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COMMENTARY

## AHPBA Webinar about Covid-19: lessons learned responding to a pandemic

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In response to the COVID-19 pandemic, the leadership of the Americas Hepato-Pancreato-Biliary Association held an international Webinar on April 17, 2020 consisting of hepato-pancreato-biliary (HPB) experts. The full webinar can be viewed at: <https://cancerinsightllc.box.com/s/q7jlyexj8zucodzf1smjmoptx58cmi70>.

The current SARS-COV2 virus (COVID-19) pandemic has placed significant stress on healthcare systems and hospitals around the globe. Following the initial outbreak in China, several countries in Europe (Italy, UK, Spain, France), as well as the United States have been among those most severely impacted. Some countries in Europe, like Switzerland, had time to anticipate and prepare so as to avoid the dramatic situations that occurred in Northern Italy in March, as well as in New York in April. While operating room volume was impacted in many centers, the extent of advance preparation varied. For example, in many institutions, operating room volume was decreased by 60% or more and operating rooms and recovery areas were converted to intensive care beds. This led to a dramatic increase in intensive care unit (ICU) capacity and in the number of health care professionals allocated to the ICU. The response to the COVID-19 pandemic has had significant implications on the surgical management of hepatobiliary diseases that has been accompanied by high levels of uncertainty and lack of uniformity as institutions have had to respond quickly with rapid implementation of policies based on the available data at that time.

While COVID-19 is not known to cause specific symptoms in the liver, pancreas or biliary tract, the pandemic have resulted in significant implications for the delivery of surgery related to hepato-pancreato-biliary (HPB) disorders. Decision-making

based on the risks and benefits of an operation, as well as who to offer, has become much more complex during the current pandemic. In order to conserve hospital resources and reduce nosocomial transmission of the virus, many jurisdictions and hospitals have placed significant constraints on surgical activity. The decisions on how to limit surgical procedures during a public health crisis such as the COVID-19 pandemic should be made based on a variety of disease and local hospital and system factors (Table 1). These factors include the severity of the illness, the ability to diagnose COVID-affected persons or carriers, and the impact on hospital and healthcare resources. The symptoms of COVID-19 infection can range from asymptomatic carrier, to respiratory failure requiring ventilatory support. During the exponential growth phase of viral infection, most hospitals and health systems have taken the step of reducing or cancelling elective surgery. While definitions of “elective” surgery may vary, such operations are generally considered to be surgical procedures where delay of the intervention is possible without patient harm.

The decisions to proceed with operations for “semi-urgent” procedures vary significantly by the local COVID infection rates and the available hospital resources. The threshold used in defining “semi-urgent” surgery will depend on the length of time of which deferral or delay of surgery is thought to be safe. These decisions must often be made on a case-by-case decision; surgeons should consider safe alternatives to surgery that can be used to increase the safety of surgical delay. For example, stenting of biliary or gastrointestinal obstruction as well as initiation or continuation of neoadjuvant therapy for cancers should be

**Table 1** Factors to consider in Allocating Surgical Resources in a Pandemic

Virus Factors
- Mode of Transmission
- Virulence
- Local Prevalence
- Availability and Accuracy of diagnosis/testing
Local Health System Factors
- Institutional supply of Personal Protective Equipment (PPE)
- Institutional resources- surgical supplies, inpatient beds, ICU resources
- Local/national government regulations

considered (Table 2). If a dramatic increase in COVID-patients with a concomitant decrease in OR capacity is anticipated, a plan should be developed to modify the treatment strategy of patients while minimizing the risks of delayed operative intervention. In particular, three strategies have been employed as a means to decrease surgical volumes:

- 1) delay the operation: e.g. by giving chemotherapy for a prolonged period, allowing a slightly longer prolongation time to surgery
- 2) modify the treatment strategy: e.g. neoadjuvant treatment in resectable pancreas cancer has not been adopted widely yet. Thus, it was proposed to give neoadjuvant chemotherapy routinely prior to pancreas resection, with expanded indications.
- 3) change strategy: instead of immediate operation, choose another non-surgical option with similar expected outcomes (e.g. for small hepatocellular carcinoma (HCC) consider radio-embolization (SIRT) rather than resection).

