

Leveraging IR's Adaptability During COVID-19: A Multicenter Single Urban Health System Experience



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Editor:

As hospitals across the United States confront the burden of the 2019 novel coronavirus disease (COVID-19) pandemic, interventional radiology (IR) departments have been asked to perform nontraditional roles to support outbreak efforts. Furthermore, the scope of practice among IR services has been changing dramatically in response to shifting demands. The literature discusses the impact of COVID-19 on workflow and preparedness in IR practice, highlighting isolation strategies and infection control (1,2). Equally important and less discussed, however, has been the unique value that IR can contribute in a pandemic effort. This letter discusses the integral role that IR has played in the COVID-19 response of a large multicenter medical system in New York. Specifically, the adaptability of IR to changing pressures and workflows is discussed in the context of critical care and multidisciplinary support.

At the time of writing, this health system has 1,733 inpatients with COVID-19, with > 2,800 patients with COVID-19 discharged since the beginning of the pandemic (Fig 1). As a result, disproportionate pressure

has been placed on the intensive care unit (ICU). In this context, the spectrum of techniques in IR has significant utility. In this institution, IR/Diagnostic Radiology and upcoming Early Specialization in Interventional Radiology trainees have been redeployed to the ICUs as rotating residents. The residents' skills as radiologists and proceduralists are typically valuable on their standard postgraduate year 5 in surgical ICU rotations. Deploying junior residents to ICUs during staff shortages has demonstrated the value of IR in the critical care setting. Residents place ultrasound-guided venous and arterial catheters, perform bedside ultrasound imaging, and interpret portable chest radiographs for the clinical teams. The clinical and clerical throughput of the ICU has been managed with trainees writing notes, filling orders, fielding consultations, handling admissions, processing discharges, and performing rounds. Crucially, the supporting staff, including IR nursing staff, are trained in critical care and have also been relocated to ad hoc ICU settings throughout the hospital.

While the role of trainees in the ICU has demonstrated the broad utility of the IR skill set, the changes within the dedicated IR service underscore the value of the specialty's adaptability. Before this pandemic, this institution performed primarily outpatient procedures with 60% of cases on an elective basis, encompassing women's and men's health and interventional oncology. As priorities shifted, it was decided that outpatient clinics would transition increasingly to telehealth, and procedures would be limited solely to urgent and emergent procedures in concordance with societal recommendations (3). During the past month of the crisis, case breakdown shifted to be < 40% outpatient cases. More than 125 inpatient procedures have been performed on patients with COVID-19 across 6 hospitals, including approximately 60 procedures being performed at the bedside in the last 2 weeks alone. Even in interventional oncology, where maintenance of caseload was intended as much as possible, an analysis from March 12 to April 11, 2020, demonstrated a reduction in interventional oncology caseload as the pandemic progressed (Fig 2). Of note, the average number of inpatient consultations at the academic medical center to the department decreased from 5 consultations per day in January to 4 consultations per day in March. IR departments must leverage their unique abilities and shift focus to most directly address the pandemic.

In this department, preliminary efforts were directed at shouldering the weight of the hospital's overwhelmed services. An overall increase was observed in the number of requests for gastrostomy tube catheters and peritoneal dialysis, likely owing to a reduction in endoscopy services and increased strain on inpatient hemodialysis resources, respectively. Furthermore, as anesthesia resources became increasingly limited, the department

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Total COVID-19 and PUI Hospitalized Patients by Day

