European Knee Society

COVID-19 – EKS Guidelines and Recommendations for Resuming Knee Elective Surgery (orthopedics – joint replacement)

Restarting surgery in COVID -19 decreasing epidemic (not eradicated)

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Introduction

The COVID-19 breakout forced to stop almost all elective surgeries in the affected countries, to reduce the spreading of contagion decreasing the number of patients not needing urgent operations, decreasing the overall affluence of patients and relatives in hospitals, avoiding to operate on affected symptomless patients, and to divert resources for COVID-19 hospitalized patients. In a more advanced period of the epidemic, in some most affected areas, the OR have been transformed in ICU, to exploit the presence of ventilators to assure a sufficient pulmonary and life-saving assistance to the most severely affected patients.

The measures of social distancing are producing, slowly but constantly, the desired effect of reduction of the epidemic. The “neglected” orthopedic patients are now back in the game, and a road map to safely, and effectively reopen the ORs, and to schedule in a proper manner these patients for a transient period of time (whose length is difficult to preview), must be outlined and described; we should also take in account that during this time frame, a resurgence of COVID-19 can occur, but we must be able to shelter the elective surgery from this unfortunate event.

We are formulating a proposal for the return to purely elective surgery (intervention planned or booked in advance of routine admission to the hospital). The timing for this surgery should be tailored to the patient needs, staff, and hospital organization, and penetration of COVID infection.

What is an elective knee surgery? It is a non-emergent primary or revision arthroplasty surgery where a shared decision making process (between surgeon and patient) have led to the decision of performing the joint replacement based on the degree of joint derangement, and the consequent level of severe pain and disability.

Many different variables should be considered in formulating an algorithm for elective surgery in the COVID-19 time.

The main issues are based on the diversity of local situations depending on:

1. Intensity of actual infection in the geographic area of interest. Degree of involvement of the hospital of interest in COVID-care (COVID free, Patients Under Investigation (PUI) and COVID positive wards, separated pathways organized or not). In case of no COVID positive wards, do you have the possibility to surgically treat unrecognized and symptomless COVID positive patients? If not, screen every patient with questionnaire, low dose CT scan of the lungs (it is not enough a standard lung X-Ray) and PCR-test to cover the last 72H before CT-sensitivity appears.). Precautions and strong hygienic rules must be taken with preventive measures and appropriate behavior in clinics for planning the surgery, COVID screening of potential surgical patients, at the ward during pre-operative time and after surgery and in the OR/PACU (ICU if needed) as well as in the rehabilitation units, if this remains part of your treatment pathway.
2. The architecture of the Hospital of interest needs to allow for separation of COVID plus and PUI and COVID negative patients, the routes from wards to ORs, distance between wards and ORs, number and disposition of the surgical theaters need to allow applicating the separation of patients.
3. Plan the organization of surgical activity as before the virus breakout; staff availability (nurses, anesthesiologists, cleaning team, transporters, …). A multi-disciplinary meeting (online) should be organized before start-up of surgical activities.

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4. Day case surgery (including one night stay) should be considered, discussed with patient and implemented whenever possible, in order to reduce hospital stay and potential contamination during the elective hospital stay. This option could be especially attractive for patients afraid of being contaminated in the hospital. They should be warned for potential hospital stay for pain, nausea, orthostatic intolerance or other reasons if medically indicated. However, all steps of these procedures must be well checked in advance: in geographic areas where contagion is still present, discharge to hotels or other similar facilities can be difficult; discharge at home not always possible because of the distance; availability of secretarial staff for distance follow-up with phone calls and new technologies at regular intervals. At start-up it is advised only to consider patients within local distance and with easy access to transportation.
5. Instructions, directives and rules dictated by the Healthcare authorities, (national, regional and local) predominate above all scientific guidelines only aiming to help surgeons think about their own personal protocol.
6. Many of these above factors cannot be regulated and/or influenced by a general algorithm, but every single Country, Region and Hospital can evaluate and adapt to their own specific situation.

In this section we discuss return to elective surgery whenever allowed and indicated. We will describe the different steps that should be controlled during the patient journey.

