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MEETING SUMMARY

Confronting COVID-19: Finding Hospital Capacity and Improving Patient Flow

A Webinar Series Hosted by PCORI for Hospitals and Health Systems

Part 3 – Elective and Urgent Surgeries amid COVID-19

April 14, 2020

Overview

Faced with an actual or potential surge of COVID-19 patients, hospitals across the country are contemplating challenges with capacity and patient flow. Learning from clinicians, health system leaders, and operations management experts about how to manage capacity in real time can help health systems adapt to evolving circumstances surrounding the current pandemic.

On April 14, 2020, PCORI (the Patient-Centered Outcomes Research Institute) hosted "Part 3–Elective and Urgent Surgeries amid COVID-19" of its webinar series. As the COVID-19 pandemic evolved, national, state/provincial, and local governments issued recommendations to postpone nonessential surgeries and other procedures in both the United States and Canada to preserve institutional capacity and staff, personal protective equipment (PPE), medications, and other supplies needed for the treatment of patients with COVID-19. Very little clear official instruction was put forward about urgent or essential surgeries such as those for advanced cancers or organ transplants. As a result, it has fallen to surgical specialty societies to offer guidance to clinicians and health systems on how and whether to continue performing these urgent procedures amid the pandemic.

The resulting decline in overall surgical volume has not only delayed surgeries for many patients but has also had a substantial financial impact on the healthcare sector. According to data gathered by the Healthcare Financial Management Association, in recent weeks, the volume of inpatient and outpatient surgical procedures has declined by 50% or more in hospitals across the United States. Surgeon leaders representing health systems in Toronto, Ontario, and Los Angeles, California, reported on how their hospital systems and regions are prioritizing surgical cases amid the COVID-19 outbreak and contemplating how to rebuild the surgical procedure caseload to standard levels as the effects of the pandemic recede.

The expert panel included the following individuals:

Speakers

- **Bruce L. Gewertz, MD,** Surgeon-in-Chief, Chair, Department of Surgery, and Vice Dean of Academic Affairs, Cedars-Sinai Health System (a nonprofit academic healthcare organization serving more than 1 million people annually in more than 40 locations in Los Angeles, California, and beyond).
- **Shaf Keshavjee, MD,** Surgeon-in-Chief, Sprott Department of Surgery, University Health Network (UHN) and Professor of Thoracic Surgery, University of Toronto.
- **Tom Waddell, MD,** Chair, Division of Thoracic Surgery, University of Toronto, and the Surgery Pandemic Planning Lead for UHN. (UHN encompasses 1,300 beds in four major hospitals in Toronto, two tertiary academic hospitals, a cancer center, a rehabilitation institute, and the Michener Institute of Education. It conducts the largest hospital-based

research program in Canada and typically ranks number 1 or number 2 annually in the total volume of transplants performed at any center in North America.)

Moderator

Susan Dentzer, Senior Policy Fellow, Duke-Margolis Center for Health Policy

Discussants

- **David B. Hoyt, MD,** Executive Director, American College of Surgeons (a scientific and educational organization that works to raise the standards of surgical practice and improve the quality of care for surgical patients)
- **Eugene Litvak,** President and Chief Executive Officer, Institute for Healthcare Optimization (a nonprofit organization that catalyzes and spreads improvements in operations management and patient flow across the healthcare delivery system); Adjunct Professor, Operations Management, Department of Health Policy and Management, Harvard T. H. Chan School of Public Health

Webinar recordings are available at www.pcori.org/confronting-COVID-19.

Urgent and Elective Surgeries amid COVID-19

Surgeon leaders in Toronto and Los Angeles reported that their health systems began to prepare for COVID-19 in January and February 2020 and, based on projections for the possible number of COVID-19 cases in their regions, took action in March to reduce surgical volume. As noted previously, as part of an institutional response to the pandemic, postponing nonessential surgeries helped these hospitals to

- Free up PPE for use by staff caring for patients with COVID-19
- Reduce postsurgical patient demand for intensive care unit (ICU) and medical-surgical floor beds that could thereafter be used for patients with COVID-19
- Allow surgical and other staff to be reassigned to other care duties, including caring for patients with COVID-19
- Reduce the risk of COVID-19 exposure by having fewer patients come into the hospital for reasons other than COVID-19-related care
- Reduce the mortality of postsurgical patients because preliminary data from China suggested that patients exposed to COVID-19 during or after surgery had high mortality rates

The following sections summarize key strategies that Cedars-Sinai and UHN used to prioritize urgent surgeries, such as those for cancer and transplants, amid the pandemic and to plan for recovery and reinstatement of all surgical services, including elective surgery, when the course of the pandemic allows.