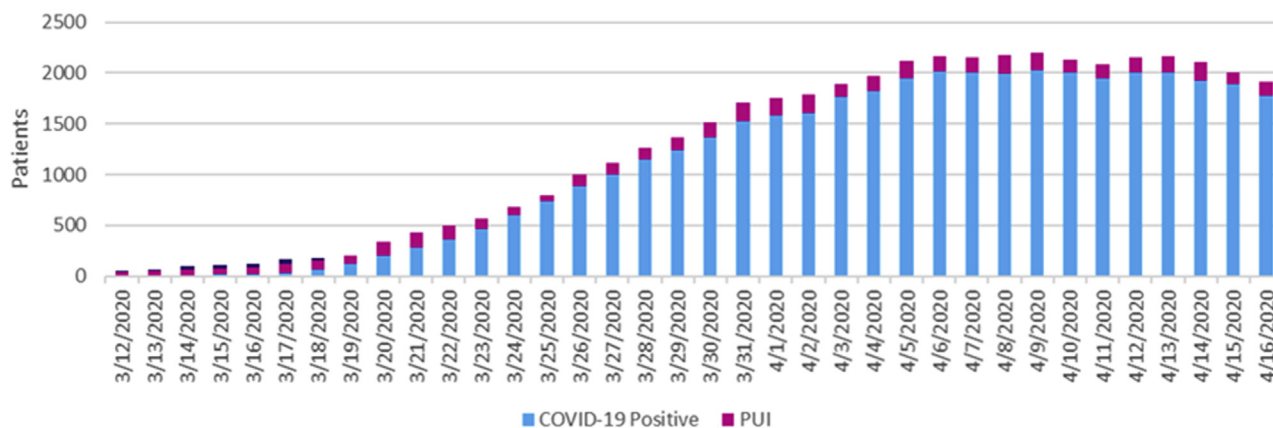


Figure 1. Overall number of patients suspected of having or positive for COVID-19 in the hospital system across all sites from March 12 to April 16, 2020. PUI = persons under investigation. (Source: Office of the Chief Medical Officer, Mount Sinai Health System.)

Interventional Oncology Caseload by Month

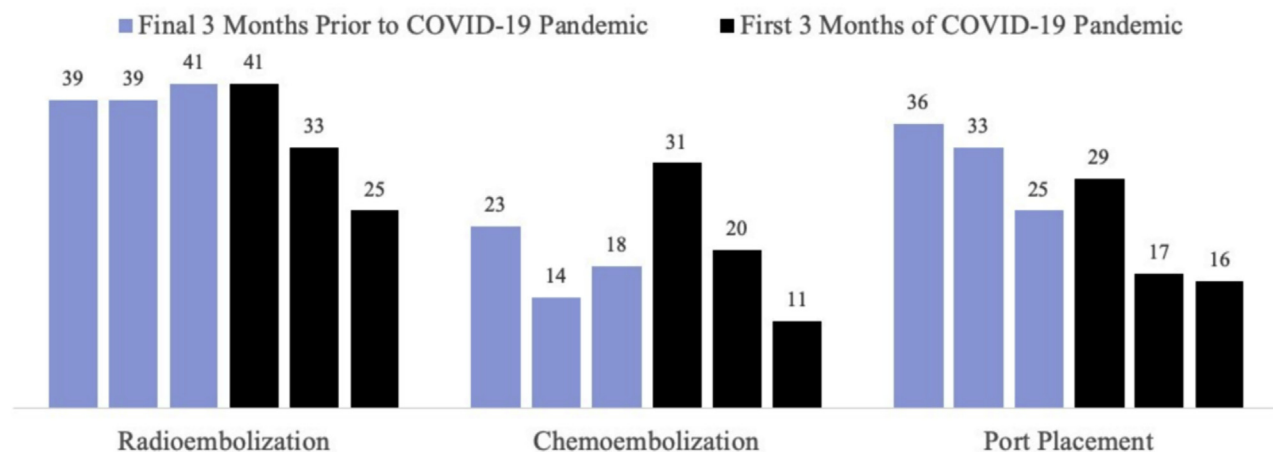


Figure 2. Overall caseload of selected IR oncologic procedures at a tertiary care center demonstrates a reduction in caseload with the progression of the COVID-19 pandemic. The first 3 months in blue represent October 12, 2019–November 11, 2019, November 12, 2019–December 11, 2019, and December 12, 2019–January 11, 2020. The 3 months in black represent January 12, 2020–February 11, 2020, February 12, 2020–March 11, 2020, and March 12, 2020–April 11, 2020. The COVID-19 pandemic represents the time period beginning March 11, 2020, the day the World Health Organization declared COVID-19 a pandemic.

collaborated with nursing staff to adequately select patients who required only conscious sedation. After supporting other departments, subsequent emphasis was placed on procedures that would limit the movement of patients and spread of infection. This translated to an increase in ultrasound-guided interventions such as paracentesis, central catheter placement, and abscess drainage (4). In these ways, the department supported triage not just at the patient level, but at a multidisciplinary and department level.

