General principles

Anesthesia for robotic surgery

Physiology of pneumoperitoneum

Complications

Air embolism

Arrest… etc

Preoperative assessment and patient selection

Patient positioning and prevention of injury

Bedside – including port placement and docking

Draping robot

(basic understanding in order to be able to deal with trouble shooting)

Need all 4 arms to be draped even if not using

Port placement

Establishing pneumoperitoneum

Hasson

Veress

Optical

Insufflation pressure

Complications and trouble shooting

Eg. Adhesions, Obesity, Narrow pelvis, Prior surgery or radiotherapy, Existing stoma

Docking the robot

Modelled on Device teaching

Targeting

Ensuring adequate space between arms

Burping

Safety

e.g. height limitation

Locking instruments to avoid drift

Emergency undocking

Trouble shooting errors and faults

Instruments

Familiarity with commonly used laparoscopic instruments for the bedside assistant

Inserting and exchanging instruments

Diathermy settings

Console

How does it all work?

Basic rundown of buttons etc

Controlling the camera

Use of different lenses and changing view

Understanding when/why to use different lens

Swapping between instruments

Fourth arm control

Clutching

Customising your setup

Ergonomics

Scaling ratio movement

Adjusts movement speed to surgeon preference

Default 3:1, 2:1, 1.5:1

Available instruments

Diathermy settings

OPERATING

Basic surgical skills on the console

Haptics

Definition

Wrist movements

Understanding how the system works and how optimise use

Grasping objects

Passing items between hands

Cauterising

Settings

Knot tying

Suturing

Dissection and developing tissue planes

Emergency management

Vascular emergency

??other essential crisis management

Trouble shooting

Instrument out of view

Use instrument out of view visual cues

Only works if foot is on camera pedal

Poor vision

Switch dominant eye if smudge only on one side

Can adjust zoom if tissue close and there is spatter/diathermy smoke issue

Surgical skills for the bedside assistant

Fundamental laparoscopic skills

Safe instrument handling

Suctioning

Clipping

Stapling

Cutting

Specimen extraction

Trouble shooting

Loss of pneumoperitoneum

Port loss (inadvertent removal)

Port site closure

Undocking robot

Emergency and routine

Advanced aspects of operating

Haemostatic agents

Stapling

Fluorescence imaging

Tilepro

E.g. USS

Simulation Training for Robotic Surgery

Communication and human factors

Team based training

Operating room communication

Virtual Reality Simulator Training

Procedural Training

3D printed synthetic human organ hydrogel models (this model may soon replace animal and cadaver training in robotics)

updates could be included with scannable QR codes and searchable web links. These links will provide access to the latest instructional content for the major robotic surgery systems

SPECIALTY SPECIFIC OUTLINE

For each specialty…

Other fundamental skills not covered in basic course?

Core procedures

For each core procedure:

Approach(es)

Equipment required

Patient positioning & operating room setup

Port placement

Docking

Step by step procedure guide – operative steps/technique

Particular specialised skills required for this procedure

Urology

Nephrectomy partial nephrectomy pyeloplasty, intrarenal stone surgery, in surgery, nephroureterectomy, cystectomy, cystoprostatectomy, radical prostatectomy, retroperitoneal node to section.

General surgery

Hernia surgery including incisional hernia and mesh hernia repair. Colorectal cancer surgery. Upper gastrointestinal surgery including obesity surgery antireflux surgery and gastric surgery. Pancreatic surgery. Appendicectomy and gallbladder surgery.

General gynaecology and gynaecology Oncology

Hysterectomy oophorectomy endometriosis surgery

Radical hysterectomy radical ovarian surgery and retroperitoneal node to section

Sacrocolpopexy /incontinence surgery

Cardiac surgery

Mitral valve repair/replacement

ENT surgery

Floor of mouth tonsillar vocal cord surgery

Thoracic surgery

Lobectomy, lung cancer surgery, thyroid surgery, diaphragmatic surgery, flexible endobronchial surgery

Endoscopic flex robotics for oesophageal and gastric surgery performed by gastroenterologists (a new market)