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Letter to the Editor

Prevention of nosocomial COVID-19: Another challenge of the pandemic

Jens T. Van Praet MD, PhD[1,2], Bram Claeys[3], Ann-Sofie Coene[4], Katelijne Floré MD[5] and Marijke Reynders MD[5]

[1]Department of Nephrology and Infectious Diseases, AZ Sint-Jan Brugge-Oostende AV, Brugge, Belgium, [2]Department of Internal Medicine and Pediatrics, Ghent University, Ghent, Belgium, [3]Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium, [4]Faculty of Medicine, KU Leuven, Leuven, Belgium and [5]Department of Laboratory Medicine, Medical Microbiology, AZ Sint-Jan Brugge-Oostende AV, Brugge, Belgium

To the Editor—Coronavirus disease 2019 (COVID-19) is an illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a recently emerged novel virus that is currently spreading globally.[1] Its clinical presentation varies from mild, sometimes unrecognized, respiratory symptoms to overwhelming pneumonia and multiple-organ failure leading to death. The virus is probably mainly transmitted via respiratory droplets and can survive on surfaces for several days. The incubation period varies between 4 and 14 days, and patients can be contagious before the onset of symptoms.[2] The duration of infectivity is uncertain, with one study reporting that 90% of mild cases had a negative real-time polymerase chain reaction (PCR) test by day 10.[3]

On March 13, 2020, the first outpatient with COVID-19 was admitted to our hospital, a 1,182-bed acute- and tertiary-care hospital in Belgium consisting of 3 separate campuses. In week 13 (March 16–22), we observed that 4 patients who had been hospitalized for other reasons presented with COVID-19 (Table 1). COVID-19 was diagnosed based on a positive real-time PCR test from a nasopharyngeal swab and/or the presence of typical radiographic abnormalities on a computed tomography (CT) scan of the lungs. Because the hospitalization duration of these patients clearly exceeded the minimal incubation period, these infections were considered nosocomially acquired, transmitted by healthcare workers or external visitors. We implemented several measures to prevent further cases of nosocomial transmission. First, from the beginning of week 12, we screened all healthcare personnel with direct patient contact for cases of low-grade fever (>37.4°C) and acute developing or worsening respiratory symptoms and tested possible cases using nasopharyngeal swabs and real-time PCR. Positive screening resulted in removal from the work floor for 14 days.

Furthermore, we cancelled all elective consultations and procedures, and we prohibited visits to the hospital with restrictive exceptions for intensive care, pediatric wards, and obstetric wards, as required by government regulations from March 13 (end of week 12). From this day forward, all healthcare workers were obligated to wear surgical masks as personal protective equipment during patient contact, regardless of their own symptoms. Additionally, we created physically separated wards for patients with or without COVID-19.

Table 1. Characteristics of the Nosocomial COVID-19 Cases in Week 13

Patient Sex and Age	Days of Hospitalization Before Onset Symptoms	Original Reason for Admission	Clinical Symptoms of COVID-19	Outcome
Female, 78 y	40	Humerus fracture	Fever (>38.5°C) and cough	Full recovery
Male, 75 y	25	Acute kidney injury and nephrolithiasis	Fever (> 38.5°C)	Full recovery
Female, 90 y	32	Lumbalgia	Fever (>38.5°C) and cough	Full recovery
Male, 65 y	8	Cholangitis with underlying liver metastases	Low-grade fever (>38.2°C) and respiratory failure	Deceased

The number of admissions of outpatients with COVID-19 increased from 5 in week 12 to 22 in week 13, 49 in week 14 and 42 in week 15, illustrating the increasing incidence of COVID-19 during the beginning of the epidemic in Belgium. In these same weeks, the screening positivity rates of symptomatic healthcare workers in our hospital were 8.6% (6 out of 70), 31% (17 out of 54), 39% (16 out of 41) and 28% (16 out of 57), respectively and the numbers of patients diagnosed with probable nosocomial COVID-19 were 0, 4, 4, and 23, respectively. We defined probable nosocomial COVID-19 as a diagnosis made beyond 4 days of hospitalization and the absence of clinical suspicion of COVID-19 upon admission. Of 31 probable nosocomial COVID-19 infections, 22 (71%) were observed at geriatric wards.

Our data indicate that nosocomially acquired COVID-19 can be observed at the start of a local epidemic and represents another challenge of the pandemic. Despite diverse and strictly followed preventive measures, we observed increasing numbers of new cases in our hospital during the first weeks of the epidemic, especially in geriatric wards. Further studies are required to identify the optimal preventive approach, which will probably include the regular screening of all asymptomatic healthcare personnel working at wards with high rates of nosocomial transmission.

