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The Importance of Universal Preprocedural Testing for the Novel Coronavirus 2019**To the Editor:**

With the outbreak of the novel coronavirus and its associated clinical syndrome COVID-19, health systems nationwide have struggled to safely treat patients while conserving resources and protecting HCWs. The Centers for Disease Control and Prevention (CDC), along with multiple medical societies such as the American College of Surgeons (ACS), have issued guidance for personal protective equipment (PPE) usage and even disease management based on patient infection status (1, 2). But current CDC screening guidelines prioritize testing only those who have symptoms or a history of high-risk travel or contacts. Due to limited availability of testing and long wait times for results, many health systems prioritize testing based on CDC recommendations and will not test asymptomatic patients without selective risk factors. We, however, urge healthcare systems to prioritize testing for periprocedural and critical care units to protect patients, staff, and physicians.

Multiple reports have surfaced suggesting that prevalent, presymptomatic, or asymptomatic individuals are a major vector of viral propagation (3, 4). Combined with efforts to minimize aerosol-generating exposure risk among periprocedural personnel, our institution now tests all patients before undergoing invasive procedures for the novel coronavirus regardless of symptom status. The first patient tested under this paradigm had a positive polymerase chain reaction (PCR), altering his treatment course significantly and highlighting the need for universal preprocedural testing.

The patient is a 64-year-old man who returned to the hospital from an acute rehabilitation facility with acute cholecystitis. He presented 6 weeks after a coronary arterial bypass and mitral valve repair with worsening epigastric and substernal chest pain that had been progressing over months. He was initially diagnosed with hypertensive emergency, started on a nitroglycerin drip, and admitted to the cardiology ICU. His coronavirus screening for symptoms, recent high-risk travel, or contact with symptomatic or infected individuals was negative. Axial imaging of the chest and abdomen performed at admission had only revealed a distended gallbladder with no other pathology. Therefore, he did not receive a coronavirus test.

Over the following 24 hours, he continued having severe, colicky lower chest pain and subsequently developed a leukocytosis of 23,000 with lymphopenia. An ultrasound delineated stones within the gallbladder neck, a thickened gallbladder wall, and a positive Murphy

sign. The general surgery service diagnosed the patient with acute cholecystitis and scheduled him for laparoscopic cholecystectomy the following day. Pursuant to the newly adopted testing policy, the surgical service ordered a novel coronavirus nasopharyngeal PCR.

The following morning, the test returned positive. The patient was subsequently transferred from the cardiac ICU to a COVID-19 isolation ward, and his cholecystectomy was cancelled in accordance with ACS guidelines for acute cholecystitis in infected patients (2). Instead, he underwent percutaneous cholecystostomy placement under sedation. Multiple surgeons and cardiac ICU staff were placed on active COVID monitoring, requiring bid temperature and symptom reporting to occupational health. Thanks to the patient's diagnosis preoperatively, adequate exposure mitigation strategies could be employed to limit staff exposure and protect high-risk patients. At the time of submission, no staff or patient infections have been linked to this patient.

POLICY CONSIDERATIONS

Providing healthcare during the novel coronavirus pandemic requires a tenuous balance between competing goals: treating patients adequately, conserving critical resources like PPE, and protecting the healthcare workforce from infection. The stakes are high, especially for critical care or anesthesia staff performing aerosol-generating procedures or those treating surgical disease. As demonstrated by this case, universal preprocedural testing of patients undergoing nonemergent procedures should be strongly considered to minimize risk of viral infection among periprocedural teams.

Performing procedures on patients with COVID-19 increases the risk of viral transmission to providers and staff through aerosolization of infectious particles. Airway management (5) (i.e., intubation), electrocautery (6), and specific procedural techniques such as laparoscopy (7) have all been shown to create airborne contagion, particularly when working within the respiratory or gastrointestinal tracts (8). Most operating and ICU rooms are under neutral or positive pressure, potentially allowing viral dissemination throughout the periprocedural area. Additionally, performing procedures, especially operations, requires large teams to work closely around the patient for extended amounts of time. Both surgical and anesthesia societies recommend avoiding procedures in COVID-19 patients when possible and using maximal protective equipment when procedures are unavoidable (2, 9).

