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Early observations from the initial impact of the current COVID-19 pandemic on surgical services in the United Kingdom: a comprehensive review

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Abstract. – OBJECTIVE: The COVID-19 pandemic has resulted in a serious impact on health services. In this comprehensive review, the authors have explored the published evidence that has looked into the early effects of this impact on various aspects of delivering surgical services during the crises in the United Kingdom.

MATERIALS AND METHODS: Electronic literature search of the databases (Medline/PubMed, EMBASE, NICE guidelines and Google Scholar). The key words used were COVID-19, SARS-CoV-2, Coronavirus, pandemic, surgery, surgical services. The retrieved studies were systematically reviewed and critically analyzed to construct this comprehensive review.

RESULTS: The surgical interventions have been focused on emergency and cancer surgery during the pandemic. Since the service situation is changing quickly; surgeons should be up to date with the local and national guidelines. It is vital to safeguard the specialized clinical professionals to fulfill their tasks through the pandemic; especially that another wave of the pandemic is still a possibility in the horizon. Attention should be given to surgical training and medical education during the crises by the training providers.

CONCLUSIONS: The aftermath period is still going to be a serious challenge to the service. Therefore, a strategy of shared responsibility, planning ahead with consideration of developing a transitional period should be adapted.

Key Words:
COVID-19, SARS-CoV-2, Coronavirus, Pandemic, Surgery, Surgical services.

Abbreviations

ALSGBI: Association of Laparoscopic Surgeons of Great Britain and Ireland; ARDS: Acute Respiratory Distress Syndrome; ASA: American Society of Anaesthesiologists; ASGE: American Society for Gastrointestinal Endoscopy; AsiT: Association of surgeon in Training; BSG: British Society of Gastroenterology; CT: Computerized Tomography; COVID-19: Corona Virus Disease - 2019; FFP: Filtering Face Piece; GMC: General Medical Council; ISCP: Intercollegiate Surgical Curriculum Programme; JAG: Joint Advisory Group on Endoscopy; MDT: Multidisciplinary Team; NHS: National Health Service; NICE: National Institute for Health and Care Excellence; OPCs: Outpatients` Clinics; PPE: Personal Protection Equipment; WHO: World Health Organization.

Introduction

The rapid escalation of the COronaVIrus Disease-2019 (COVID-19) pandemic has resulted in a huge impact on health services worldwide. This pandemic has clearly demonstrated that the human community is not well prepared to face such crises at global level. Cocolini et al[1] described the current situation as follows: "the world is potentially facing one of the most difficult infectious situations of the last decades. COVID-19 epidemic warrants consideration as a mass casualty incident of the highest nature. An optimal management should consider all four phases of the so-called disaster cycle: mitigation, planning, response and recovery"[1].

The World Health Organization (WHO) has expressed its deep concerns about the exponential growth in the number of the officially reported infected cases, which has passed a figure of 6.5 million confirmed infected cases and nearly 400,000 related deaths at the time of writing this paper[2]. The front-line health workers have been subjected to a higher risk of cross infectivity with a potential of significant morbidity and even mortality. It is not surprising, therefore,

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that this pandemic will have its short-term and long-term negative effects on health services. In this comprehensive review, the authors have explored the available published evidence that has looked into the early effects of this impact on the various aspects of delivering the surgical services during the crises in the United Kingdom. This review has not discussed the epidemiology, the pathophysiology, the clinical presentation and the available medical treatments of the COVID-19.

Materials and Methods

The authors have performed electronic literature search of the databases (Medline/PubMed, EMBASE, NICE guidelines and Google Scholar). The keywords used were COVID-19, SARS-CoV-2, Coronavirus, pandemic, surgery, surgical services. The relevant studies were screened, and full text versions were retrieved. The references to all the retrieved texts were searched for further relevant studies. The full texts of all the retrieved studies were systematically reviewed and critically analyzed to construct this comprehensive review.

