Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Journal of Microbiology, Immunology and Infection (2021) 54, 156—158

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.e-jmii.com

Correspondence

A mysterious surge of aspergillosis among non-SARS-CoV-2 patients during COVID-19 pandemic

KEYWORDS
Aspergillosis;
COVID-19;
Galactomannan;
SARS-CoV-2

Dear Editor,

Under the threaten of coronavirus disease 2019 (COVID-19) pandemic, every country implemented many infection control interventions to prevent the spread of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). During mitigation on COVID-19, the collateral benefits of decreasing influenza activity were observed in Taiwan.[1—3] Additionally, co-infection of aspergillosis with COVID-19 has been reported.[4,5] Would the pulmonary aspergillosis increase or decrease while physicians fighting COVID-19 pandemic?

We retrieved computerized data of *Aspergillus* galactomannan testing from blood and respiratory specimens (endobronchial aspirates or bronchoalveolar lavage fluid). The computerized data included results of galactomannan testing, physician-in-charge, and case-site allocation. Aspergillosis was defined by positive galactomannan testing at a cutoff index of 0.5. We use the Taiwan Centers for Disease Control and Prevention national website (https://nidss.cdc.gov.tw/en/) to obtain the laboratory-confirmed COVID-19 cases.

The indigenous COVID-19 outbreak had occurred between calendar week 4 and week 15, with a peak between 11th-13th weeks in Taiwan. There were only 3 imported cases who were admitted to one of the current study institutes. Therefore, our study mainly observed non-COVID-19 patients who acquired aspergillosis during the pandemic. We compared the changes of variables during the initial 30 calendar weeks in 2020 with the same period in 2019. Spearman's Rho calculator was used to compare the correlation between variables. The Mann—Whitney U test was used for continuous variables.

Respiratory aspergillosis did not reach a statistically significant difference ($p = 0.390$) between 2020 ($n = 123$; mean, 4.1 ± 2.7 per week) and 2019 ($n = 106$; mean 3.5 ± 1.8 per week). However, 14 non-SARS-CoV-2 patients with aspergillosis occurred in calendar week 11 of 2020, in comparison to only 2 cases during the same time in 2019 (Fig. 1A). The 14 patients with aspergillosis from 9 sites of ward allocations were detected by 10 in-charge physicians who ordered 28 galactomannan tests, including 25 blood and 15 endobronchial samples (Fig. 1B). The occurrence of aspergillosis was significantly correlated with the numbers of physician-in-charge ($p < 0.001$), case sites of allocation ($p < 0.001$), and galactomannan testing ($p = 0.019$).

In Taiwan, SARS-CoV-2 was tested for risk persons who exposed to infected cases and for targeted indications of anyone with pneumonia of unknown etiology. Clinicians,

