Title

Operationalizing the Operating Room: Ensuring Appropriate Surgical Care in the Era of COVID-19.

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Operationalizing the Operating Room

Ensuring Appropriate Surgical Care in the Era of COVID-19

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Over the past decade, most academic medical centers have experienced increasing demands for surgical services. In many instances, lack of capacity in the operating rooms has resulted in a back log of patients needing surgery. On March 12, the World Health Organization declared COVID-19 as a worldwide pandemic. In the United States, in the preparation for a surge in patients requiring hospitalization for COVID-19, national societies, including the American College of Surgeons [1] as well as the Centers for Medicare and Medicaid Services,[2] and hospitals put forward recommendations for triaging surgical patients and prioritizing only emergent, urgent, and semiurgent procedures. Surgeons and hospitals undertook this work to address multiple strains on the healthcare delivery system as a result of the pandemic. These included the need to: 1) significantly expand inpatient capacity (both acute care and intensive care units) for surge patients; 2) reduce strain on the blood supply which was diminishing as a result of a diminished number of blood drives; and 3) decrease the chance of healthcare worker (physician, nursing, staff, and learner) exposure to COVID-19. At the same time these considerations were being addressed in the hospital, ambulatory clinic practices were maintained and rapidly transitioned to telehealth. We hypothesized that the rapid changes in surgical practice associated with the COVID-19 response would result in a growing backlog of patients in need of surgery. Therefore, we developed a surgical oversight group to evaluate allocation of the increasingly limited operating room resource as well as a technical solution with our electronic health record to ensure that high-priority surgical care was triaged appropriately based on the most urgent indications; it was critical to be able to identify this subgroup quickly such that they could still proceed to the operating room.

In early March (March 8), in response to clear evidence of community transmission, UCSF Health implemented a rapid COVID-19 Surge Plan, which included reducing the average number of elective cases by 25%. With this mandate, the Epic surgical case request was modified to include an additional mandatory question centered around the urgency of patient need: Case Priority (COVID-19 Surge Planning) with the following answer options: "low," "normal," and "high." The field was from the Epic Foundation Build and therefore could be added within hours with minimal technical expertise. A cross surgical department oversight group was convened by the perioperative hospital leadership and surgical department chairs to develop definitions for "low," "normal," and "high" priority surgical cases. "Low" priority cases were defined as those that could wait more than 1 month; "normal" priority cases could be delayed up to 4 weeks; and "high" priority cases needed to be done within 1 week. The following week (March 13), a San Francisco City Ordinance[3] was put in place requiring postponement of elective surgery. With this ordinance, only "high" priority surgical patients proceeded to surgery, and the operating room schedule was reduced further to 15% of its usual volume of cases. At this point, it was clear that additional considerations were essential prior to moving forward with an operation, including the need for intensive care unit support after surgery, and anticipated length of stay so as to preserve both acute care and intensive care unit beds for COVID-19 patients. The postoperative level of care and length of stay were already part of the surgical care request form and a few other relevant questions were added (Fig. 1A).

As guidelines from professional societies and Centers for Medicare and Medicaid Services were released with guidance on prioritization of surgical care, the oversight group further refined the guidance and tasked each surgical specialty area to collectively and transparently develop disease-specific triage guidelines. Ultimately, it was decided that a "normal" priority level was too broad, and this category was refined and separated into 2 groups: "normal" A, or lower, priority patients (who could wait up to 3 mo for surgery, such as patients with symptomatic Crohn disease or those in need of dialysis access) and "normal" B, or higher, priority patients (who need to undergo surgery within 1 mo, such as patients with colon cancer and locally invasive thyroid cancer) (Fig. 1B). This refinement of the "normal" category was performed, in part, in anticipation of the need to think creatively about tackling the growing backlog of surgical cases in need of triage when some of the tight COVID-19 restrictions are lifted on operating room utilization. With the backlog of operating room cases increasing daily and no clear end to the COVID-19 surge in our region, it did not seem appropriate to return to business as usual in the foreseeable future. Therefore, instead of the traditional allocation of block time by surgical service (based on overall surgical volume), the group prepared for incremental, equitable increases driven by patient prioritization (Tiers 3 and 2B), as well as the time patients spend waiting for surgery in the queue.

