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My Thoughts/My Surgical Practice

## Pre-operative COVID-19 testing and decolonization



As the COVID-19 pandemic sweeps through the world, the practice of healthcare is changing. On March 14, 2020, US Surgeon General Jerome Adams recommended that hospitals and healthcare systems stop performing elective procedures due to the COVID-19 outbreak. This recommendation was followed on March 18, 2020, by a Centers for Medicare & Medicaid Services (CMS) directive to “limit all non-essential planned surgeries and procedures, including all dental, until further notice”.<sup>1</sup> These guidelines noted that decisions to proceed with scheduled surgeries should be based on a discussion between the hospital, surgeon, and patient and should consider not only the clinical situation but the availability and conservation of personal protective equipment (PPE) for healthcare workers. State governors took these guidelines under consideration and issued state-specific guidance and recommendations.

Initially, our medical centers faced planning for inpatient, ER, and critical care surge capacity, cohorting COVID-positive patients, modeling case numbers, counting ventilators and estimating utilization rates of PPE.<sup>2</sup> While the numbers increased across the United States of America, we began to plan for the surge capacity at our hospital, the University of Alabama at Birmingham. On March 13, 2020, Alabama Governor Kay Ivey, declared a state of public health emergency. This emergency declaration was quickly followed on March 19, 2020 by issuing a statewide public health order containing the directive that “effective immediately, all elective dental and medical procedures shall be delayed.” On March 27, 2020, Alabama State Health Officer Dr. Scott Harris issued follow-up guidance directing the postponement of all dental, medical or surgical procedures until further notice, except for those deemed an emergency medical condition, defined as a situation where lack of immediate management would cause serious impairment to bodily functions or serious dysfunction of bodily organs. States, including Alabama, began issuing “Stay at Home” orders to stop the spread of this deadly new virus.

Based on these state orders, our Surgeon-in Chief, OR Executive Physician and Perioperative Leadership teams consisting of surgical, anesthesia, nursing, and administrative leadership in collaboration with other procedural department Chairs restricted surgical procedures to only those which were urgent or emergent effective on March 18, 2020 to prepare for the surge in COVID-19 cases. We utilized our operational model of assigning each case a “level” (Table 1) based on urgency to guide which cases could proceed. In addition to our case levels 1–3, we added a level 4 which would include CMS Tier 2b, 3a, and 3b cases.<sup>3</sup> Level 4 cases were posted as urgent and required approval by the Department Chair or Divisional Director. Additionally, our Operating Room operational

model was reduced to a low restricted number, mirroring a week-end staffing model.

Our goals of providing safe surgical care during the COVID-19 pandemic are to protect our patients and health care workers while conserving our PPE. It was immediately apparent that we needed to re-design processes of care to achieve these goals. The Preoperative Assessment, Consultation, & Treatment Clinic (PACT) undertook the task of developing a pre-surgical COVID-19 testing strategy that allowed for CMS Tier 2b, 3a, and selected 2a cases to proceed. Tier 3b surgeries are those such as transplant, trauma, and emergent cardiac and vascular surgery. These Tier 3b surgeries proceeded without COVID-19 testing but with all involved personnel in full PPE before we had expanded testing capacity. Initially, our PACT testing pathway focused on risk stratified procedures. As testing expanded, we were able to modify this initial pathway to include all surgical and some procedural areas as directed by our testing stewardship committee.

To accomplish our preoperative testing, we partnered with the Southern Research Institute who established a drive through testing center to provide nasopharyngeal swabbing seven days a week. The primary testing platform utilized is the COBAS® 6800 COVID-19 test, a real-time Reverse Transcriptase-PCR test intended for the qualitative detection of nucleic acids from the SARS-CoV-2 virus obtained from a nasopharyngeal or oropharyngeal swab. The sample for testing is obtained off-site and transported in a suitable virus medium for processing at the University of Alabama Molecular Diagnostics Lab for RNA PCR processing with a 12–24 h turn-around time.

We pilot tested our process on March 28, 2020, and testing was limited to 10 patients per day who were considered high-risk for aerosolization, such as head and neck procedures. Beginning on April 6, 2020, testing was conducted for all same-day and out-patient procedures regardless of aerosolization risk. A positive screening test resulted in case postponement for two weeks with planned retesting. Since the initiation of this pre-operative COVID-19 process until May 5, we have tested 2437 asymptomatic patients and have found 18 positive results. Of these positive results, 16 were asymptomatic, and two were symptomatic for a positive rate of 0.74%. Of our asymptomatic patients, one patient had their case canceled and subsequently died two days later from complications related to COVID-19.