Restructuring of the Surgical Services

The large number of infected cases combined with the limited resources with the lack of sufficient intensive care beds, have resulted in redeployment of the junior doctors and nurses from the cold specialties to work for the emergency and intensive care units[3]. Urgent departmental new policies with regular updates have been implemented to prepare for shortage of the surgical team members due to absences or self isolation. A good example has been the implementation of the first and second on-call rotas, where the second on call person is being on standby. Senior members of the surgical teams have also played a valuable role in helping their colleagues in some exceptionally busy intensive care units: "Surgeons may be required to familiarise themselves with the WHO guidelines for the clinical management of severe acute respiratory infection when COVID-19 disease is suspected. In such cases, they should ensure they have been adequately updated in airway management and ventilation skills by a senior anaesthetist or intensivist"[4].

Hospitals have been advised to discharge in-patients who are medically fit to leave. In addition, the National Health Service (NHS) has put provisional plans to lease/buy capacity in independent hospitals to expand critical care services to the maximum possibly needed[5].

Recently published guidelines by NHS England have advised to prioritize levels of surgical intervention during the crises into five categories (Table I). These guidelines cover all surgical specialties with the exception of obstetrics and gynaecology and ophthalmology: "these time intervals may vary from usual practice and may possibly result in greater risk of an adverse outcome due to progression or worsening of the condition, but we have to work within the resources available locally and nationally during the crisis"[6]. The NHS England has also published surgical speciality specific guidelines during the COVID-19 pandemic[7].

As the pressure on surgical services is expected to increase over the coming months, busy centres might benefit from the provision of networked teams. The Surgical Colleges advised that the workforce likely will break down into torso/cavity surgeons (vascular, general, urology) and extremity surgeons (orthopaedics, plastics), with the recommendation that each site would have the presence of a torso and extremity surgeons with middle grades where possible. The setting and implementation of the networking arrangements must involve senior clinical and managerial endorsement that is supported by agreed departmental policies. In order to maximize the availability of health work force and make use of their valuable expertise, steps have been taken by the related authorities to provide temporary registra-

Table I. Prioritization of patients requiring surgery during the COVID-19 crisis[6].

Priority	Category
Priority level-1a	Emergency-operation needed within 24 hours
Priority level-1b	Urgent operation needed with 72 hours
Priority level-2	Surgery that can be deferred for up to 4 weeks
Priority level-3	Surgery that can be delayed for up to 3 months
Priority level-4	Surgery that can be delayed for more than 3 months

tion to doctors and nurses who left the register or gave up their licence to practise in the last three years, if they are willing to return to work[4,5].

Outpatients' Clinics (OPCs)

Outpatient services are often considered to be the first point of contact that most elective care surgical patients have with secondary care. The management and delivery of OPCs is based on a complex system that involves a wide range of clinical and non-clinical staff across many disciplines and departments[8]. In 2018-2019, there were 123.4 million outpatient appointments in NHS England alone, of which 96.4 million were attended by patients[9]. It is not surprising, therefore, that the impact of cancelling the usual "face to face" clinic activities during the current pandemic will have its serious implications on the service. In addition to the clinical assessment, one should keep in mind that the OPCs are closely related to a wide variety of essential surgical and endoscopy services, including referral for various investigations, adding patients to the waiting lists, consenting patients for elective surgery, breaking bad news, the two weeks wait rule and the management of patients with malignant pathologies. In addition, OPCs are excellent venues for training/teaching of trainees, medical students and staff too. To overcome this issue, the majority of the NHS hospitals have implemented the use of "virtual clinics" that rely completely on phone communications when possible. The positive side of this approach is that the patients (whether new or follow up) would still have their consultation on a timely or even advanced manner. That is in addition to decrease the chances of the cross infectivity. However, virtual clinics lack the possibility of assessing the physical signs. Also, there have been other challenges in assessing patients with dementia, learning difficulties, poor hearing, poor historians and the language barrier in some patients. The implementation of virtual clinics would also result in "delays in acting" with a potential of significant future backlog on the service. When possible and safe to do so, patients should be discharged from routine follow up through a pragmatic approach. Nevertheless, the patients should be clearly advised to seek re-referral when relevant. A key element in the management of surgical OPCs in the current crises is efficient Triage of the new patients. Patients with suspected malignancies can be triaged straight to diagnostic tests according to locally agreed new policies that are based on national guidelines. If physical assessment is essential, then, any probability or proven COVID-19-positive patients should be reviewed and examined under strict infection control measures according to the local guidelines. In addition, checklists should be designed to allow efficient follow up, particularly for the outcome of the various investigations that are requested through the virtual clinics[10].