To help manage this complicated and rapidly kinetic situation and to ensure operating resources were directed to those patients most in need based on the urgency of their surgical conditions, a Tableau dashboard was developed (Fig. 1C) which allowed the leadership group to monitor both the operating room activity as well as the patient case backlog. This dashboard was created by writing several custom structure queried language queries to pull the required data from the UCSF Epic Clarity database, and then integrating those queries into Tableau as data sources. Tableau then connects directly to the UCSF Epic Clarity database via Microsoft structure queried language Server, and extracts the data on a set schedule (for this dashboard, the data updates daily). Tableau is a third-party platform that can use data from a wide variety of data sources including text and Excel files,
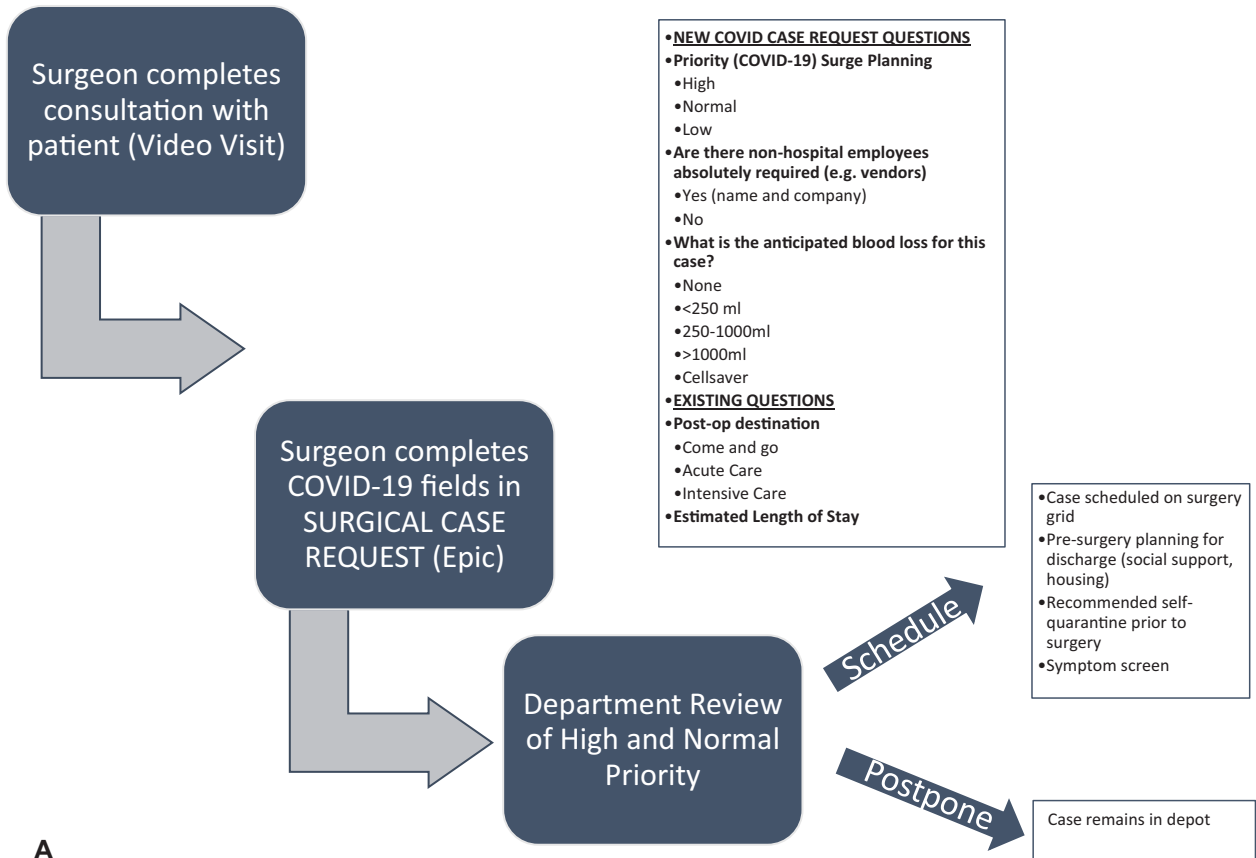
FIGURE 1. A, UCSF Epic Surgical Case Request Workflow Adapted for the Era of COVID-19. B, UCSF Surgical Prioritization Schema. C, UCSF Tableau Surgical Case Dashboard.
