Best Practice using Ultravision in Robotic TLH

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Education / Career History

1994 MBBS, University of Burdwan, India

2003 MRCOG, Royal College of Obstetrician and Gynaecologist

2009 Diploma in Advanced Gynaecological Endoscopy, University of Surrey

2015 FRCOG Royal College of Obstetrician and Gynaecologist

2015 Masters (MCH) in Minimally Invasive and Robotic Surgery, Anglia Ruskin University

Major Certifications/Licenses

Qualified Surgeon 2008 (GMC Specialist Register)

Royal College of Obstetrician and Gynaecologist

British Society of Gynaecological Endoscopy

The system components

Ultravision generator

Ultravision 5mm Trocar

Ultravision Ionwand Pack

Minimally invasive surgery has seen many advances through technology and innovation in the last decade, with the aim of making surgery safer and patient experience better. Some of the advances do, however, present their own challenges:

- poor visibility, due to the build-up of smoke when using electrosurgical instruments;
- health risks associated with venting this smoke into the operating room (OR) for the OR personnel; and
- the negative effects that flushing the peritoneum with cold dry CO_2 have on a person's recovery from surgery.

We asked Mr. Misra to share his thoughts on how the combination of Ultravision with robotics has improved his outcomes in Hysterectomy procedures, and how surgical conditions can be optimised using Ultravision's unique mode of action.

The University Hospitals of North Midlands has two (soon to be three) robots available for performing Robotic Hysterectomies. Our department has been able to offer the procedure since 2016 and use of the robot has steadily grown since. We have been using the Ultravision system during these procedures for a little over 12 months, with highly impactful results.

As a result of the minimally invasive aspects of the surgery, robotic procedures have many patient benefits including quicker recovery, smaller scars, less blood loss, less pain, earlier return to work, and a shorter stay in hospital.

Ultravision compliments robotics by significantly reducing pauses to manage smoke and by allowing you to maintain a stable abdominal pressure, which means you can operate at very low pressures. Previously we were using a pressure of about 15mmHg, but we are now operating at pressures between 8 to 12mmHg (depending on the patient's body habitus). Lower pressure has a big advantage in terms of pain management because the patient does not have the over-distention of the peritoneum, which causes pain. The reduced exposure to CO_2 also helps the patient to stay normothermic, which has been shown to help reduce blood loss and the rates of SSIs.

Ultravision has become an integral part of a care pathway, that often enables our patients to be discharged within 12 hours (previously a 23-hour care pathway), this is preferable for the patient and has advantages for the hospital in terms of both costs and capacity.

ULTRAVISION

Surgical Smoke

Surgical smoke, for the purposes of this document, means ***all particulate matter*** *created when using electrosurgical and laser devices. These particles are a mix of fine dust, water, known pathogens, and viruses. Harmful chemicals such as acetylene, formaldehyde and hydrogen cyanide have all been identified in smoke. Although present in small amounts, these and many other known chemicals that have been identified have the potential to cause neurological, respiratory, and digestive disorders after prolonged exposure.*

Measures to manage smoke.

Not being able to visualise the operative field makes surgery less safe for your patient and before the Covid-19 pandemic, most surgeons managed surgical smoke for this reason. Covid-19 has encouraged a huge shift in attitude toward the potential health implications caused by smoke for your surgical team, with some surgical societies even suggesting the cessation of minimally invasive procedures due to the perceived increased risk to personnel.
Prior to the Covid-19 pandemic and subsequent introduction of Ultravision, we had a few options for managing surgical smoke in our department;

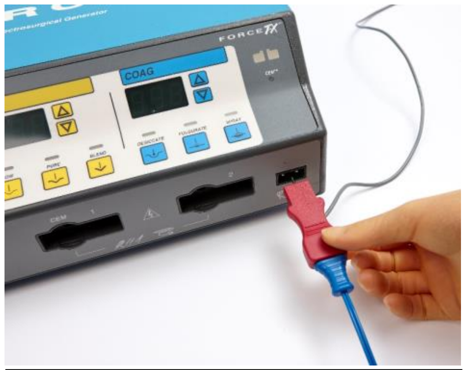
1. Venting the smoke, by opening a tap on the port and letting smoke into the OR atmosphere, which is less than ideal because of the health and safety concerns.
2. Venting smoke through a passive filter, which we found largely ineffective and time consuming, with several filters sometimes required as a result of blockages as they become damp.
3. Suctioning smoke, using pooled suction into central system that had no filtration and resulted in increased CO_2 exposure for patient.
4. Using an advanced insufflation system, which was considered prohibitively expensive, resulted in high CO_2 exposure for the patient, and because of its mode of action allowed smoke to enter into the OR.