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Author for correspondence: Dr Jens Van Praet, E-mail: Jens.VanPraet@azsintjan.be
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Critical role of Wuhan cabin hospitals in controlling the local COVID-19 pandemic

Wenlong Yao MD, Xueren Wang MD, PhD and Tianzhu Liu MD

Department of Anesthesiology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

To the Editor—COVID-19 is quickly spreading all over the world. The total number of confirmed cases has exceeded 1.6 million in just 2 months.[1] Patients with a variety of respiratory symptoms have flooded into hospitals in a relative short time, posing an enormous challenge to every healthcare system. Wuhan was the first center of the pandemic, and it had the highest number of cases in China. But the pandemic in Wuhan was controlled by 2 months of lockdown beginning January 23, 2020, and newly detected cases of COVID-19 have now decreased to zero. Among a series of preventive approaches,[2] cabin hospitals played a critical role in isolating mild and asymptomatic cases. Here, we evaluate the role of cabin hospitals in controlling the COVID-19 pandemic by retrospectively analyzing the correlation between available beds in cabin hospitals and epidemic data.

We obtained the data regarding total daily beds available in cabin hospitals from the official website of the Wuhan municipal government, and we extracted daily numbers of newly diagnosed cases, newly cured cases, and new deaths, and we calculated the overall recovery rate and mortality from COVID-19 in Wuhan from the official website of the National Health Commission of the People's Republic of China. COVID-19 cases were diagnosed according to history, symptoms, chest CT, and nucleic acid test.[3] From February 12 to February 14, a clinical diagnosis of COVID-19 was applied to make sure that every patient received immediate treatment in Wuhan. Therefore, the number of cases diagnosed in these 3 days dramatically increased, and we was excluded these data from our analysis. We used SPSS version 19.0 software (IBM, Armonk, NY) for the statistical analysis. A Pearson correlation analysis was performed by correlating cabin beds with all epidemic data. $P < .05$ was considered a significant difference.

The official government website reported a total of 28 designated hospitals with 8,254 beds for COVID-19 patients in Wuhan before February 4, 2020. The utilization ratio of beds was as high as 99.1%. On February 4, 2020, the first cabin hospital in Hongshan stadium opened with 1,000 beds. By February 26, 2020, a total of 17 cabin hospitals with 35,499 beds had been set up in Wuhan; overall these cabin hospitals received ~12,000 mild cases of COVID-19. The final utilization ratio of cabin beds was ~33.8%. All epidemiological data and their fluctuating trends with the increase in cabin beds are shown in Figure 1.

By statistical analysis, the number of newly diagnosed cases showed a highly negative correlation with the availability of cabin beds ($r = -0.833$; $P < .0001$). We detected a highly negative correlation between the number of new death cases and the number of cabin beds ($r = -0.859$; $P < .0001$). The overall recovery rate was positive correlated with cabin beds ($r = 0.961$; $P < .0001$). In addition, we detected a significantly decrease of severe cases in the hospital with the increase of cabin beds ($r = -0.977$; $P < .0001$). [A correlation coefficient of 0.8–1.0 indicates a high correlation; 0.6–0.8 indicates a strong correlation; 0.4–0.6 indicates a moderate correlation; 0.2–0.4 indicates a weak correlation; and 0.0–0.2 indicates a very weak or no correlation.]

The approaches for prevention and control of COVID-19 can vary from city to city. However, the principle of controlling contagious diseases is to isolate the source of infection, to cut off transmission, and to protect vulnerable populations.[4] Although both COVID-19 and SARS are respiratory diseases caused by coronavirus, COVID-19 differs from SARS[5] in that many mild and asymptomatic cases of COVID-19 also have transmissibility, and these cases are often missed and not isolated. Therefore, the management of mild or asymptomatic COVID-19 cases is equally important as the treatment of severe cases. Our analysis showed that, with the increase of available beds by cabin hospitals, the newly diagnosed cases and severe cases decreased. Thus, the cabin hospitals played an important role in controlling the COVID-19 pandemic. They effectively prevented family infection or community spread. Early treatment of mild cases can prevent COVID-19 cases from deteriorating.

Cabin hospitals were mainly responsible for the treatment of mildly ill patients. All admitted patients were diagnosed by a positive nucleic acid test, concern regarding cross infection was alleviated. In these temporary hospitals, patients were also cared for by professional medical staff. When a case became severe, the patient was transferred to a designated infectious hospital immediately. Food, accommodation, medication, and examination were paid by the government. These incentives greatly increased the motivation of mildly ill patients to be admitted to cabin hospitals, which reduced social mobility and the risk of community infection. At the same time, timely medical treatment also improved prognoses, avoiding exacerbation of the disease.[6] In addition, initiation of cabin hospitals reduced the workload of designated infectious hospitals, so the

Author for correspondence: Tianzhu Liu, Department of Anesthesiology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China. E-mail: liutzh@126.com

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