Austerity Measures in Operating Theatre and Wards During COVID Times

Due to the highly infective nature of the COVID-19 virus, several pathways were created with the aim of protecting healthcare professionals and patients they are caring for. Allocating dedicated senior staff to key management roles has been implemented to minimize COVID-19 spread. All staff has been trained for application and disposal of Personal Protection Equipment (PPE), including masks [level 2 or 3 filtering face piece (FFP) depending on the aerosol-generating risk level], eye protection, double non-sterile gloves, gowns, suites, caps, and socks[11].

Local protocols have been urgently implemented to ensure that patients are not moved between different areas until their destination has been confirmed. A dedicated and adequately stocked COVID-19 operating theatre have been designated, ideally a negative pressure theatre that is close to the theatre complex entrance without passing through non-infected areas. That is in addition to allocating dedicated staff changing areas[10].

Moreover, intra-operative new measures and guidelines have been agreed at local levels to minimize contamination and cross infectivity, like minimizing the staff number in theatre to the essential required level, no external observers should be allowed in theatres, appropriate PPE for the relevant staff, using smoke evacuation for various energy sources like diathermy, team changes will be needed for prolonged procedures in full PPE, higher risk patients should be intubated and extubated in theatre with minimal immediate attending staff, preferably in a negative pressure room if available[12].

The NHS came with several precautions for hospital staff during viral pandemics; no belts, no wallets nor cash/coins are to be carried (only contactless bank cards). The use of mobile phone should be restricted as less often as possible. Mobile phones, spectacles and computer keyboards should be cleaned with 70% alcohol at least once before leaving the ward and going home at the

end of the shift. Pens, stethoscope and hospital notes, if any, should be placed in a plastic re-sealable bag after cleaning them with alcohol 70% or should be left in hospital if possible. 'Bare below elbows' in hospital is to be practiced vigilantly, and hands should be cleaned from elbow below, with soap and water just before leaving the ward. Staff is strongly advised to avoid touching any surfaces if possible. Restriction of visitors and encourage working from home when applicable. Routine examination of patients should be avoided if possible. A distance of 1-2 meters away from patients during ward rounds must be taken into account. When getting close to patient during examination or taking blood samples or any intervention, PPE (FF2 mask at least or surgical mask and full face visor, both with full sleeve apron) should be worn, and patients should be asked to turn their faces away from the examining doctor/nurse and use tissue to cover their mouths and noses even using a face mask. To reduce the risk of cross infections, the discharged post operative patients have been strongly advised to avoid contact with others. Any future communication or consultation should be based on virtual clinic settings when possible[13,14].

Elective Surgery

The limitation of the available related evidence combined with the uncertainty of the pathophysiology and the time course of COVID-19 infection, imply that patients would be at risk of being deprived of access to timely surgical care for a long time[15]. Interpreting the meaning of "elective" and balancing this definition with the health of the patient can become a challenge for even the most experienced surgeons[3].

The term Elective Surgery does not mean optional surgery, but it simply means non-urgent, keeping in mind that literature showed that 50% of all elective surgical patients could get serious harms if their elective surgery gets delayed or cancelled[15]. On the other hand, minimizing or even cancellation of non-urgent elective theatre lists, including day surgery, has the benefit of releasing wards, doctors and staff for the more urgent clinical needs associated with overwhelming admissions of patients with COVID-19 symptoms[10]. That is in addition to minimizing cross infectivity and the utilisation of unnecessary resources, such as beds, ventilators and PPE[16].

Hospitals in England have been advised to hold all non-urgent elective surgery for at least three months, in order to assist the service in dealing with the COVID-19 pandemic. This decision was supported by the Royal College of Surgeons in England[4]. They also advised that hospitals and surgeons should carefully review all scheduled elective procedures with a plan to "minimize, postpone or cancel scheduled operations, endoscopies and other invasive procedures as necessary, and shift inpatient diagnostic and surgical procedures to outpatient settings, when feasible"[5].