The scope of IR services can be fully realized only if accompanied by an equally adaptive workflow. To this end, the IR postanesthesia care unit was converted into a medical/surgical ward. The procedure rooms were reorganized to minimize infection including decreasing the number of

procedure rooms from 6 to 3—designated as a COVID room, a non-COVID room, and an outpatient room, respectively. Adherence to personal protective equipment has been strictly enforced among the IR staff. The department has ensured that IR nurses, physicians, technologists, and patient care associates have had adequate protective equipment, and to date, none have contracted COVID-19 during IR duties.

While the unparalleled adaptability of IR has traditionally been viewed within the confines of the fluoroscopy suite, this pandemic has demonstrated that these skills ought to be viewed on a system-wide level. During the COVID-19 crisis, IR services supported critical care services, aided overwhelmed services, and developed effective workflow patterns. Leveraging these unique

advantages, IR can continue to step into a leadership role during the COVID-19 pandemic and future system-wide crises.

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Diagnosis of Asymptomatic COVID-19 Infection in a Patient Referred for CT Lung Biopsy



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Editor:

As the prevalence of coronavirus disease 2019 (COVID-19) infection continues to rise, there is increased risk of disease transmission to health care workers performing procedures where the virus may aerosolize, such as computed tomography (CT)–guided transthoracic lung biopsy. We report a case of an asymptomatic patient in whom COVID-19 infection was diagnosed based on imaging findings at the time of CT-guided transthoracic lung biopsy. Institutional review board approval was not required for this case report.

A 61-year-old asymptomatic man with prior tonsillar cancer was referred for CT-guided transthoracic lung biopsy of a suspicious nodule identified on chest CT 1 month prior (**Fig 1**). Laboratory testing performed before the biopsy demonstrated a mildly decreased white blood cell count of $3,100/\text{mm}^2$



Figure 1. Noncontrast chest CT image obtained 1 month before transthoracic lung biopsy demonstrating a suspicious 1.1×1.5 cm nodule left lower lobe (white arrow). No other lung abnormalities were present.

(normal range, $4,000\text{--}11,000/\text{mm}^2$), with otherwise normal laboratory values. CT performed in the prone position before the procedure redemonstrated the suspicious left lower lobe nodule as well as multiple new ground-glass and nodular opacities in the periphery of both lungs (**Fig 2a–c**). The imaging findings raised concern for possible asymptomatic COVID-19 infection, and the lung biopsy was postponed. The patient was subsequently referred for polymerase chain reaction testing, which confirmed COVID-19 infection.

Up to 50% of patients infected with COVID-19 are either asymptomatic or capable of disease transmission before showing symptoms (1). A recent study of patients with polymerase chain reaction–proven COVID-19 found that 54% of the asymptomatic cohort had lung opacities present on CT (2). The most commonly reported chest CT findings of COVID-19 infection include peripheral predominant ground-glass opacities and consolidations, sometimes with a rounded morphology (3). Although COVID-19 infection is transmitted primarily through direct contact or respiratory droplets, patients with a cough can aerosolize the virus. Because many of the complications from CT-guided transthoracic lung biopsy are likely to induce coughing (4), there is increased risk of disease transmission to health care workers who may be using only standard universal precautions during the procedure.

With widespread community transmission of COVID-19 in many parts of the United States, interventional radiologists performing CT-guided transthoracic procedures should carefully review imaging obtained before procedures for findings associated with COVID-19 infection, including in asymptomatic patients. Depending on the clinical setting, it may be prudent to either defer the interventional procedure and obtain COVID-19 testing or use more stringent airborne precautions to avoid accidental exposure to the COVID-19 virus.

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