The Context: COVID-19 Cases Treated to Date

As in other parts of the United States and Canada, small numbers of patients with COVID-19 were being admitted to Cedars-Sinai and UHN in early March 2020, and the volume of patients increased as the month progressed.

Cedars-Sinai saw its first COVID-19 cases during the week of March 9, and, as of mid-April, the number of hospitalized COVID-19 cases (positive and under investigation) had risen to 130. However, the volume of cases appeared to have plateaued, and a decline seemed to be under way, including a decline in the number of patients on ventilators. UHN started with two to five COVID-19 cases in early March but saw a rapid increase each week thereafter. As of mid-April, UHN had received 90 confirmed COVID-19 cases; 59 patients were hospitalized, with 23 in the ICU.

Neither health system had encountered demand exceeding its capacity to treat patients, including the need for vital supplies such as ventilators. As a regional center that provides extracorporeal membrane oxygenation (ECMO), UHN received patients with COVID-19 who were transferred from other area hospitals to receive that treatment. However, only six patients were being treated with ECMO as of mid-April. Cedars-Sinai has an active ECMO program but has used it only once for COVID-19-related pulmonary failure.

Prioritizing Surgeries

In mid-March, having seen the pandemic unfold in New York and other parts of the world, both Cedars-Sinai and UHN scaled back substantially on surgical volume. Cedars-Sinai reduced daily surgeries from 120 on average to approximately 40 beginning in mid-March. UHN reduced surgical hours by 50% and subsequently adopted a 14-day rule, described further below. Both health systems created separate treatment areas for persons confirmed to be COVID-19-negative on the basis of testing and for persons under investigation for or confirmed to have COVID-19.

UHN's strategy for categorizing and prioritizing cases based on level of urgency. UHN used a previously developed data-driven approach to reduce the volume of nonemergency and even many urgent surgeries. In Canada, all provinces have systems to track the amount of time that patients wait for surgery, with targets set for the medically appropriate maximum duration of wait time for each surgery by condition (for example, three to four weeks for a lung lobectomy). UHN's surgery program had further analyzed its surgical volumes to assess and compare wait times and to make the most efficient use of its capacity to perform surgeries.

Within the UHN system, surgeries that can be scheduled ahead of time are categorized by levels according to degree of urgency: priority 1, which is urgent surgery, followed by priorities 2, 3, and 4. For example, a typical lung cancer removal would be classified as a priority 3 case, and the provincial performance target is to get 90% of these patients to

surgery within 28 days. Information about all these scheduled surgeries at UHN, and divided into the priority 2, 3, or 4 categories, is contained on a visualization dashboard linked to UHN's electronic health record so that the scope and type of surgical demand can be seen at all times.

In addition, UHN has further subdivided its priority 1 urgent and emergent surgeries into eight subcategories of urgency because it concluded that the existing system of classifying surgeries by priority was not granular enough to capture the nuances of surgical needs. Under this finer classification system, for example, level 1 equates to surgeries that need to occur within 45 minutes, and level 8 are surgeries that need to occur within 14 days.

In late March, UHN drew on this system to issue its 14-day rule, which meant that, for the next two weeks, the only surgeries that could be performed were those in which patients would be harmed if they were not operated on within 14 days (in effect, these surgeries fell into priorities 1 and 2). All other surgeries (priorities 3 and 4) were deferred. The plan was to have the 14-day rule in place until the worst of the pandemic had receded and more surgeries could be resumed.