In most North American healthcare facilities, clinical screening is used to direct PCR testing to high-risk patients because testing capacity remains limited. In general, those with negative screens (like the patient mentioned above) are not tested. However, this strategy misses a significant number of cases. Early data from thousands of tested individuals within our medical system (collected before implementation of our universal preoperative testing policy) found that over 10% of patients who underwent PCR testing despite a negative screen were, in fact, infected. In other studies, this phenomenon is even more pronounced—recent data from

China suggest between 25% and 69% of secondary cases contract the virus from presymptomatic individuals (10). In light of these concerning numbers, clinicians cannot rely on clinical screening to accurately identify all infected individuals.

Some may argue that allocating limited tests to patients with surgical disease wastes resources without altering management. We disagree. In this patient's case, the preoperative test drastically altered his treatment course. Instead of undergoing a laparoscopic gastrointestinal procedure requiring intubation and general anesthesia in a positive pressure environment, he instead had a localized drain placed under sedation with minimal personnel in a negative pressure room. The exposure risk was drastically altered.

Unfortunately, the risk of viral transmission by asymptomatic individuals extends beyond patients. Infected HCWs pose transmission risks to other HCWs and patients, especially high-risk patients within critical care environments. In one CDC survey of 8,382 HCWs reporting positive COVID-19 status, 55% reported exposure only in the healthcare setting, and 8% reported never experiencing symptoms (11). To many unstable patients housed in non-COVID ICUs, coronavirus transmission from the medical team could prove lethal.

We also recognize that, in light of large-scale community spread, all patients (not just those requiring procedures) presenting to the hospital should be tested universally. However, tests may be unreliable. Nasal swab real-time-PCR results out of China report a sensitivity of 63% (12). Meanwhile, antibody testing in California estimates 221,000–442,000 COVID-19 cases in Los Angeles County alone, which is 28–55 times the reported 7,994 COVID-19 cases (13). Whether the problem with reliability resides in test acquisition or the test itself is unclear. In our institution, false-negative results have reduced clinical confidence. We have consequently created a cumbersome clearance process that involves repetitive testing and expert review of each negative case before admitting or transferring patients to non-COVID units.

A chasm thus continues to separate perfect solutions from pragmatic measures. Ideally, clinically reliable test results would exist. Universal testing of all patients and staff within healthcare facilities would simplify targeted isolation and stay-at-home orders to reduce hospital-associated transmissions. Serum antibody presence would confer proven immunity. Serologic antibody analysis would identify immune individuals to care for those infected. Finally, advanced PPE (i.e., respirators) would be used for all patient care.

Yet, testing remains limited in sensitivity and quantity, markers of true immunity are undeveloped, and PPE is scarce. Recognizing these limitations, the authors recommend the following for peri-procedural and critical care units:

1. utilization of COVID precautions (full-eye protection, N-95 masks, gown, gloves) for all providers during any patient encounters, regardless of testing status;
2. universal preprocedural COVID testing for all nonemergent cases;
3. treatment of COVID-infected patients in a manner that optimally reduces exposure risk for the treatment team;
4. regular symptoms-based screening of those who work in COVID-positive units;
5. randomized individual testing of asymptomatic medical staff in COVID-naive critical care units; and

6. minimization of staff intermixing between COVID-positive and COVID-free units.

In summary, we support these measures as means of pragmatically protecting healthcare staff while mitigating the risk of transmission to and between severely ill patients. Our institution has adopted several of these policies, and we continue to work with hospital leadership to implement the final parts. These are critical steps needed to maintain the readiness of our healthcare system. We urge other centers to consider adopting similar policies.

The authors have disclosed that they do not have any potential conflicts of interest.

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DOI: 10.1097/CCE.000000000000133