Because of the issues we experienced with these alternatives, in 2020 we introduced the Ultravision system, manufactured by Alesi Surgical. It is the only smoke management system that uses electrostatic precipitation to maintain a clear visual field without the need for filtration and exchange of CO_2, thereby preventing the release of surgical smoke into the OR during laparoscopic surgery. This process significantly speeds up the sedimentation of the smoke particles, giving an excellent field of vision as it rapidly clears any smoke created. Before the use of Ultravision, we would have to remove CO_2 to remove the smoke. Invariably what happens when doing this, is loss of the pneumoperitoneum. When performing complex surgeries, this can be frustrating and tiresome, and it certainly adds to the time taken. We have estimated an average time saving of 20-30 minutes if we use Ultravision when performing a hysterectomy.

ULTRAVISION

Intraoperative guidance.

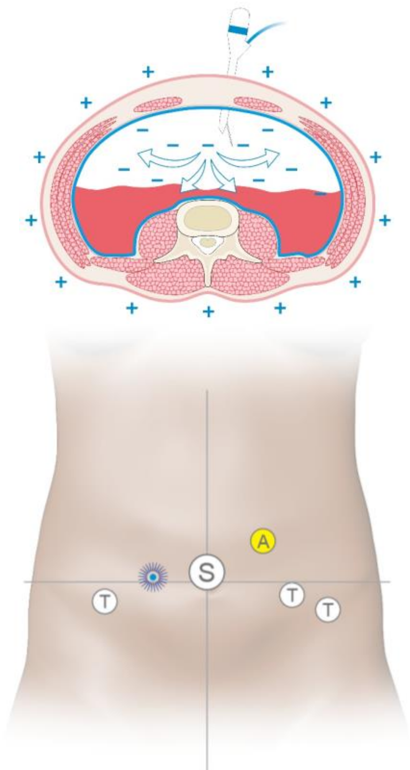
Ultravision is very easy to set up, you just 'plug and play'. The generator connects to the electrosurgical unit via a 'patient return adaptor', a cable from the Ultravision unit that fits into the port of the electrosurgical unit where the patient return connects. You then connect the patient return electrode to the patient return adaptor.



*It is necessary to have a patient return connected for all procedures (even if only using an Ultrasonic device).

Of the two consumable options currently available, for robotic procedures, we usually opt for the Ionwand, with its percutaneous 3mm catheter. This is preferred partly as the 5mm would only be used as an ancillary port, so optimum position for smoke clearance may not be achieved, whereas the Ionwand can be placed in such a way that smoke clearance is optimised, and the robotic arms (and your assistant) do not accidentally interact with it.

When positioning the Ultravision devices within the operative field, there are a few factors that need to be considered:



S= scope, T = working port, A = Ancillary port (where used) = Ionwand

When to insert the wand – it is usually inserted when all the operative ports are already *in situ*. This allows the user to determine the best position to minimize interaction with the robotic arms. The only time we may consider inserting earlier in the procedure is when there are significant adhesions that need to be 'taken down', and so we need smoke management earlier.

Depth/ space – to work optimally the consumable needs to be positioned so the Ionwand ideally has at least 2.5 cm of space all around it. This allows the Ions created to pass through the peritoneal cavity and clear the smoke. If too close to tissue or other instruments, the 'charge' created will localize and return to the generator without affecting the smoke particles.

Procedure specific positioning guidance – Alesi Surgical provides guidance for a range of surgical procedures based upon experiences of current users. The advice is designed to help maximise the performance of Ultravision, without compromising your normal operative procedure.

We initially followed the general guidance – '*place the wand between the scope port and one of your main operative ports, on the side the generator is positioned (for ergonomic reasons) and towards the site of surgery'*. Then with use, we slightly manipulated the position based upon our own experience.

ULTRAVISION

By placing the Ionwand (marked with a ◉) slightly more distal than the operative ports, on either side of the umbilical region, we found greater performance in terms of visualisation, without any interference between the wand and the robotic arms. The wand is inserted under direct vision to minimise the risk of damage to other structures and does not require an incision because it is very sharp. Once in situ, we then secure the wand to the abdomen with a piece of ‘op-tape’ or wound closure strips to help reduce the chance of accidental removal.

Once inserted and secured the generator is turned on, and as per Alesi’s advice, will stay on until just before the device (Ionwand) is removed from the abdominal cavity. Whether for cleaning, if soiling occurs, or for the end of the procedure.

Robotic set up with Ionwand

Ionwand can be seen in situ through robotic camera

Cleaning may be required if smoke clearance is slowed. Slowing occurs for only a few reasons and will normally be accompanied by an audio-visual indicator (flashing lights by the patient return & Ionwand sockets and an intermittent audible notification). Most commonly it is due to a lack of space around the Ionwand, either due to contact with tissue and/or instruments; or due to soiling – blood, tissue, or fluid build-up on the wand.

With a diameter less than 3mm, when removed, the Ultravision catheter should not require a suture or other skin closure at the end of the procedure. For the majority of cases, only a dressing is required.

> *“I would use Ultravision as part of the best robotic surgery set-up I can use”.*
>
> *Mr Gourab Misra*