in high quality training. The training needs to be team based, structured and accredited. The clinical outcomes should be defined, measured and recorded prospectively in clinical trials or through a national registry.

Introduction:

Robots have been used in assisting surgeons to perform surgical tasks in orthopaedics, neurosurgery and cardiac surgery for some time however there has been exponential increase in the use and popularity following the introduction of robotic prostatectomy. Nowadays robotics is widely used in general surgery, gynaecology and head and neck surgery.

Clinical application:

Despite the increased popularity of robotic prostatectomy which is recommended by NICE as the technique of choice, there is no unequivocal evidence to show its superiority over traditional laparoscopic surgery in other surgical procedures. Further trials are required to ascertain the long-term benefits of robotic surgery in oncology, functional outcomes including QoL and to assess the cost effectiveness. In other pelvic surgeries the use of robot has shown marginal benefit but has involved greater costs and longer operating times.

In 2000, the Da Vinci robot was approved by FDA for use in laparoscopic surgery. Da Vinci system overcomes some of the limitations of the standard laparoscopy and allows for precise dissection in a narrow confined space, hence the increasing application in robotic assisted laparoscopic prostatectomy. The advantages include stable operator controlled camera system, high definition 3-D magnified view, articulating instruments with seven degree of freedom, improved ergonomics, motion scaling and tremor filtration. The short term benefits are mainly related to reduced wound related complications however robotic surgery is expensive than laparoscopic surgery and open surgery. There is some evidence to suggest robotics may reduce learning curve and may enable open surgeons to take up minimal access surgery. Although the initial set up costs are high, increased competition from manufacturers and wider dissemination of the technology may drive the costs down in future.

Robotic technology is rapidly evolving with the development of new robotic prototypes for single incision surgery. Robots designed for specific procedures rather than current generic system will enable procedure specific improved outcomes with decreased complications along with cost effectiveness in future.

Training in Robotics:

Currently in the UK, the knowledge and skills are acquired through the speciality training or on pre or post CCT fellowships. Operative experience can be gained by mentored practice or by the use of simulators. Trainees must have satisfactory knowledge of the specific characteristics of the robotic platform and trained by the appropriately trained and experienced trainers. Equally important in robotic surgery is the team training with the robot. At present apart from few robotic prostate fellowships most of the robot training is provided by the manufacturer of the single currently commercially available and approved surgical robot. Ideally health care providers should have the ability and the resources to train surgical teams in all aspects of surgical care including robotics.

Training in laparoscopic colorectal surgery has been streamlined using the modular approach and through the LAPCO programme (http://lapco.nhs.uk/). Similar training model needs to be established for robotic surgery. There are some unique considerations such as port placement

where collisions of the arms have to be avoided, additional arm under the surgeon control, increased reliance on visual clues due to lack of tactile feedback with the current system. In addition, team training with enhanced communication is needed between various members as the surgeon is away from the patient, scrub team and the anaesthetist. There is a huge amount of literature on calculating the learning curve based on surgical competency and patient outcomes in laparoscopic surgery. Similar methodologies need to be adopted in achieving competency in robotic surgery. Using the cusum and operating time, appropriately 15-30 cases is thought be the required to achieve competency in robotic rectal resections based on prior experience in minimal access surgery.

The association would recommend a competency based training in robotic surgery based on the European robotic urological society fellowship programme and the European academy of robotic colorectal surgery. The training needs to be a standardised structured programme with assessment of knowledge by completing the Intuitive surgical online robotic training module, followed by training in the wet lab including animal and human cadaver training. Non-technical skills training for the teams is important followed by team observation visit to a proctor site followed by few proctored cases +/- assessment of technical competence by video analysis with ongoing audit of the clinical practice.

Quality assurance:

As a new technology, robotic surgery should be subjected to the all the currently defined quality indicators for surgical practice including mortality, oncological safety, complications, and quality of life assessments and follow the NICE approved process of assessing clinical and cost effectiveness. Standardisation of surgical training and its application is vital to ensure that newer technologies are validated appropriately.

Conclusion:

Robotic surgery with the Da Vinci surgical system is increasingly used in a wide range of surgical specialities. This technology aims to improve outcomes when compared to open surgery and to overcome some of the limitations of laparoscopic techniques. Despite increasing use, apart from prostatic surgery there is no unequivocal evidence to show the superiority of robotic surgery over the traditional laparoscopic techniques. As there is a greater focus on early intervention and quality of life, there is likely to be development of robotic platforms for procedure specific or platforms for specific parts of the procedure rather than the currently available single robotic system used in all specialities to cover the entire surgical procedure. At the same time there is advancement in laparoscopic surgery with 3-D technology and improved instrumentation. An area of considerable interest, unique to robotic

platforms is the ability to integrate electronic systems such as cross-sectional imaging and programmable parameters into a robot, allowing 3-D lesion definition, plotting no-go anatomical danger zones facilitating dissection in the ideal plane in oncosurgery. In training, robotics lends itself to telementoring as a training tool. Establishing small number of accredited, adequately resources, high volume centres of excellence with the additional remit of delivering training would provide a suitable framework for training in robotic surgery in the UK similar to the models established for training in laparoscopic colorectal surgery.

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