In addition, as one considers how to treat HPB surgical patients during this pandemic, one should account for the risk of COVID

**Table 2** Common definitions of urgency for surgical procedures

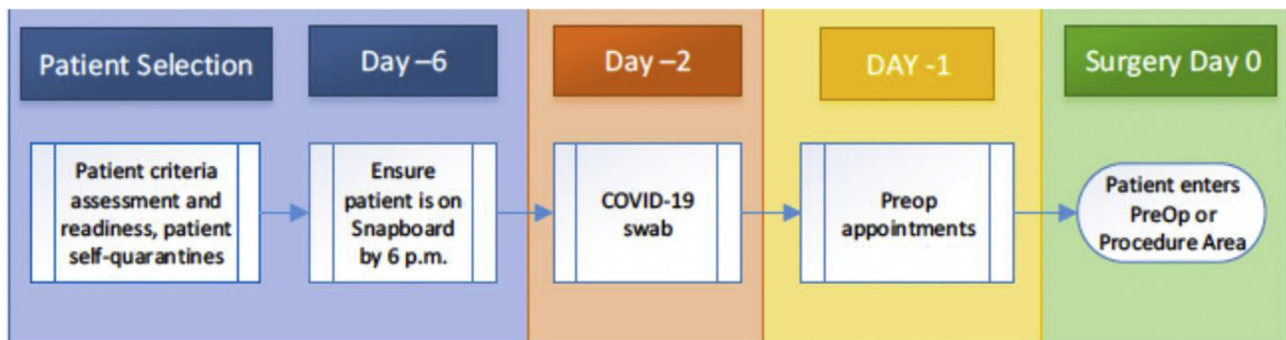
Urgent/Emergency Surgery
- Unstable condition requiring immediate care.
- Risk of medical harm if care is delayed
- Delay in care is likely to increase mortality and morbidity.
Semi-Urgent Surgery
- Active, stable medical issues with potential of progression to urgent with prolonged deferral
- Significant delay will result in progression to local unresectability or requiring escalation of procedure with increased morbidity/mortality.
- Significant delay will likely lead to meaningful change in care plan.
- Hospitalized patients where the operation or procedure would provide opportunity for discharge
- Need for palliation unresponsive to maximal medical management.
Elective Surgery
- Stable surgical issues not meeting Urgent or Semi Urgent criteria
- Non-essential procedures that can be delayed without undue risk to the patients health
- Surgical problems with well-established, adequate local care.

infection amongst surgeons and surgical team members, and assess the resources in the loco-regional healthcare system. In these unprecedented times, there are obvious limitations within hospitals that must be considered before embarking on an operation that utilizes physician and nursing teams, other staff, an operating room, a ventilator, and a hospital bed. Some of these operations may also necessitate an ICU bed postoperatively. Furthermore, there is the issue of exposure –from hospital staff to patient, patient to staff, and also patient to patient. Anticipating peaks of COVID-related disease and resource utilization, as well as duration of resource utilization, are important and must be considered in the context of patients presenting with malignancies.

HPB malignancies, in general, are aggressive cancers. Specifically, pancreatic adenocarcinoma, cholangiocarcinoma, gallbladder adenocarcinoma, primary liver malignancies and liver metastases are all malignancies that generally progress off treatment. Many patients with these diseases, if left untreated, have a median survival of less than a year. Importantly, delay in surgical treatment may allow these cancers to progress and become unresectable. The Society of Surgical Oncology has recommended that surgeons should “... operate on all patients with aggressive HPB malignancies as indicated.” There are some strategies, including intra-arterial hepatic therapies and chemotherapy among others, that can serve to delay surgery and extend the duration of time resectability can be maintained. While the ultimate decision must depend on the availability of resources, these cancers can be lethal, and attempts at safe and expeditious surgery should be prioritized. Indeed, the American College of Surgeons Elective Surgery Acuity Scale considers most cancers to reside within Tier 3a for which no postponements are recommended (<https://www.facs.org/about-ac/covid-19/information-for-surgeons/triage>).

There has also been a significant decline in the number of liver transplants performed in the US since the week of March 2nd 2020 (<https://unos.org/covid/>) (Fig. 1). The reason for this decrease is undoubtedly multifactorial and likely depends on the prevalence of the virus with some centers only transplanting extremely sick transplant patients due to health resource limitations. There has also been a steep drop in cadaveric donation (<https://unos.org/covid/>). The decrease may be due to decreased consent related to family fear of extra time in the hospital, absence of family in the hospital preventing face-to-face interactions with Organ Procurement Organization personnel to aid in the donation process for families. In addition, due to the states quarantine rules, a marked decrease in motor vehicle collisions and violent crimes has led to fewer potential donors. Most centers also have halted or severely cut back on living donor liver transplants and some recipients are refusing to come for transplant as they fear the risk of infection from COVID-19 is too high. Recommendations from the American Society of transplant surgeons (ASTS) Task Force can be found at:

<https://asts.org/advocacy/covid-19-resources/asts-covid-19-strike-force/asts-covid-19-strike-force-initial-guidance#Xpytm9NKjUI> (Table 3).



