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Effect of COVID-19 control policy on pharyngitis

Letter to the Editor

Reduced incidence of acute pharyngitis and increased incidence of chronic pharyngitis under COVID-19 control strategy in Beijing

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Highlights

- Acute pharyngitis cases is decreased in a Beijing hospital during COVID-19 pandemic
- Chronic pharyngitis cases is increased in a Beijing hospital during COVID-19 pandemic
- Number of throat swabs has been increased since 2019
- High incidence of chronic pharyngitis might due to high frequency of taking throat swabs
Dear editor

In this Journal, we described the impact of non-pharmaceutical interventions during COVID-19 pandemic on pertussis, scarlet fever and hand-foot-mouth disease in China (1). As SARS-CoV-2 has swept the globe, the incidence spectrum of various diseases has been greatly affected in different pandemic prevention policies and people’s coping strategies in various countries. In China, to achieve the strict COVID-19 control policy, nucleic acid testing and wearing mask are two of major control methods (2, 3). The typical nucleic acid testing largely relied on taking throat swabs. Both wearing mask and taking throat swabs could potentially affect the incidence of pharyngitis. However, the incidence trend of pharyngitis during COVID-19 pandemic in China remains inconclusive.

Pharyngitis is a common specific or nonspecific inflammatory reaction of pharyngeal mucosa, submucosal tissue and lymphoid tissue(4). It can be divided into acute pharyngitis and chronic pharyngitis. Acute pharyngitis is often accompanied by upper respiratory infection diseases, which can be divided into bacterial pharyngitis, viral pharyngitis and fungal pharyngitis (4). Chronic pharyngitis is a part of chronic
inflammation of the upper respiratory tract. The course of disease is often and easy to aggravate repeatedly. Tissue lesions in adjacent parts, physical and chemical stimuli such as high temperature, dryness and dust can induce the onset or aggravation of chronic pharyngitis.

We compared the reported cases of acute pharyngitis and chronic pharyngitis before and after the outbreak of COVID-19 to explore the impact of COVID-19 control policies during the pandemic on pharyngitis. The monthly numbers of acute pharyngitis, chronic pharyngitis, and throat swabs were collected from 2019-2022 in Beijing Jiangong Hospital, most of whose patients are from Baizhifang Subdistrict and Taoranting Subdistrict of Xicheng District, Beijing, China. Data analysis and visualization were performed in statistical software (Prism 8.0, GraphPad Software). Paired Samples t-test was used to compare morbidity across different groups.

As shown in Fig. 1A, the monthly reported number of acute pharyngitis is gradually reduced after the outbreak of SARS-CoV-2. Based on the annual reported cases, the annual increased rate of acute pharyngitis is -32.9% and -48.7% for 2020 and 2021 respectively (Fig. 1B and Table 1).
Compared with that in the first three months of 2021, the increment rate of acute pharyngitis in the first three months of 2022 is -81.4% (Fig. 1B and Table 1). We reason that more and more people wear masks and keep social distance during the COVID-19 pandemic, which could reduce incidence of acute pharyngitis.

The monthly number of chronic pharyngitis in 2020 is decreased compared with that in 2019 (Fig. 1C). Interestingly, the monthly number of chronic pharyngitis is increased from 2020 to 2022 (Fig. 1C). Based on the annual reported cases, the annual increased rate of chronic pharyngitis is -18% and 110.1% for 2020 and 2021 respectively (Fig. 1B and Table 1). The increased rate of chronic pharyngitis in the first three months of 2022 is 57.5% compared with that in the first three months of 2021 (Fig. 1B and Table 1). In Beijing, the strict regulation of COVID-19 required constant nucleic testing for SARS-CoV-2. In most cases, throat swabs were taken for nucleic testing. As shown in Fig. 1D, the number of throat swabs in Beijing Jiangong Hospital is greatly increased after the outbreak of SARS-CoV-2. The number of chronic pharyngitis and the number of throat swabs are linearly correlated ($R^2=0.6525$, $p<0.0001$), suggesting that taking throat swabs could increase the incidence of chronic pharyngitis (Fig. 1E).
During COVID-19 pandemic, wearing mask and social distance are required, which could reduce upper infections (5, 6). During COVID-19 pandemic, China takes a national SARS-CoV-2 nucleic acid testing strategy, which involves inpatient screening, rapid screening in fever clinics, travel screening, and large scale population screening (7). Taking throat swabs become consistent, which could be a major physical stimulus for increasing chronic pharyngitis. Since August 2021, China has been sticking to “Dynamic COVID-zero” strategy (8). As a potential secondary disaster caused by COVID-19 control policy, chronic pharyngitis should be paid more attention during Dynamic COVID-zero time.

Pharyngitis is more common in autumn, winter and spring, so there is a low incidence in summer (Fig.1A and 1C). Under the influence of Beijing’s medical insurance policy, the medical insurance balance returns to zero on January 1 every year. Combined with the upcoming Spring Festival from January to February, local residents in Beijing have more visits and follow-up visits before January 1, forming low visit to hospital from January to February (Fig. 1A and 1C).
In this study, we investigated the impact of the COVID-19 control regulation on the incidence of pharyngitis based on the data from Beijing Jiangong Hospital. From 2019 to 2022, cases of acute pharyngitis are decreased, while cases of chronic pharyngitis are increased. During COVID-19 pandemic, a strict control regulation is performed in Beijing. Wearing mask and social distance would reduce acute pharyngitis incidence. However, constantly taking throat swabs would increase the incidence of chronic pharyngitis. This study will advance our understanding of the potential benefit and secondary disaster caused by COVID-19 strict control policy.

Conflict of interest

The authors declare that there are no conflicts of interest.
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Fig. 1. Trends of pharyngitis numbers from January 2019 to March 2022. (A) Monthly trends of acute pharyngitis numbers. (B) Increase rate of acute and chronic pharyngitis. (C) Monthly trends of chronic pharyngitis numbers. (D) Monthly trends of throat swabs numbers. (E) Correlation of chronic pharyngitis numbers and throat swabs numbers.
Table 1. Epidemiological data of pharyngitis in Jiangong Hospital from 2019-2022.

| Category      | Number of reported cases | Number of reported cases | Increased cases (2022 VS 2021) | Increased rate | P value |
|---------------|--------------------------|--------------------------|-------------------------------|----------------|---------|
| Acute pharyngitis | 43                       | 8                        | -35                           | -81.4%         | 0.133   |
| Chronic pharyngitis | 261                     | 411                      | 150                           | 57.5%          | 0.016   |

2021 (In the first 3 months) 2022 (In the first 3 months) Increase Increased rate P value

| Category      | Number of reported cases | Number of reported cases | Increased cases (2021 VS 2020) | Increased rate | P value |
|---------------|--------------------------|--------------------------|-------------------------------|----------------|---------|
| Acute pharyngitis | 314                     | 161                      | -153                          | -48.7%         | 0.030   |
| Chronic pharyngitis | 961                     | 2019                     | 1058                          | 110.1%         | 0.016   |

2019 2020

| Category      | Number of reported cases | Number of reported cases | Increased cases (2020 VS 2019) | Increased rate | P value |
|---------------|--------------------------|--------------------------|-------------------------------|----------------|---------|
| Acute pharyngitis | 468                     | 314                      | -154                          | -32.9%         | <0.000  |
| Chronic pharyngitis | 1172                    | 961                      | -211                          | -18%           | <0.000  |
Paired Samples t-test was used to compare morbidity across different groups.