A) Patients selection

- In the first phase, a strict separation from urgent cases and purely elective cases should be ruled: trauma cases, despite the decreased incidence, should be treated in specific hubs, or completely separated in different ORs with different teams not interacting with elective surgeries teams.
- During the patient selection process, distance from home to the hospital should be considered, as complications cannot be easily treated, if any,

during a persistent period with imposed travel limitations and to avoid to hospitalize COVID-19 from a more contagious region into a less contaminated zone of the country.

- The potential need for elective surgery in times of COVID should be discussed with the patient. He needs to express his specific and imminent wish to be operated for an elective case. The reason should be objective for the surgeon and worth the potential, unknown risk for the patient. Functional impairment and pain are main reasons.
- Potential need for extensive preoperative screening (co-morbidities), for longer surgical times (complex primary, revision), for a stay in the ICU or blood transfusion, should be evaluated. This decision making should be carried out by an inter-collegial decision of anesthesiologist, surgeon, and infective disease specialist.
- The potential need for in-hospital post-operative rehabilitation also must be taken in account; joint pain and stiffness with impaired limb function is a frustrating and disappointing complication needing further in-hospital treatment, and it should be prevented/avoided. Wearable sensors technologies as well as remote physiotherapy management using dedicated applications should be promoted and implemented prior to start elective knee surgery. Patient motivation to proceed with auto-rehab might be an important factor at the early stages of return to elective surgery.

B) Organization of the outpatient clinic

- Scheduling of the consultations should be organized as well as possible to reduce waiting time and limit the number of patients in the waiting room (recommendation to schedule patients every 20 min) and if possible, run 2 consultation rooms so that patient will hardly cross each other. Seating in the waiting room should be separated by 2 meters, allowing a surface of 4m2 per individual. Patients should be informed that no relatives can accompany them, except for parents for under-aged patients (< 18 years).

- Standardized screening through a questionnaire including questions about the risk of being COVID+ should be administered online or during a dedicated phone call prior to the clinic. The phone call can be carried out by the secretarial staff and based upon the enclosed questionnaire.

- Patient information of adapted and appropriate social distancing rules and behaviors should be displayed, as well as the type of appropriate personal protection should be displayed in every consultations room and in the waiting room. If the hospital applies a wear masks policy, this should be communicated, and masks should be available for all patients.

- A “surgical waiting list” will be created after the clinic to grade surgical priority based on the previously mentioned points and the clinical symptoms and the COVID status.

- Surgical selection criteria should be more evidence-based than ever before: patients, selected for primary knee replacement (either uni or total), should express a Visual Analogue Score (VAS) for maximal pain of 7/10 or more, have an Oxford Score lower than 20, and present with a bone on bone

osteoarthritis (Kellgren-Lawrence grade IV) on a load bearing radiograph of the knee. Revision?. During the call we were not in agreement on giving scores to avoid controversy in the future,

- Ethical considerations should be taken in account before giving a selective indication for knee replacement: decisions based merely on economical reasons, personal or institutional, must be avoided. However, strict adherence to the above listed indications, is a warranty against unethical behaviors.

C) Patients preparation

The patient preparation protocol is summarized in the attached algorithm.

- Pre-operative evaluation with RT-PCR test and (when available) immunologic test for antibodies, swab test, must be executed no later than 48 h prior to surgery (and adapted to the delay required to obtain the results of the test in your location as this delay may vary from one country to another and from one hospital to another.)

  Swab testing must be accompanied by immunologic test for antibodies; in case of positive IgM and negative IgG, patient should be refused surgery, discharged, monitored and re-tested with swab test and serum test after 14 days. Pre-admission questionnaire should be re-administered after this period. If the patients results positive to tests, he must be delated.

- The anesthesiologic evaluation is crucial as the comorbidities should be perfectly analyzed and the ASA status defined to better evaluate the potential need for extensive medical explorations (cardiac, pulmonary…) as the access to these evaluations might be limited during this period.

Routine x-rays of the chest should be done, also in patients for whom it is not usually performed (young age, negative history for pulmonary disfunctions); when in doubt, low dose CT-scan should be added.

Furthermore, the ASA stratification (1-2 and 3-4) and the analysis of the comorbidities will help to determine the potential need of ICU post-operatively.

In case of potential need of ICU, availability should be checked the day before surgery, and immediately before surgery as well.

The evaluation must be done with a pre-admission evaluation. When for different reason this is not possible (distance from the hospital, conditions of the patients, etc), they should be admitted in a Screening Ward, where they are tested and treated as positive until the contrary has been proved. In case of positive testing, they must be discharged, or transferred to a COVID + ward.