**Figure 1** Pre-operative COVID-19 Screening protocol

UNOS recommends centers asked that organ recovery be performed by local transplant center surgeons to minimize out of town teams travelling and mixing of multiple teams at various donor hospital sites. While donors are now all being universally tested for COVID-19, recipient testing is more variable depending on center availability and demand; when done, recipient testing should be done on admission to the hospital, and ideally have a result pre-transplant; if the test is not back at the time of transplant, this information can be used to manage immunosuppression in the post-operative period should the test come back positive.

The availability of testing (both serology and direct viral testing) is critical to decisions around surgery. As we all develop protective strategies and wait for the more ubiquitous availability of testing, it is becoming obvious that routine testing of patients and hospital staff will become critically important. For patients where it is deemed appropriate to proceed with surgery, testing should take place to determine the COVID status or the risk of infection of each patient. Screening questions can be used to determine the likelihood of exposure or infection including: travel history to high prevalence areas; exposure to people suspected to be COVID positive or under quarantine; fever  $>38^{\circ}\text{C}$ ; new respiratory symptoms (cough, shortness of breath, sore throat); or diarrhea. In some instances, patients are being asked to self-quarantine six days prior to their procedure. In addition, an increasing number of centers are implementing testing for COVID-19 RNA via PCR two days prior to surgery (Fig. 1). If the test is equivocal or if suspicion of COVID-19 positivity is high, a CT chest has been used as an additional screening tool with ground-glass opacities a possible early indicator of disease. Patients that are COVID-19 PCR negative proceed to surgery. During induction and intubation, all non-anesthesia personnel should consider distancing themselves or leave the operating room while the anesthesia team maintain aerosol and droplet precautions including N95 masks and splashguards. Following intubation, anesthesia remain in the room and droplet precautions are maintained for up to 20–30 min, which represents seven replacement/recirculation times of the air in the operating theatre. As such, in many centers the operative team only returns to the operating room after this time has passed such that the

procedure can proceed. Droplet/Aerosol precautions (N95 masks) are maintained throughout the case by all OR personnel for aerosol generating procedures (AGPs) such as airway procedures, endoscopy/bronchoscopy and oral-maxillofacial procedures. Whether laparoscopy or robotic surgery should be considered an increased risk of COVID-19 dissemination remains debatable. At the conclusion of the operation, similar procedures are observed for extubation with aerosol/droplet precautions being observed by anesthesia team members while other staff

**Table 3** Recommendations from the American Society of transplant surgeons (ASTS) Task Force

- Lifesaving and life altering transplants should continue to be performed.
- Living donations (assuming the recipient can wait) should be placed hold until the course of the US penentrance of COVID-19 is understood.
- Deceased donor transplants must be undertaken cautiously and considered on a case-by-case basis. Consideration includes whether the facility has the current and future capacity to provide adequate post-operative care. Considerations should be given to availability of beds and adequate blood component supply
- The transplant team must evaluate each organ offer for the specific potential recipient in light of resource availability and total course, prior to deciding whether to proceed with transplant.
- Informed consent processes and protocols should be assessed, so that recipients and families understand the risks and benefits during this uncertain time.
- Induction immunosuppression places an organ recipient in a vulnerable state for many months and may jeopardize the survival or post-transplant care if the recipient contracts the virus. There is a paucity of data, however, for safety we recommend limited use of induction therapy during this COVID-19 surge. - Lymphocyte depletion should be used with great caution.
- Consideration must also include where and with whom convalescence will occur.
  - o Centers must factor what will happen if the patient or caregiver becomes exposed/infected with COVID-19?
  - o Is there the capacity to quarantine, monitor and treat the recipient or caregiver?
- Transplantation is not just the surgical procedure; it can include a protracted treatment that will likely be impacted by pandemic.
- It is possible that sick healthcare professionals will take care of sick patients.

Derived from. ASTS task force site: <https://asts.org/advocacy/covid-19-resources/asts-covid-19-strike-force/asts-covid-19-strike-force-initial-guidance#.Xpym9NKjUI>.

leave the room. The patient should be recovered in the operating room for 21–30 min before transfer to the recovery area. For patients who are found to be COVID-19 PCR positive on pre-operative screening, and where delay can reasonably be considered, surgery is deferred at least two weeks. After a 2 week deferral, the patient's symptoms are reassessed. If the patient is asymptomatic they are retested and if found to be COVID-19 PCR negative they can then proceed to surgery under the usual precautions. If at any time a COVID-19 positive patient cannot be deferred due to risk or progression of disease, the surgery may be allowed to proceed under aerosol/droplet precautions.

