



The Impact of COVID-19 on Surgical Practice – A Summary

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Short Communication

In March 2020, the World Health Organization declared COVID-19 a pandemic [1]. The effects were felt worldwide, particularly in health care. A rapid restructuring, reallocation of resources and reprioritization of care was undertaken, in all departments including surgical. Priorities during the crisis include patient and Health Care Worker (HCW) safety, maintaining emergency surgical capabilities and reallocation of manpower and resources to areas of higher demand. Prevention of transmission is key to addressing all priorities [2]. Viral spread is recognized in close contacts through aerosol and droplets, and indirect transmission from fomites on surfaces [3-5]. The virus remains viable in aerosols and on surfaces for 3 and 72 h respectively [6]. It has also been isolated in blood, bile, feces and urine [7,8]. One study in Wuhan found that of 138 patients admitted to Zhongnan hospital over January 2020 with COVID-19, 41.3% became infected in the hospital – 29% of these were HCW [9]. Infected HCW may infect other patients, are unable to work and are negatively affected (in terms of health and wellbeing).

For this reason, hand hygiene and Personal Protective Equipment (PPE) appropriate for each activity is imperative, throughout the perioperative period [10]. A restructuring and redeployment of medical care teams and work patterns was undertaken - to ensure enough manpower where needed, to cover gaps due to sickness and also to have a 'backup' team not performing clinical tasks, but readily available [11]. Staff caring for positive patients, should be distinct from those caring for 'clean' patients to avoid cross-contamination.

Pre-Operative Care

Pre-operative care has been transformed with the screening of all scheduled operations and postponing of non-urgent cases [11]. This reduces transmission in hospital and unnecessary use of resources, ensuring emergency surgical teams and 'escalation' beds are available (free theatre and recovery areas). The balance between the risk of getting COVID-19 and the outcome to the patient if surgery is delayed (threat to life, disease progression, permanent organ damage and feasible alternatives) needs to be assessed. Life/limb-saving or clinically urgent operations should proceed. Non-surgical management is recommended wherever possible – reducing transmission and conserving resources. Furthermore, patients undergoing surgery during the incubation period of COVID-19 have high mortality and ITU requirement rates [12]. Relevant organizations have published guidelines for different specialties for alternative management methods [13-19]. In cases where operations are necessary, the simplest procedure with reduced risk of post-operative complications and emergency re-operation should be chosen (e.g. stoma formation rather than anastomosis) [20]. Consent for the operation must include the risks associated with catching COVID-19 as an inpatient. Patients with malignancy are of concern – their operations are time sensitive, but they are at higher risk of catching COVID-19 and more vulnerable to complications [21]. 'Clean' surgical hubs are being utilized for urgent cancer operations, after a case by case basis discussion at MDT [22]. Patients referred to surgical specialties should be assessed by a senior clinician, who can recognize if a patient needs theatre. Cases for theatre must be discussed with a consultant surgeon and if >10% mortality is expected, a consultant anesthetist [11]. For orthopedic patients who necessitate surgery, elective theatre lists should be used, working closely with orthogeriatrics where appropriate. Trauma (wounds and minor injuries) referred from triage, should go to fracture clinic directly, and be assessed by a senior clinician. Splints rather than plaster casts are recommended to prevent re-attendance [23]. COVID-19 symptoms may present as an acute abdomen (nausea, vomiting, diarrhea, abdominal pain and gastrointestinal bleeding) [24,25]. This may be misleading. Deranged clotting and liver function tests were also noted in these patients. It is important to note; nasogastric tube insertion is an Aerosol Generation Procedure (AGP) –

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appropriate PPE is required [20]. Streaming of 'green' and 'red' patients should be ensured, to prevent transmission between patients. Patients planned for surgery should be screened for COVID-19 with history, swab and imaging – chest X-Ray or a CT-chest (CT chest advised if any other CT performed) [20]. Elective patients should self-isolate for 2 weeks pre-operatively. COVID-19 positive patients should be isolated in negative pressure rooms or cohorted on wards and floors. They should have their own route from ward to theatre. Transporting staff should wear appropriate PPE, the patient a surgical mask and the route decontaminated after [26].

