

Guideline



Health
Northern Sydney
Local Health District

RNSH COVID-19 Technical Guidance on Minimally Invasive Surgery

Summary	This document provides guidance on management of minimally invasive surgery during the COVID-19 pandemic.
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Sector/Service	Royal North Shore Hospital
Audience	Medical
Date Created	31 st March 2020
Previous Reference No.	Nil
Related Policy/s	Nil
Key Words	Surgery, Minimally Invasive

RNSH COVID-19 Technical Guidance on Minimally Invasive Surgery

The COVID-19 status of every patient should be considered prior to a decision regarding the surgical route. All patients should undergo *pre-operative screening* on the day of the operation that will include a history, physical examination, and a patient questionnaire. This is directed at COVID-19 symptoms, travel, and exposure.

For positive, suspected, or at-risk untested COVID-19 patients, the advantages and disadvantages of the open and laparoscopic approaches should be weighed up carefully and if there is no significant advantage of a laparoscopic approach then an open procedure should be performed.

All patients due to undergo urgent or semi-urgent surgery:

Known COVID-19 positive patients:

- If possible and clinically appropriate, urgent operative intervention should be delayed until the infection clears. Alternate treatment strategies should be considered but only if this does not unduly prolong the patient's hospital stay (e.g., antibiotics, percutaneous drainage, etc.)
- In the absence of definitive data, the benefits of minimally invasive surgery compared to laparotomy may not outweigh the potential risks of aerosolised COVID-19 to clinical and non-clinical staff in the operating room. While there are no definitive data and it is likely there will not be for a long time, the possible risk to personnel should be assumed. For patients not amenable to non-surgical management the clinical team needs to make a judgement about whether an emergency operation should be performed via laparotomy or by a minimally invasive approach (requiring pneumoperitoneum).
- Essential surgery (e.g. cancer) should be delayed until the infection clears
- If surgery is deemed necessary full PPE should be used for all operating room staff

Untested patients but who screen positive for any COVID-19 variable:

- A thorough analysis of the risk and benefits of a potentially aerosolising procedure (e.g. laparoscopy) should be undertaken. If there are no clear advantages for a minimally invasive approach, then an open approach should be considered. The admitting surgical team needs to make this judgement.
- Treat as above on the assumption the patient may be COVID-19 positive

Untested patients who screen negative for all COVID-19 variables:

- Minimally invasive surgery is reasonable with the following guidelines:
 - PPE including N-95/P2 masks for all staff in the operating room (as per local RNSH guidelines)
 - Limit to essential personnel only in the operating room and with limited staff turnover/exchange/coverage
 - Attempt for absolutely no plume of pneumoperitoneum to escape, with desufflation performed via suction device. Do not vent the pneumoperitoneum into the room. **An insufflation-filtration device such as the ConMed AirSeal®**

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system or the Stryker PneumoClear® system or an equivalent system should be used in all cases.

- An additional smoke evacuator should be attached to one of the cannulas (e.g. Stryker PureView or the Buffalo PlumePort filter)
- Tissue extraction should be performed with the least amount of CO² escape possible (desufflate with laparoscopic suction prior to mini-laparotomy, making extraction incision, vaginal colpotomy, etc.)

All patients due for surgery for essential but non-emergency conditions (e.g. cancer)

Patients who are not known to be COVID-19 positive should undergo a full screen by the pre-operative staff and surgeon prior to their operation. This will include a history, physical exam, and completion of a screening questionnaire.

Untested patients but who screen positive for any COVID-19 variable: (****)

- The case should be cancelled and delayed until testing is completed and results are negative

Untested patients who screen negative for all COVID-19 variables:

- Minimally invasive surgery is reasonable with the following guidelines:
 - PPE including N-95/P2 masks for all staff in the operating room
 - Limit to essential personnel only in the operating room and with limited staff turnover/exchange/coverage
 - Attempt for absolutely no plume of pneumoperitoneum to escape, with desufflation performed via suction device. Do not vent the pneumoperitoneum into the room. **An insufflation-filtration device such as the ConMed AirSeal® system or the Stryker PneumoClear® system or an equivalent system should be used in all cases.**
 - An additional smoke evacuator should be attached to one of the cannulas (e.g. Stryker PureView or the Buffalo PlumePort filter)
 - Tissue extraction should be performed with the least amount of CO² escape possible (desufflate with laparoscopic suction prior to mini-laparotomy, making extraction incision, vaginal colpotomy, etc.).

PPE and other operative considerations for both open and laparoscopic surgery

General Statements

- 1) Any use of electrocautery should involve a smoke evacuator system, and the suction for the instrument should be set at “continuous – high”.
- 2) Given the rising concern for, and the incidence of COVID-19 positive patients the movement of personnel in and out of the OR should be strictly limited. Staff breaks should be taken between cases when possible.

Specific technical considerations during minimally invasive procedures

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In laparoscopic surgery, an essential part of the technique is establishment and maintenance of an artificial pneumoperitoneum; with this comes the potential risk of aerosol exposure for the operation team. In previous studies, viral particles have been shown to be aerosolised and capable of infecting those who inhale these particles (8–12). Ultrasonic scalpels or electrical equipment commonly used in laparoscopic surgery can easily produce large amounts of surgical smoke, and, the low-temperature aerosol from ultrasonic scalpels cannot effectively deactivate the cellular components of virus in patients. Sudden release of trocar valves, non-air-tight exchange of instruments or even small abdominal extraction incisions can potentially expose the health care team to the pneumoperitoneum aerosol; theoretically the risk may be higher in laparoscopic than traditional open surgery although there is controversy about this.