The NHS has always been under pressure of meeting the demands of the waiting lists. Since January 2013 the routine waiting list has been growing significantly at about 7.7% per year (and waiting times have gone up by about 6% per year). With the previous winter elective cancellations, there was an estimated loss of up to 50,000 inpatient operations in January 2018. A three-month COVID-19 shutdown potentially adds about 5 months worth to that existing waiting list growth[17]. According to the hospital activity statistics, inpatients represent about 15% of elective admissions. If that went on for three months because of COVID-19, then the NHS might lose capacity for about 150000 inpatient operations[18].

The above inevitable situation would most certainly result in significant delays in the waiting lists, with the possibility of worsening of the related pathologies in some patients unfortunately. That is in addition to the expected huge pressure on the delivery of future various surgical services and the critical financial challenges.

Emergency Surgery

During the challenging times of the pandemic, the goal of the emergency surgeon has been providing timely surgical care through an efficient use of the existing resources like hospital and intensive care unit beds, available PPE and reducing the chances the cross infectivity. Shared decision making has been taken at multidisciplinary level according to the available institutional resources. Overall, there is no substitute for sound surgical judgment, especially that there is a viable role for conservative management in specific conditions; like appendicitis, gall stones related disease, diverticulitis, and various perianal pathologies[19].

The current advice is that COVID-19 should be sought in any patient needing emergency surgery. A combination of clinical assessment, radiological signs and microbiological tests should be implemented in this concept to either confirm or exclude the infection status. This is to be accomplished through the patients `history, a re-

cent Computerized Tomography (CT) scan of the chest (within the last 24h), and COVID-19 testing. Any patient undergoing abdominal CT scan should have CT chest too. Clinicians should also keep in mind that the current tests for COVID-19 may be false negative[12].

Emergency surgery has been led by the most experienced member of the surgical team available. Patients with the relevant risk-stratified score for predicting mortality of ≥10% have had their operation performed in a timely manner under the direct supervision of a consultant surgeon and consultant anaesthetist. In cases with predicted mortality of >5%, a consultant surgeon and consultant anaesthetist have had to be present for the operation except in specific circumstances where adequate expertise is available[4].

Minimal Access Surgery

The advantages of minimal access surgery in the various aspects of surgical practice are well reported in literature. In fact, minimal access surgery has been the standard practice in many surgical disciplines over the last decade or so. However, and due to the paucity of the available related literature and evidence, the concept of COVID-19 transmission during minimal access surgery has been a matter of debate among surgeons from various specialities worldwide.

Since it is relatively a stagnant heated volume of gas in the peritoneal cavity, there have been suggestions that the pneumoperitoneum created during minimal access surgery may subsequently allow for a concentrated aerosolization of the virus. Therefore, the sudden deflation of the pneumoperitoneum at the end of the procedure or during ports exchanging, could lead to the transmission of the virus. However, it has been reported that derbies aerosolization during laparoscopic surgery is actually related to the electrosurgical smoke produced by energy devices in a closed environment like the abdominal cavity. On the other hand, the ability of Carbon Dioxide alone to aerosolize particles in the abdomen is still unknown. The concept of viral particles emission during laparoscopy has been reported in one small study only[20,21].

Despite all the current concerns regarding aerosolization during laparoscopic surgery, the Association of Laparoscopic Surgeons of Great Britain and Ireland (ALSGBI) has advised in its recent statement that there is no available evidence supporting the concept of viral transmission during laparoscopic surgery. Therefore, the association has published a list of recommendations regarding the use of laparoscopic surgery during the current pandemic. The focus of the recommendations is on minimizing the operating time and the implementation if intraoperative measure that would decrease the chances of viral aerosolization, like the involvement of senior surgeons and suitably trained staff, routine use of a closed circuit smoke evacuation with ultra-low particulate air filtration systems, use of balloon ports & contained extraction systems to reduce gas leakage around port sites, using the lowest abdominal insufflation pressure (12 mmHg or less), minimal use of energy devices during procedures, and routine closed evacuation of all gas at the end of procedure, prior to specimen and ports removal[22]. Comparable general recommendations have been recently published by the European Association of Urology - Robotic Urology Section (ERUS). From the robotic surgery point of view, the ERUS has advised that inserting 8 or 5 mm instruments in a 12 mm Da Vinci trocar without a reducer should not be practiced. For (robot-assisted) laparoscopy and retroperitoneoscopy, the lowest allowed intra-abdominal pressure with the use of intelligent integrated insufflation systems has been recommended[23]. In the same concept, the initial intercollegiate general surgery advice has been based on the selective use of laparoscopy in cases where the intended benefit outweighs the risk of viral transmission, especially that safety mechanisms (filters, traps and careful deflating) are difficult to implement[12].