Intra-Operative Care

The operation should be conducted by the most experienced member of the team (consultant or senior trainee). Operating and intubation should not be teaching opportunities – exposing as few staff, for as little time as possible.

COVID-19 patients should be operated in the same designated theatre with the same anesthetic machine [27]. An intubation and anesthetic trolley should be kept inside the room [26]. The theatre should have an anteroom (negative pressure), for donning and doffing and for the runner outside to leave any requested items. Where possible disposable tools should be used, bodily fluids and specimens double-bagged and the theatres disinfected after use [28]. Electrocautery, laser-ablation and ultrasonic tools generate surgical plume, which has the potential to spread viruses [29-31]. This is particularly a concern in laparoscopic surgery in which aerosols generated build-up in a closed cavity and reach higher concentrations. The release of trocar valves, non-airtight exchange of instruments and specimen removal are opportunities for transmission [32]. The risk of this must be weighed-up against the increased length of stay in open surgery (increased time for potential exposure to COVID-19). Suggestions for reducing risk include careful achievement of pneumoperitoneum, keeping CO2 pressure low, reducing Trendelenburg position, suctioning of plume, using low setting electrocautery and avoiding long dissection times [33]. High efficiency particulate air filters are recommended [34]. Regional anesthesia is preferred if possible [26], as intubation and extubation are AGPs. Therefore, it is advised to be performed in theatre, by the most senior member of the team with minimal personnel present [28]. Awake intubation techniques should be avoided, with Rapid Sequence Induction preferred, using a technique most likely to be successful the first time (e.g. video laryngoscopy) [28]. A heat and moisture exchanger should be used on the expirator, the filters and soda lime replaced after each case and suction kept to a minimum. A 20-min interval must be kept between intubation and the rest of the theatre team entering. Hand hygiene is imperative, particularly after AGPs – hand contact interactions between the anesthetist and surrounding objects is a recognized opportunity for contamination [35]. Endoscopy is an AGP, due to stimulating coughs, retching and passing of flatus. The potential to spread the virus through fluid splashes generated from removing endoscope, removing specimen, saliva and stool spillages also exists [36,37]. Endoscopy, therefore, should be limited to emergencies including acute bleeding, acute cholangitis, foreign bodies and obstruction.

Post-Operative Care

Recovery should take place in theatre if possible, with anticipatory antiemetics to prevent post-operative vomiting [26]. Patients operated in the incubation period for COVID-19 have higher rates of ITU requirements, and ITU should be made aware of these patients early

on [12]. Patients with impaired respiratory function post-operatively are at risk, and post-operative physiotherapy should be encouraged. Patients should be discharged as soon as safe to do so. Follow-up should only be performed if necessary, ideally virtually [11]. It should be noted that COVID-19 symptoms may present as post-operative complications [20,25]. A high clinical suspicion is needed.

General Principles

End of life care will be part of the management for some patients with COVID-19. There will be cases in which surgical intervention will not improve the quantity or quality of the patient's life, and therefore it may be in the patient's best interest to treat symptoms conservatively while maintaining dignity. Advance Care Plans should be encouraged [11]. Virtual clinics should be performed in place of regular clinics, to shield patients/staff from exposure. A case by case decision should be made about patients coming in person to clinic [11]. Training and communication with staff are imperative to ensure all policies and updates are implemented, and any problems can be addressed early.

Conclusion

These changes are intended to ensure patient and staff safety, whilst reducing risk of transmission. The future implications of delaying operation, the long term sequela of infection with COVID-19, impaired communication due to PPE, re-attendance after conservative management and complications from open surgery, remain undetermined. However, in order to protect our HCW and patients, we should follow the quickly evolving guidance available.

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