Having the existing categorization system in place and knowing how many surgeries fell into each category allowed UHN to assure its surgeons and their patients that the highest priority surgeries could be performed throughout the period when the 14-day rule was in place, including any priority 1 surgeries for patients who might arrive at UHN hospitals on an emergency basis.

As of mid-April, operating rooms at UHN were being used at roughly 25% to 30% of total capacity, focusing on priority 1 and 2 cases. No surgeons had any scheduled operating room days or surgical block times; cases were instead being assigned based on urgency.

Cedars-Sinai's strategy for categorizing and prioritizing cases based on level of urgency. Surgeons and anesthetists met at the outset of COVID-19 preparations to prioritize the list of planned surgeries each week, using guidelines established by subspecialty surgical societies. Once the decision was made in mid-March to cut back on surgeries by about two-thirds, and to prioritize those that would be undertaken, Cedars-Sinai began to further prioritize prospective surgeries by categorizing them into two categories, "A" and "B."

Type A patients were either current inpatients in the hospital, those who would require postoperative hospitalization in ward or ICU beds, or those who would require intubation during surgery; type B patients were either outpatients or those who were not expected to require intubation. The ability to operate on type A patients was deemed dependent on whether Cedars-Sinai had the needed resources to carry out these surgeries, such as ICU beds and an adequate number of operating rooms, as well as whether it had the capacity to test any of the patients in this category for COVID-19. The health system then asked all

its clinical subject matter experts to prioritize their type A patients based on medical necessity.

The ability to operate on type B patients would also be prioritized based on existing resources as described above. An additional question, not yet resolved as of mid-April, was whether Cedars-Sinai would need to test patients for COVID-19 who were otherwise asymptomatic for the condition. The question was important, in part, because there are six to eight operating rooms on most floors of Cedars-Sinai's flagship hospital in Los Angeles. Although one operating room floor was designated only for COVID-19 patients, some specialized floors accommodated COVID-19 patients while others did not. It was essential to keep COVID-19-positive patients out of the non-COVID-19 floors, but with operating rooms on every floor, the hospital structure itself created a challenge.

As of mid-April, surgical leadership, including oncologists and transplant physicians, began meeting weekly to review and prioritize cases based on all these considerations. Cedars-Sinai continued to perform urgent cardiovascular, neurosurgical, general surgical, gynecologic, and cancer procedures that could not be postponed even for a month. Any surgeons whose cases were deferred could appeal the decision to the executive surgical committee through their section or department chair.

Limiting transplants. Both health systems have suspended all but the most urgent transplant cases such as liver or heart transplants for patients who would not otherwise survive. Pancreas and kidney transplants have stopped at both systems as of mid-April but could be reintroduced as the spread of the virus slows. Physical distancing practices in the community also have led to fewer serious trauma cases and fewer donor organs.

Labor and delivery. Both health systems continued to provide for labor and delivery services and performed COVID-19 testing for all mothers. Cedar-Sinai reported that very few patients who had come in to deliver were COVID-19-positive.

Avoiding all nonurgent and nonessential procedures. Surgeons recommended against performing purely elective surgeries, such as cosmetic procedures, as the pandemic unfolds. Such procedures use PPE that may be needed elsewhere in the healthcare system, and they create mixed messages about social distancing that are important for preserving community health. However, they recommended that health systems begin considering how and when to rebuild surgical volume, as discussed below.

Recovery: Rebuilding Surgical Volume

Balancing demand and future needs. Hospitals and health systems are eager to begin serving more patients and rebuilding surgical volume when the time is right and are discussing what the criteria for resuming more surgeries should be.

In light of the infectivity and transmissibility of COVID-19, both safety and the availability of adequate resources are key. Cedars-Sinai uses three principles for evaluating the importance of surgical procedures, focusing on patients with malignancies or unstable conditions:

- The patient must have tested negative for COVID-19 within 48 hours of the procedure and must self-isolate after being tested and before having surgery. The health system remains alert to, and concerned about, the possibility of false negative results from tests lacking sufficient sensitivity.
- The health system must have the available resources to treat the patient after surgery such as an ICU bed.
- The health system's planning models do not suggest that adding more surgical patients will compromise the hospital's ability to respond to COVID-19 demands.