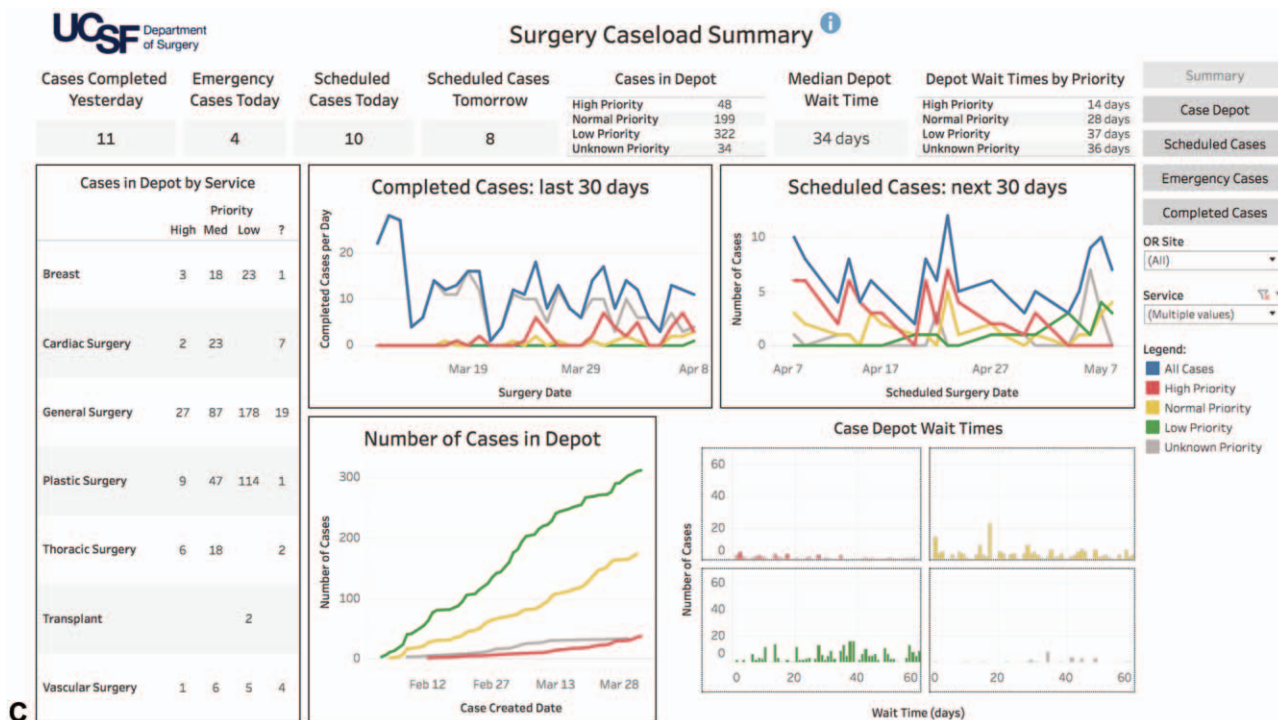
FIGURE 1. (Continued).

so this dashboard could potentially be replicated at most any institution in the United States.

To facilitate case scheduling and routine operational work as well as central oversight, the dashboard was shared broadly and reviewed formally every morning by the surgical oversight group, and key elements were incorporated into the overall UCSF Health COVID-19 dashboard. It has allowed us to ensure that, despite the uncertainty COVID-19 has brought, we are still delivering timely surgical care to those in need. We have demonstrated a rapidly implemented collaborative approach which harnessed the electronic health record and informatics to develop tools that facilitated both

transparency and operational efficiency. We also anticipate that this will position us well to thoughtfully restore surgical services, incrementally, as the pandemic wanes.

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