In a graded effort to reopen the Alabama economy, Governor Ivey and Dr. Harris issued the Safer-at-Home directive, which went into effect on April 30, 2020. This guidance allows for the resumption of elective medical and surgical procedures in hospitals

**Table 1**  
UAB case leveling system.

Case Level	Definition	Time Between Posting and Start
1	Immediate threat to life, as determined by an attending surgeon	None
2	Life or limb-threatening condition that requires operative intervention within 1–2 h as determined by an attending surgeon	1–2 h
3	Substantial risk to patient that requires operative intervention	<8 h
4	Cases deemed to be medically necessary and cleared by Department Chairs or Division Directors	Scheduled for Future Dates

**Table 2**  
Current testing capacity at UAB hospital.

Testing Platform	Testing Turn Around Time	Current Average Daily Capacity
Cobas 6800	24 h	376
Leal LDT CDC Assay	24 h	150
Cepheid	90 min	65

and ambulatory surgery facilities. A joint statement from the American Society of Anesthesiologists and the Anesthesia Patient Safety Foundation on April 29, 2020, recommends that all patients presenting for non-emergent surgery have undergone RNA PCR COVID-19 testing.<sup>4</sup> The sound testing process and increased laboratory capacity allowed us to increase our volume of testing. Several tangible benefits of presurgical testing include PPE conservation and the protection of healthcare workers from inadvertent exposure to COVID-19.<sup>5</sup> A known COVID-19 status provides considerable reassurance to the perioperative team and therefore a safer working environment. Testing also provides an element of additional patient safety and reduction in healthcare expense and resource utilization, as performing surgery on asymptomatic COVID-19 positive patients is associated with a 44% increase in postoperative ICU admissions and a 20.5% mortality rate.<sup>6</sup>

Our process involves surgeons posting cases to the operating room schedule at least 72-h in advance of the desired surgery date. The PACT drafts a testing schedule 72-h in advance and sends that schedule to the UAB Access Center. The Access Center contacts the patient and provides an appointment for off-site COVID-19 testing. “Presurgical” was added as testing criteria in addition to the usual screening symptoms of fever, shortness of breath, and cough. Forty-eight hours before surgery, the patient presents to the off-site testing location for nasopharyngeal swabbing. Once tested, the testing-site advanced practice providers instructed patients to self-quarantine until the time of surgery. The Anesthesia Information Technology department (ANES-IT) created a flag system of notification on the surgery schedule to notify providers of COVID-19 testing status, indicating a negative, positive, or pending result, as well as a status of previously positive and now negative.

On April 20, 2020, the Cepheid rapid-test for COVID-19 became available at UAB, providing results within 1 h. We had 35 of these RNA PCR tests available for daily use. Patient populations given prioritization for use included Tier 3b patients as well as those presenting in advanced stages of labor, presenting for emergent hemodialysis, acute stroke or myocardial infarction, and bone-marrow transplant patients who were febrile. As of Monday, May 11, 2020, 289 Cepheid rapid-tests were completed, with eight being positive for a positive rate of 2.77%. We have been allocated 50 tests a day by our testing stewardship committee and can process up to 16 tests simultaneously. Our current testing capacity at UAB Hospital is shown in Table 2.

In addition to pre-surgical COVID-19 testing, UAB instituted a patient decolonization process. The PACT enters the Day-of-Surgery Anesthesia orders at the time of the pre-anesthesia assessment, currently conducted via telephone or telemedicine. Decolonization includes up to 3 chlorhexidine baths before presentation for surgery, chlorhexidine mouthwash and gargle within 1 h of surgery, and Profend® nasal swabs (2 per each nare) immediately before surgery. Both of these agents, chlorhexidine, and povidone-iodine, have a broad-based antibacterial and antiviral activity that protects patients and healthcare workers from subsequent transmission.<sup>7</sup>

The COVID-19 pandemic has forced all hospitals to adapt and remain flexible in order to provide optimal care and protection for our patients and providers, and UAB is no exception. Our collaborative Perioperative Leadership Team has successfully leveraged our Information Technology structure and worked diligently to develop data-driven processes, such as the PACT-directed COVID-19 testing protocol that continually assess the current situation and respond appropriately to this ever-changing environment. At UAB, through a central source of order entry, we developed a robust pre-procedural testing model that has enabled excellent clinical care, minimized PPE use while at the same time increasing provider safety and confidence. This testing model allowed for an earlier expansion of surgery capabilities and provision of needed surgical care for Tier 2a, 3a, and 3b patients. No periprocedural team member has contracted COVID-19 from a patient interaction since the implementation of our testing efforts. These models and processes will continue to adapt to daily changes as we approach “The New Normal” of healthcare operations.

#### Declaration of competing interest

All Authors have no conflicts of interest related to this manuscript.

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