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## Letter to the Editor 'Neurosurgical Service Coverage During the COVID-19 Pandemic: The 'Battle Plan' at the University of South of Florida Affiliate Hospitals'



### LETTER:

On March 11, 2020, the World Health Organization declared the coronavirus 2019 (COVID-19) infection a pandemic, where more than 110 countries reported around 120,000 confirmed cases.<sup>1</sup> The numbers in the United States were relatively low ( $\approx$  1100 confirmed cases and 40 deaths) around that time<sup>1</sup>; the curve, however, demonstrated an exponential trend in the following week, instigating an emergency response at the local, national, and international levels.<sup>2-4</sup>

Hospitals in some states and counties were especially overwhelmed with large numbers of severely affected patients with COVID-19, mandating an urgent modification of treatment protocols for patients with other conditions to meet emergency care needs.<sup>5,6</sup> A neurosurgical treatment algorithm was recently published,<sup>7</sup> and neurosurgical departments are sharing their response models during the COVID-19 pandemic.<sup>8</sup> To maintain optimal care for patients with neurosurgical conditions and mitigate the risk of COVID-19 transmission to residents, nurse practitioners, staff and attendings, the department of neurosurgery at the University of South Florida devised a crisis plan, the "Battle Plan," which was put into effect on March 23, 2020.

### THE "BATTLE PLAN" TEAMS

The idea behind the battle plan is to divide the pool of attending physicians and residents into 3 teams, where each team provides comprehensive coverage of the neurosurgical service for 1 week, followed by a 2-week self-quarantine at home in accordance with the United States Centers for Disease Control and Prevention recommendations for exposed individuals.<sup>9</sup> Each team is composed of 3 attendings of different subspecialties, i.e., cranial, spine, and endovascular, 2 junior residents, and 1 senior resident (Table 1).

Being in a facility that has known and also possibly unidentified patients infected with COVID-19, our personnel on the neurosurgery service are potentially exposed and subsequently quarantined for 2 weeks after 1 week of service coverage (Table 2). Members of any one team are prohibited from physically meeting with members from the other 2 teams, whether inside or outside of the hospital premises, to prevent disease spread among service personnel. COVID-19 testing is reserved for individuals displaying disease signs/symptoms (fever, cough, dyspnea, etc.); if positive, all other members of the same team are tested and thoroughly screened over several days for early COVID-19 manifestations.

While the battle plan allows residents and attendings to provide neurosurgical care for all admitted patients, safety remains of utmost importance; thus, proper personal protective equipment is provided to personnel examining new patients in the emergency department (ED) as well as consults who are either COVID-19 positive or of indeterminate status. All hospital personnel wear masks to avoid contributing to in-hospital community spread.

Transfer of care between 2 teams occurs in 2 phases. On Sunday afternoon, the covering team is in-house and presents all cases and imaging in great detail to the in-coming team through videoconferencing. At 6 AM on Monday, the new team is in-house and reviews all cases again, including overnight admissions, but this time the outgoing team participates through videoconference so that the 2 teams are never in-house at the same time. Continuity of care is established by the night call resident. The in-coming team's night call resident assumes control of the house at 6 PM on Sunday so that he/she is knowledgeable of all patients transferred to the new team, as well as with any new patients admitted overnight, again without having any physical contact with the previous team.

To exemplify the efficiency of the battle plan, we will describe a real-life encounter. On April 3, 2020, a patient presented to the ED with a large intraparenchymal hemorrhage. She was rushed to the operating room from the trauma bay for emergent evacuation of the hematoma, but she was not tested for COVID-19. Post-operatively, her respiratory status declined, and the intensive care unit team could not wean her off the ventilator. Subsequently, her COVID-19 testing returned positive. In the neurosurgery department, 3 residents and 1 attending from Team 2 were exposed to that patient. Their exposure, however, did not alter the dynamics of the battle plan since, all members of Team 2 were subsequently quarantined for the next 2 weeks per protocol. They all tested negative for COVID-19 and were followed up closely for the emergence of any disease signs, until they returned for service coverage on week 3 postexposure.