Cancer Surgery

Cancer surgery is perhaps the most challenging aspect of the surgical services during the COVID-19 pandemic. The combination of a potential of delays to diagnosis and hence treatment, could lead to poor surgical outcome and possible ethical consequences. The current crises have resulted in sudden disruption of the usual cancer surgery pathways like outpatients' clinics, the two weeks wait rule, the multidisciplinary team (MDT) meetings, cancer surveillance and various essential cancer services (radiology, endoscopy, histopathology, haematology, oncology, physiotherapy, dietetic and rehabilitation). In addition, cancer patients are vulnerable to COVID-19 infections due to their already compromised immune system, keeping in mind that cancer in more common in the older population who mostly have other significant co-morbidities. In addition, a large number of them would need variable cy-

cles of perioperative chemo-radiotherapy and immune therapy. Furthermore, the associated stress and psychological impact, with poor nutritional status are other important factors that could considerably contribute to the lowering of the immune system in cancer patients. Another potential obstacle in surgical management of cancer patients has been the availability of higher level of care beds post surgery. Depending on the type of the pathology and the American Society of Anaesthesiologists (ASA) grade, it is not unusual for elective cancer surgery patients to be admitted to intensive Care Units over the early post operative period at least. The situation has been even more challenging when the cancer patients are showing symptoms and signs of COVID-19 infection with or without positive microbiological or serological tests. For the above reasons, performing cancer surgery during the current crises carries a risk of significant morbidity and mortality. On the other hand, cancer surgery should be performed in a timely manner according to the agreed guidelines to avoid disease progression to the level of inoperability.

Early published reports have acknowledged the above challenges and suggested some actions to face their expected associated difficulties. These actions have been generally based on the principles of shared decision making, decrease the chances of cross-infectivity, the availability of beds and resources, minimizing the patients` visits to hospitals, the implementation of virtual MDT meetings and clinics, direct referrals to the relevant investigations, differing surgery in non-urgent cancer patients, and undertaking a policy of using neoadjuvant chemotherapy and then wait, particularly in the frail patients. Ideally, all elective urgent and cancer surgical procedures should be performed in "Virus Free" centres[14,16,24-27].

The authors would also like to highlight that the National Institute for Health and Care Excellence (NICE) has recently published a rapid guideline in delivering anticancer treatment during the COVID-19 pandemic[28].

Mortality Figures

Since we are living in the early phase of recovery following few months of the COVID-19 pandemic, the current available evidence that has looked into the mortality figures associated with various surgical interventions during the pandemic is unsurprisingly limited. Nevertheless, the general consensus from early reports is that surgical intervention during the current crises is generally associated with high mortality figures, particularly in patients with positive COVID-19 status. In one retrospective cohort study of 34 operative patients (with confirmed COVID-19 infection status), 44.1% of the patients needed ICU care, and the mortality rate was 20.5%. The mortality figures were higher in the elderly patients and the ones who have other co-morbidities. The most common complications in the non-survivors were Acute Respiratory Distress Syndrome (ARDS), shock, arrhythmia and acute cardiac injury[29]. However, the methodology and data analysis of this paper has been criticized by other authors[30]. Currently, the CovidSurg observational study is taking place in nearly 90 international centres so far. It is designed to collect real-world data through international collaboration, in order to determine the 30-day mortality figures (as a primary outcome) in patients with COVID-19 infection who undergo various surgical interventions[31]. According to the study main coordinator in a recent interview, early data of 500 patients has shown that the overall mortality figures is about 25% in patient who have COVID-19 positive status. All the mortalities were in patients who were older than 50 years in age. During high scale and emergency global crises like the current viral pandemic; where the available evidence is limited and generally weak, this type of study is ideal to be performed despite the usual limitations of observational studies like confounding factors and heterogenecity[32].