https://doi.org/10.1016/j.jmii.2020.11.002

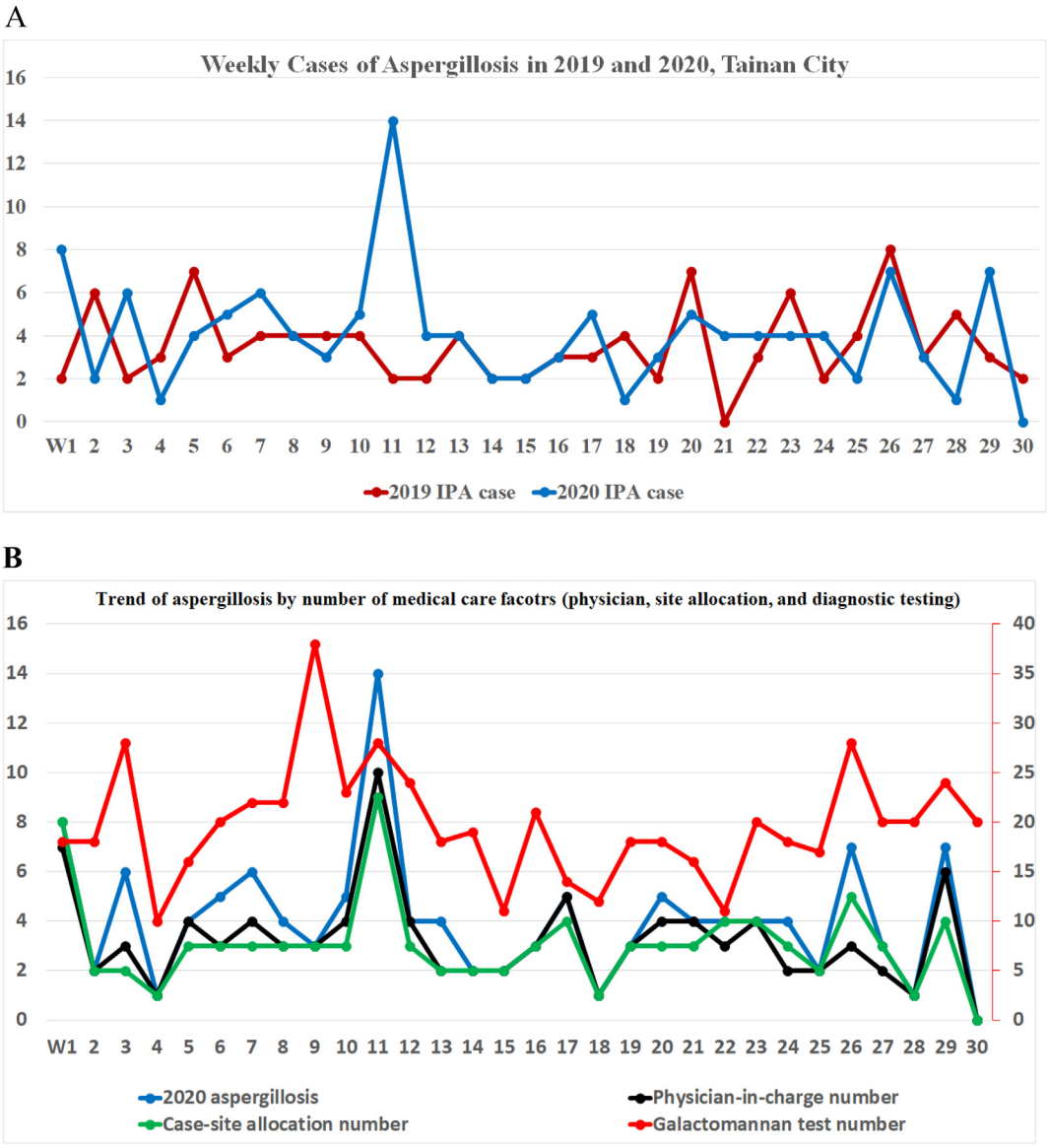

Figure 1. **A:** The trend difference of respiratory aspergillosis occurrence during 30 weeks between 2019 and 2020 does not reach a statistically significant difference, except a surge of aspergillosis in week 11 in 2020. Note. IPA, invasive pulmonary aspergillosis. **B:** The peak of 14 aspergillosis patients came from 10 in-charge physicians and 9 sites of allocations. The occurrence of aspergillosis was significantly correlated with the number of physician-in-charge (black curve, $p < 0.001$), case-site allocation (green curve, $p < 0.001$), and the number of galactomannan testing (red curve, right vertical axis, $p = 0.019$).

therefore, would try every effort to recognize "unknown etiology" by excluding the potential pathogens of pneumonia. In addition to routine microbiological investigations, *Aspergillus* galactomannan assay could be applied. In week 9, a surge of testing numbers mostly by blood samples did not increase the detection of aspergillosis. Due to the diagnostic pressure from the COVID-19 outbreak, physicians' awareness resulted in a surge of aspergillosis in week 11 while shifting more diagnostic samples from blood to endobronchial secretion. Aspergillosis case number was correlated with the physicians in charge and the case sites of allocation.

A surge of diagnostic activity for pulmonary aspergillosis was triggered due to the high vigilance of the physicians during the COVID-19 pandemic. More physicians from a multidisciplinary approach may involve more detection of

Aspergillus infection. Clinicians should keep alert other respiratory pathogens, such as *Aspergillus* species, in addition to SARS-CoV-2.

Ethical statement

We declare compliance with ethical standards approved by the Institutional Review Board of Chi Mei Medical Center (IRB no. 10711-008).

Funding statement

This work was supported in part by a research program (Project no. MISP#57760) of Merck Sharp & Dohme Corp., Inc. USA.

Declaration of Competing Interest

All authors have no potential conflicts.

Acknowledgments

We thank Mei-Yu Su at Department of Intensive Care Medicine, Chi Mei Medical Center, for data collection.

References

1. Kuo SC, Shih SM, Chien LH, Hsiung CA. Collateral benefit of COVID-19 control measures on influenza activity, Taiwan. *Emerg Infect Dis* 2020;**26**:1928—30.
2. Yang CJ, Chen TC, Kuo SH, Hsieh MH, Chen YH. Severe complicated influenza declined during the prevention of COVID-19 in Taiwan. *Infect Control Hosp Epidemiol* 2020. https://doi.org/10.1017/ice.2020.272.
3. Chan KS, Liang FW, Tang HJ, Toh HS, Yu WL. Collateral benefits on other respiratory infections during fighting COVID-19. *Med Clin (Barc)* 2020;**155**:249—53.
4. Lai CC, Wang CY, Hsueh PR. Co-infections among patients with COVID-19: the need for combination therapy with non-anti-SARS-CoV-2 agents? *J Microbiol Immunol Infect* 2020;**53**:505—12.
5. Lai CC, Yu WL. COVID-19 associated with pulmonary aspergillosis: a literature review. *J Microbiol Immunol Infect* 2020; **S1684—1182**(20):30238—43.

Chih-Cheng Lai
Department of Internal Medicine, Kaohsiung Veterans General Hospital, Tainan Branch, Tainan, Taiwan

Chin-Ming Chen
Department of Intensive Care Medicine, Chi Mei Medical Center, Tainan, Taiwan

Kuang-Ming Liao
Department of Internal Medicine, Chi Mei Medical Center, Chiali, Tainan, Taiwan

Chien-Ming Chao
Department of Intensive Care Medicine, Chi Mei Medical Center, Liouying, Tainan, Taiwan

Khee-Siang Chan
Department of Intensive Care Medicine, Chi Mei Medical Center, Tainan, Taiwan

Wen-Liang Yu*
Department of Intensive Care Medicine, Chi Mei Medical Center, Tainan, Taiwan
Department of Medicine, School of Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan

*Corresponding author. Department of Intensive Care Medicine, Chi Mei Medical Center, 901 Chung Hwa Rd., 710, Tainan City, Taiwan. Fax: +886 6 2833351.
E-mail address: yu2231@gmail.com (W.-L. Yu)

3 September 2020
Available online 1 December 2020