Testing of providers also remains variable and has not been universally feasible. Of note, in some places, in addition to all surgical patients being tested in order to allow protective measure for the OR team, only symptomatic health care workers are tested. In Lausanne, among over 1700 tested health care workers, the COVID positive rate was about 17%, making the overall COVID positive rate of 1.6% for the entire health care workers working in at the academic tertiary center in Lausanne, thus demonstrating that protective measures were efficient. These data are important given that in Italy over 100 physicians have died from Covid-19. The limitations of testing resources are compounded by a potential lack of sensitivity. The most common and earliest available test, COVID RNA-PCR, may not become positive for 3–5 days after exposure.

The change in numbers and types of admitted patients and operative cases due to COVID19, as well as related changes in workflow, service assignments and hands-on teaching, are significantly impacting trainees at every level. The impact on trainees has been and will continue to be seen at every level, from medical student (<https://www.aamc.org/news-insights/itching-get-back-medical-students-graduate-early-join-fight>) to resident ([https://www.absurgery.org/default.jsp?news\\_covid19\\_trainingreq](https://www.absurgery.org/default.jsp?news_covid19_trainingreq)) to fellow (<https://acgme.org/COVID-19/Three-Stages-of-GME-During-the-COVID-19-Pandemic> & <https://twitter.com/FellowshpCouncil/status/1239932992400658433>), and the effects of the pandemic are likely to persist for trainees for several years to come. In particular, at the resident and fellow level, HPB operations for benign and malignant disease may be canceled or limited. The duration and extent of cancellation has varied across the US, with some institutions so overwhelmed with COVID that no non-urgent operations are being undertaken and with near-regular volume at other centers. Decisions to cancel or modify operations have been impacted by the volume of COVID, availability of ICU beds and PPE, policies on the use of MIS techniques, and redeployment of surgeons to other teams and services during this time. Changes in OR scheduling began in early March in some parts of the US and may extend still for months to come. Senior residents may thus lose their anticipated advanced experiences in HPB surgery that were intended to optimize their preparation for fellowship. Fellows may be missing out on expected increased independence intended to facilitate

their upcoming transition to attending or faculty surgery position. Non-operative training has also been affected by the pandemic, as many clinics have transitioned to tele-medicine and/or canceled non-urgent visits, and even multidisciplinary clinics may be virtual. As surgeons by and large are new to telemedicine, trainees have had no formal training in this approach; in turn, telemedicine training will need to be developed.

In-patient care has also been impacted in many institutions, in order to allow for coverage of COVID-related services such as emergency general surgery, vascular access, and ICU. Furthermore, in advance of the anticipated COVID surge, training programs may have adjusted work schedules. One common approach has been to assign one or two-week blocks of on-duty, followed by time of “work from home”, in order to limit exposure risk by limiting time in the hospital when feasible. In some institutions, the usual subspecialty services combined to a team of fewer residents and fewer attending surgeons at a time as non-urgent cases were delayed. In some places, residents and fellows have been redeployed to departments and services outside their normal areas, which of course necessarily changes their focus for this period of time and disrupts expected educational experiences. Residents have been assigned to restructured services in general surgery, surgical consults, and ICU primarily, keeping them within the Department of Surgery. Fellows have also been eligible for assignment based on their level of training and area of subspecialty training. Given that in some cases, attending surgeons have been reassigned to other areas, trainees may be supervised by surgeons other than their usual supervising attending surgeons. It is critical to ensure that appropriate supervision is readily available during this time.

Most training programs in surgery and surgical subspecialties have seen changes in the mode of delivery of didactics as well as other conferences during this time. In most instances, weekly residency-wide teaching sessions have continued but is now virtual. Several services have now created regular resident and fellow-level virtual teaching sessions, including, for example, journal club, preoperative conference, literature or topical review. Many departments are conducting grand rounds lectures and/or Morbidity & Mortality conferences virtually as well. In general, virtual conferences have been well-received by both trainees and faculty. The next step includes adaptation of technical skills training to a virtual setting. This effort is already underway in some programs, and will further develop. However, the larger society conferences have been canceled, causing the loss of associated opportunities to trainees, who normally would attend such meetings for learning opportunities, to present research, and to network for job and academic opportunities.

The AHPBA would like to thank the participants of this Webinar, as well as the members who attend the event.

#### Conflicts of interest

We have no financial or commercial interests to disclose.