A thorough analysis of the risk and benefits of a potentially aerosolising procedure (e.g. laparoscopy) should be undertaken for all cases. If there are no clear advantages for a minimally invasive approach, then an open approach should be considered. The admitting surgical team needs to make this judgement.

General advice for minimising aerosolisation risks during open and laparoscopic surgery

- Minimise the use of electrocautery as much as possible
- Have separate suction at the operative field as needed
- For all open electrocautery use, a smoke evacuator system should be attached to the electrocautery pencil to reduce the aerosolised plume (e.g. Neptune SafeAir pencil)



Specific advice for laparoscopic surgery

Use of insufflators

- For the benefit of staff safety use an insufflation-filtration device such as the ConMed AirSeal® system or the Stryker PneumoClear® system or an equivalent system for every case
- The ConMed AirSeal® system works via a 12mm, 8mm or a 5mm port. There is a special tri-lumen gas tube which creates the pneumoperitoneum. The special ConMed ports are valve less which minimizes leakage of CO² gas
- Use setting 'AirSeal Mode' or comparable which maintains a stable pneumoperitoneum and facilitates smoke evacuation and filtration with 0.01µm ULPA Filter
- Use at lowest intra-abdominal pressure possible (10-12mmHg advised)
- Product video AirSeal system https://www.youtube.com/watch?v=25m_WxDMLas
- If you use either the ConMed AirSeal® system or the Stryker PneumoClear® system you should add a secondary passive smoke evacuator (e.g. Stryker Pure View or the Buffalo filter PlumePort)
- Note that if you prefer not to use the ConMed access cannulas you can use the ConMed Airseal® system as a normal insufflator without the Air Seal mode activated and this provides smoke evacuation at the highest microfiltration level (0.01µm)

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Use of trocars/cannulas

- Use as small skin incisions as possible and the least number of trocars as possible
- For all patients, consider using balloon trocars to prevent leaking of gas around trocars
- Observe for any leakage and try to reduce leakage by using suturing or other devices to reduce skin openings that cause leak around the trocars
- Avoid introducing and switching instruments if possible

Use of electrocautery and other energy devices

- Setting on the electrocautery device should be as low as possible (eg. 25)
- Avoid long electrocautery dissection times on the same spot to reduce smoke production

Particles produced by devices (11,12)

- Electrocautery creates particles with the smallest mean aerodynamic size (<0.1 µm). Although electrocautery is potentially less hazardous than laser smoke as a route of disease transmission, intact virions have been shown to be present in electrocautery smoke (including Hep B).
- Laser tissue ablation creates larger particles (0.3 µm). Many laser systems produce a plume of smoke containing debris and vapor and HPV and HIV can be detected in laser plumes.
- Ultrasonic scalpel (0.35–6.5 mm). The particles created by the ultrasonic scalpel are composed of tissue, blood and blood byproducts. Whether the risk posed by aerosols generated by the use of ultrasonic scalpels is comparable with that of laser and electrocautery is not known. It might be greater due to the larger size of particles generated and because it's low temperature vapor may contain more viable particles.
- The smaller the particles, the easier to penetrate through masks; the larger the particles, the greater the distances they travel (up to 100 cm).

Evacuation of the pneumoperitoneum

- Make liberal use of suction devices to remove smoke and aerosol during operations
- Consider an outside filter which can be attached to a trocar (e.g. Stryker Pure View or the Buffalo filter PlumePort)
- Complete desufflation through suction device before specimen extraction, conversion to open, or at the end of the procedure
- **DO NOT** open the cannula valves to evacuate smoke or gas into the room
- Always use a smoke filter on the Luer lock valve canula when opening the port (e.g. Stryker Pure View or the Buffalo filter PlumePort)
- Place a large plastic sheet over the patient's abdomen and then remove all cannulas under the plastic sheet and discard

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Personal Protective Equipment (PPE) for OR Staff for laparoscopic cases at RNSH

The Northern Sydney region is an Australian hot spot for COVID-19 infections. Given the current equipoise about the risks of potentially aerosolising procedures, and in the absence of firm evidence regarding COVID-19 the NSLHD executive recommends that PPE be worn by **all** operating room staff for **all** laparoscopic procedures and that these operations will be done in a negative pressure theatre. This policy is subject to change when more information about these risks comes to light.

- Use full PPE when coming into contact with patient in the OR PRIOR to start of surgery, which includes gowns, N-95/P2 masks, protective head covering, gloves, and eye protection in accordance to RNSH PPE guidelines .
- While operating on these patients, full PPE should be used at all times, including those listed above.
- Note that if you use the 3D camera system you cannot wear a protective shield, you're your 3D glasses. Instead you will need to use the wrap around 3D shields over your normal glasses
- When finished with the operation, all staff should de-gown and removal all PPE used in the OR with the exception of N-95/P2 mask and discard prior to leaving. This should be done in accordance with local guidelines and using the buddy system to check for the correct doffing procedure. Hands should be washed immediately afterwards. Remove P2/N95 masks outside the operating theatre and wash hands again. Follow RNSH PPE guidelines

Precautions for nursing staff with disconnection and disposal of the insufflation tubing:

- Suction should remain on prior to disconnection and disposal of the insufflation and fluid/smoke tubing
- If possible, the fluid and smoke evacuation tubing should be knotted to avoid spillage prior to disconnection
- All suction and insufflation tubing should then be removed from the drapes (suction still connected)
- The suction liners with the suction tubing still attached should then be removed from the canister and disposed of in the contaminated waste bin with appropriate personal protective gear in place
- Suction can then be turned off

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Revision & Approval History

Date	Revision No.	Author and Approval

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