UHN concurred with these principles. The health system also plans to use data on current surgeries and those performed in the past year by priority category, along with provincial standards for wait times, to project run rates needed throughout the next few months to clear surgery backlogs. UHN is also weighing its ability to move to six-day or seven-day per week surgical schedules, at least temporarily, to clear the backlog of surgeries.

Elective surgeries. Although neither health system has yet faced the volumes of COVID-19 cases predicted in early models, both are cautious about how and when to resume less urgent surgical cases for multiple reasons.

First, the demand for hospital resources may shift over time because of the unpredictable course of the pandemic. Medical/surgical or ICU beds and medications needed for surgery or ventilator use could become logistical choke-points for a hospital or health system at any given time. In addition, patients may not want to reschedule relatively low-priority surgeries, such as joint replacement, because of concerns about infection and the risks of being exposed to COVID-19 in the hospital.

Increasing ambulatory volume. As health systems focus on making hospital space available for COVID-19 surges, ambulatory surgical centers may be able to take on some of the surgical volume previously performed in hospitals once health systems determine it is safe to resume nonurgent procedures. The surgeons cautioned, however, that ambulatory centers should focus on routine procedures that match those centers' core competencies, reserving complex procedures, such as transplants, for tertiary hospitals.

Communicating with Patients

Both hospital systems provided guidance to surgeons about communicating with patients about surgeries amid the pandemic and about deferrals of surgeries in particular.

Conducting consults and visits related to surgery deferment by telehealth. Through telehealth visits and phone calls, UHN surgeons informed many patients that their surgeries would be deferred for 14 days, after which surgeries would be reevaluated and either scheduled or deferred further. Surgeons' offices consistently planned and conducted follow-up calls so that patients stayed informed as the system evaluated its surgical capacity. Cedars-Sinai surgeons' offices conducted similar outreach.

Offering patients reassurance about risk and prognosis. Most patients contacted about deferring their surgeries were relieved not to have a risk of infection from a hospital stay. However, surgeons recommended that patients with lower grade malignancies or other concerning conditions receive further clarification that delaying surgery would not affect their prognosis. More frequent contact with patients could help manage patients' anxiety.

Learning from the Pandemic

Plan ahead. Surgeons advised hospitals and health systems to adopt plans for modifying surgical schedules at least a month ahead of the anticipated arrival of COVID-19 cases. This amount of time should be sufficient to begin regulating and/or cutting back on the inflow of surgical patients and free up institutional resources for addressing the needs of patients with COVID-19.

Create a standardized prioritization process. One lesson from the pandemic has been the variation among institutions and across specialty societies in determining which surgeries are the most important and prioritizing them effectively. Using different scales and rating systems makes it difficult to compare vascular surgeries with oncology surgeries, for example. Working toward a common approach to rating the urgency of all surgeries may help surgeons and health systems plan resources in future waves of the pandemic or other crises. Surgeons must be involved in this process so that they understand the final arrangements and protocols.

Analyze and interpret models within context. As of mid-April, demand for COVID-19 care in both Toronto and Los Angeles has fallen short of the highest predictions generated by widely cited pandemic models. Nonetheless, both health systems are tracking daily hospital data against these models to predict demand on resources and capacity to perform more surgeries. In that sense, the longstanding truism holds up: all models are wrong, but some are useful.

Importantly, UHN learned that these broad predictive models typically do not capture deeper insights into what may be going on within an individual institution. For example, hospitals' own internal tracking data may show exponential growth in the number of beds occupied by patients with COVID-19 in general medical surgical wards, whereas the number of patients in ICU beds may have reached a plateau. As a result, UHN has determined that tracking internal or local data may have more value than relying on aggregate predictive models projecting overall demand.

Learn together. Both health systems report close collaboration among hospitals within their regions, as well as within and across specialties, particularly in sharing best practices for caring for patients with COVID-19. For example, the Society of American Gastrointestinal and Endoscopic Surgeons has produced guidance on surgery-specific risks such as aerosolization of the virus during laparoscopic surgery and on consent for surgery given increased perioperative morbidity and mortality if patients are carrying undiagnosed COVID-19 or contract the virus while in the hospital.