Endoscopy

Endoscopic procedure are invasive tests that could be associated with COVID-19 cross infectivity through aerosolization of the virus or faecal contamination. Therefore, the British Society of Gastroenterology (BSG) and the Joint Advisory Group on Endoscopy (JAG) have been regularly updating their guidelines according to the progress of the COVID-19 pandemic situation in the United Kingdom. The guidelines have been developed and supported through collaboration with other well-established related committees at national level. They aim to minimize cross infectivity, staff protection and limitation of endoscopy procedures to three groups. These are the emergency/essential group that needs to be continued, differ until further notice group and the needs discussion at consultant level (case-by-case) group. The authors would like to highlight

that these guidelines are getting regularly updated, therefore we advice to check the related BSG website for the up to date version[33]. Comparable guidelines have also been recently published by the American Society for Gastrointestinal Endoscopy (ASGE)[34].

Training and Education

Junior and senior surgical residents are essential for the healthcare workforce worldwide. The effect of COVID-19 pandemic on the training of this group is becoming a challenging issue with the ongoing pandemic[35]. The usual training opportunities that are needed to obtain structured technical and non-technical competencies and skills; according to the related curriculums, have become extremely limited. This is not surprising since the vast majority of the outpatients' clinics and elective theatre/endoscopy lists have been cancelled or significantly differed. Furthermore, many surgical residents have been re-allocated to cover other specialties; like intensive care and medical units, in order to cope with overwhelming pressure on the local systems. Also, essential courses/workshops and examinations have been cancelled or postponed worldwide. That is in addition to the risk of cross infectivity and the associated sickness absence or self isolation. Hourston[36] summarized the situation as "COVID-19 represents an accelerating challenge that will pose countless uncertainties for surgical trainees and other healthcare professionals. The way in which this situation is best managed will continue to evolve at every level".

Nevertheless, surgical education and training should not be abandoned. There are many opportunities for surgical trainees to expand their experiences in collaborative work, health system management, leadership and academic activities[37]. They should also make the best of the free and available webinars that are getting regularly organized by well established health authorities and surgical organizations at national or international levels.

The continuity of the surgical training is a serious responsibility that should be equally shared by the trainees, the local training providers, and the related national institutes. The training committees should take into account the above difficulties that the surgical trainees are currently facing from the concept of their career progression, in addition to their personal and families' well being since they are front line workers. A recent statement by the Association of surgeon in Training in the UK (ASiT) has addressed this issue; "Trainees deserve clear, consistent and timely communication as the situation evolves. We recognise that trainees may have understandable anxiety about decisions required to provide the best possible care in these challenging circumstances"[38]. The Royal College of Surgeon of Edinburgh has also acknowledged the challenges and uncertainty that the surgical trainees are facing through its recent statement, and highlighted that the current crises could still contribute to the trainees knowledge and experience; "Skills in emergency medicine, critical care, medical ethics, team working and communication, public health, epidemiology, and self-care will all be needed and enhanced by this experience, and will make us better surgeons with broader experience"[39].

In a recent statement published on the Intercollegiate Surgical Curriculum Programme (ISCP) website, the key stakeholders, including trainee groups, Specialist Advisory Committees chairs and Curriculum Leads, Heads of School and the Statutory Education Bodies, have decided to postpone the implementation of the new surgical until August 2021**.** It was felt that due to the continuing disruption from COVID-19 and expected clinical workload pressures of the recovery phase, it was not appropriate to implement the new curricula in August 2020 as it was initially planned[40].

The authors would also like to highlight that the current pandemic has significantly disrupted the medical education system, particularly on the final year medical students who are expected to start the initial foundation years of their career soon. This is going to be another challenge that the health services would have to face over for a long time coming[41]. The General Medical Council (GMC), medical schools and the related authorities have been taking urgent steps to minimize the resulted impact on medical education[42].

Personal Health and Wellbeing

Working in the front line during the still ongoing viral pandemic would most certainly result in negative impacts on some of the doctors` and staff health and well being. There is an unavoidable risk of acquiring and spreading the virus through cross infectivity. That is in addition to the psychological distress, depression, anxiety, and stress experienced by hospitals personnel[43]. All clinical personnel should strictly follow the

local and national guidelines that are aimed to minimize cross infectivity and virus spread, as we have discussed in detail earlier in the text.