- Informed consent must be implemented with information concerning:
  - no admissions of relatives during the hospital stay;
  - potential increased risk of infection (if technology of the surgical OR cannot be adapted) but: the antibiotic therapy will not follow the usual protocol, but it will be extended; antibiotic loaded cement always utilized;
  - blood transfusions needed in case of revision surgery, of any type, with high probability; chances of having blood transfusions explained to the patients, according to pre-op hemoglobin level
  - No patients undergoing UKA with tourniquet are at risk for transfusion even when preoperative anemia.
  - The average drop in Hb for women is 2 g/dL after 4 days so including hidden blood loss. For men it is 2.5 d/dL after 4 days. Since the WHO proposes transfusion from 8g/dL we could consider a preop Hb level of 11 a minimum for all patients. (Schwab KSSTA Lower blood loss).
  - Staff is controlled with daily detection of temperature and forced wear of PPE. Staff testing can be decided and regulated by the local rules and

legislative decisions taken by the health authorities. Ideally, regular testing of the staff should be carried out, or when symptoms appear (loss of olfaction, etc). Temperature of the staff should be registered at the beginning of the shift, as well as entering the surgical theater.

D) Admission to the ward

- Temperature of the patients at the entrance of the hospital
- 1 patient per room is mandatory;
- Patients should wear masks. Surgical masks can be considered sufficient for patients and staffs in a COVID-19 free ward. Strict hand hygiene for staff and patients. Some healthcare authorities have also prescribed gloves for the patients; utility of this measure needs to be clarified.
- All nurses and staff, wear masks.
- No relatives are admitted to the patient's room, before and after surgery. Information are regularly given by phone on a daily basis by a medical component of the staff. This measure could retain aged patients to afford surgery until the end of this obligation.

E) Operating theater

Different levels of safety measures can be adopted. By definition the patients admitted to the OR in the context of elective surgery has been tested and screened and are therefore COVID negative .

However during this period, some precautions should be taken as well:

- Vertical laminar flow system with a minimum of 20 air changes per hour.
- Portable laminar flow with high efficiency of HEPA filters can be used, to implement the elimination of any aerosol coming from patient and surgical maneuvers
- Induction and anesthesia must be performed in the OR, or in dedicated adjacent room. Waking up and post-operative time in the same OR, or in dedicated

adjacent, single patient room, and not in a common, pooled recovery room. In case of pre- and post-anesthetic maneuvers in OR, patient out directly to the room (ICU specific pathway).

- The viral transmission is due to contact with contaminated environmental surfaces and aerosolization. After induction of anesthesia, all equipment and surfaces with disinfection wipes containing a quaternary ammonium compound and alcohol, should be accurately cleaned.
- Knee surgery produces high aerosol because of the power tools, therefore the use of N95 mask is an obligation together with a face shield.
- Aspiration of the smoke of the electrocautery, all time
- Absorbable sutures under the skin.
- Dressing with absorbing medication, to be removed after 15 days.
- Space suits can be used, but the mask should be worn as well.
- Boots are suggested
- Double gloving as usual

F) Sterilization process and management of the instruments.

The standard procedures for cleaning and sterilizing of instruments are adequate and need to be strictly followed and monitored.

G) Post-operative management of the patients.

The usual DVT prophylaxis protocols should be adopted. COVID-19 is known to be proactive in causing blood clots formation. Elective surgery should be performed on COVID-19 free patients. These patients undergoing surgery have therefore the same risk as usual and national guidelines, where available, should be followed.

H) Physiotherapy

Arthroplasty classes shouldn't be performed anymore with a person to person contact. Where available new technologies for online classes should be explored.

The first post-operative sessions of physiotherapy can be organized in the patient room and the PT of the ward should wear mask and gloves.

Walking exercises in the corridor should be limited and if performed, it should respect the social distancing.

Ideally, the patients should be moved to a PT section, through a COVID-free pathway, in the same Hospital, before final discharging, or to a rehabilitation hospital, where all rules of protections have been implemented.

Technology for rehabilitation should be implemented: personalized patient education and physiotherapy should be performed adopting dedicated rehab Apps and wearables, also after the rehab period in dedicated facilities.

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COVID-19 Evidence - Based Scoping Review

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