### SURGICAL STAFFING

Since the implementation of the battle plan, all elective neurosurgical cases have been cancelled to allocate hospital resources and, most importantly, neuro-intensive care unit beds, to patients with COVID-19. Inpatient neurosurgical cases are discussed by the covering team in a daily 6 AM meeting conducted in a conference room properly cleaned, and all attendees wearing masks and maintaining 6-foot social distancing. New patients with conditions requiring urgent attention (brain tumors with mass effect, progressive spinal cord myelopathy, etc.) are also presented during the daily meeting to rank the urgency for surgical intervention and are scheduled accordingly. Per the judgment of attendings on call, emergent cases (head/spinal cord trauma, cauda equina syndrome, acute hydrocephalus, etc.) are admitted through the ED and staffed for surgery without delay in management.

Special considerations to protect the teams as well as all other operative room staff include universal COVID-19 testing for all scheduled patients; this preemptive strategy allows for catching asymptomatic carriers. In addition, a negative-pressure operating room is designated for intubating and extubating the patients by a dedicated anesthesia team in full personal protective equipment, given the high risk of COVID-19 transmission during these procedures.

### TELECLINIC

All new and follow-up patient clinic visits are conducted through telemedicine. These telemedicine visits are conducted by faculty from home during their 2-week quarantine period. Before setting

**Table 1.** Composition of the 3 Battle Plan Teams

Team 1	Team 2	Team 3
Cranial/open vascular attending 1	Cranial/open vascular attending 2	Cranial/open vascular attending 3
Spinal attending 1	Spinal attending 2	Spinal attending 3
Endovascular attending 1	Endovascular attending 2	Endovascular attending 3
Chief resident 1	Chief resident 2	PGY 6 (acting as chief resident)
PGY 2 (night coverage all week)	PGY 2 (night coverage all week)	PGY 1 (night coverage all week)
PGY 3 (alternate day/night with PGY 5)	PGY 3 (alternate day/night with PGY 4)	PGY 4 (alternate day/night with PGY 5)
PGY 5 (alternate day/night with PGY 3)	PGY 4 (alternate day/night with PGY 3)	PGY 5 (alternate day/night with PGY 4)
<b>Contingent back-up coverage</b>	2 residents (PGY 1, PGY 6), 1 fellow, and 3 attendings (>65 years of age)	
PGY, postgraduate year.		

up an appointment, new patients are screened for urgent and emergent conditions. Urgent cases are scheduled within the same week, whereas emergent cases are directed to the ED for immediate evaluation by the covering team. If the telemedicine visits identify a patient who requires urgent but not emergent in-person evaluation, they are referred to the Advanced Practice Providers clinic service (also on rotation), evaluated, and then seen by the covering attendings for the week as necessary. Postoperative visits also are performed through telemedicine, unless in-person visits are deemed necessary (removal of sutures, new neurologic complaints requiring examination, the need for urgent radiologic or laboratory studies, etc.). Only the patient is allowed into the clinic during the in-person visit, although guests are welcomed into a telemedicine format. The overall patient load decreased to around 25%, and all urgent/emergent patients seen at the clinic are admitted through the ED. The PowerShare platform (Nuance Communications, Inc., Burlington, Massachusetts, USA) capabilities had to be quickly upgraded to facilitate access to crucial imaging studies performed at institutions/radiology centers that were not electronically linked to our radiology applications. Gaps to this capability still exist.

#### EDUCATIONAL AND RESEARCH ACTIVITIES

Upholding all educational activities has remained at the core of the battle plan since the first week of implementation. Grand

rounds, journal clubs, and all other conferences (morbidity and mortality, vascular meeting, spine meeting, tumor board, etc.) are organized through videoconference applications, and attendance of all battle plan teams members remains mandatory.

The battle plan offers the residents an excellent opportunity to resume and finalize research activities that can be conducted remotely (chart reviews, manuscript write-up, etc.), as well as extra time to read neurosurgical references and prepare for board exams.

#### CONCLUSIONS

We present a crisis plan at the level of an academic neurosurgical service during the COVID-19 pandemic. The implementation of this plan is feasible in most academic neurosurgical departments and in our limited experience proved to be safe for the providers and efficient in maintaining urgent/emergent patient care during a viral pandemic.

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**Table 2.** Coverage-Quarantine Schedule for the Battle Plan Teams

	Complete Service Coverage by:
Week 1	Team 1
2 weeks quarantine for Team 1	
Week 2	Team 2
2 weeks quarantine for Team 2	
Week 3	Team 3
2 weeks quarantine for Team 3	
<b>Repeat schedule starting with Team 1</b>	

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