Teoh and Kinma[44] have shared ways about how doctors can look after their own health and well being during the current crises in their recently published article; "Doctors are often reluctant to take up the formal support that is available to them, but it is particularly important to do so under current conditions. Remember that support is available through trusts, Royal Colleges, professional bodies and charities. Share information with colleagues so they can benefit too". The authors have also highlighted that family and friends could play a key role in providing support, even through non-physical communications such as Skype and Face-Time. In addition, they have advised clinical workers to adapt certain strategies and measures in order to cope with the ongoing work pressure and the associated stress, like tasks' prioritization, mindfulness practice, reflective writing, peer coaching and problem-focused coping[44].

Future Aspects

At the time of writing this paper, the surgical services are slowly and cautiously restarting their routine services in the NHS on a low scale level depending on the urgency. Resuming of the usual routine surgical practice is not going to be an easy task to achieve by any means after the era of COVID-19 pandemic. There is already a significant back log on the various surgical and other health services, but there has to be a turning point when the practice should gradually go back to normal. A shared responsibility approach at personal, local, national and even international level should be implemented. Perhaps an intermediate recovery stage could be considered, when the related institutions adapt transitional policies through reprioritization of the services according to their urgency and the availability of local resources and expertise.

As hospitals are preparing for the resumption of elective surgery, patients have questions and uncertainties about the safety of undergoing elective operations in the current situation; The American College of surgeons has published an on-line "Post-COVID-19 Readiness Checklist for Resuming Surgery". The two parts of the check list aim to address the patients related concerns and to help the surgeons to achieve an ultimate communication with their patients in this concept[45].

Conclusions

Human communities thrive on well established and reliable systems that cover different aspects of their daily life. A sudden disruption of any or all of these systems would undoubtedly result in confusion, uncertainty and even chaos sometimes. The impact of the COVID-19 pandemic on the health services in general and surgical practice in particular has been considerable throughout the world. The initial response to the pandemic has been based on the implementation of guidelines and measures to minimize cross infectivity and virus spread through a collaborative effort at personal, local and national levels. However, the duration of the current pandemic is not very clear yet, especially that a second wave of the pandemic is still a possibility over the horizon. Therefore, it is vital to safeguard the surgeons and specialized professionals to fulfil their tasks. During the pandemic times, surgical and endoscopical interventions have been focused on emergency cases and cancer related pathologies and all non urgent elective works and face to face clinics have been cancelled or differed. Virtual clinics and virtual professional meeting have been playing an important role in providing the service during the crises. Regularly updated local surgical service guidelines have been implemented according to the availability of local resources, manpower and expertise. Since the daily service situation is changing quickly; surgeons should keep themselves familiar with local and national guidelines that are getting regularly updated online by their local institutes, the surgical colleges and the related committees. A shared decision approach through using MDT models has been implemented according to the local resources and guidelines. There is always a place for the common sense and programmatic approaches in surgery; a good example is the successful role of conservative management in the early stages of certain acute benign surgical cases that have been well reported in literature. Moreover, there is also a role of local or regional anaesthesia that should always be considered in acute surgical services when applicable. Serious attention should be given to surgical residents training opportunities and well being by the related training providers and authorities.

The aftermath period is still going be a serious challenge to the health services. Therefore, a strategy of shared responsibility, planning ahead with consideration of developing a transition-

al period in the surgical services and training should be implemented as soon as possible. The above conclusions and recommendations are mainly on based on experts' opinions and personal experiences. This is not surprising due the paucity of the available information about the virus behaviour and pathophysiology. Nevertheless, the learning curve of the provision of health services during the current crises should undoubtedly rise over time through the learned lessons, globally shared experiences and robust research activities. Therefore, surgeons from all over the world are strongly encouraged to share their good and bad experiences during the pandemic through publications and presentations.

Finally, surgeons are highly skilled and intellectual professionals who generally tend to reflect on their practice (especially after being through some challenging experiences) in a way that usually leads to improve or even evolve the surgical service systems.

Conflict of Interest

The Authors declare that they have no conflict of interests.

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