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Analysis of the dispatch of physician staffed-helicopters in the COVID-19 pandemic



Since the outbreak of coronavirus disease 2019 (COVID-19), Japanese government recommends that people wear a mask, disinfect their hands, and avoid three Cs, namely: 'closed spaces with poor ventilation', 'crowded spaces with many people', and 'close contact' [1]. On April 21, the Japanese Society for Aeromedical Services (JSAS) recommended against the use of a physician-staffed helicopter emergency medical service (HEMS) for transporting COVID-19 patients (https://square.umin.ac.jp/jsas/attachment/COVID-19_unyo0421.pdf). Our hospital in eastern Shizuoka Prefecture near Tokyo provides the HEMS and directly transported patients with various types of diseases and injuries from the scene, or performed interhospital air-transportation [2]. Patients with COVID-19 sometimes experience vascular events [3–7]. Furthermore, some COVID-19 patients present with unrelated conditions [8]. Accordingly, the number and characteristics of the patients who were transported by the HEMS during the COVID-19 pandemic period (**COVID-PP**) might have changed in comparison to the period before the pandemic. Purpose of this study is to investigate the change in the number and characteristics of patients for whom the HEMS was dispatched in eastern Shizuoka Prefecture before and during the **COVID-PP**.

First, we investigated the number of confirmed COVID-19 cases in Shizuoka prefecture from April 2020 to March 2021 using data from NHK (Japan Broadcasting Corporation). Second, we investigated the number of dispatches from April 2020 to March 2021 (**COVID-PP**) and from April 2019 to March 2020 (before the **COVID-PP**). We also investigated the details of the dispatch, such as the sex and age of the patient, whether the dispatch was requested by the local fire department (Sunto-Izu Fire Department:SFD) where our hospital is located, or another fire department, classification of transportation, duration from the request of the dispatch of the HEMS to arrival at a medical facility, number of intrinsic diseases or extrinsic diseases, number of cardiac arrests, and details of the intrinsic diseases. The dispatches were divided into two groups: the **COVID-PP** group included dispatches during the **COVID-PP** and the before **COVID-PP** group included dispatches before the **COVID-PP**. The variables in the two groups were statistically compared. *P* values of <0.05 were considered to be statistically significant. Finally, we investigated the number of transportations by ground ambulance by SFD in **COVID-PP** and before **COVID-PP**.

Fig. 1 shows the number of confirmed COVID-19 cases per day in Shizuoka Prefecture. There were 5705 confirmed COVID-19 cases in one year. Fig. 2 shows the monthly number of dispatches in eastern Shizuoka Prefecture in the **COVID-PP** and the before **COVID-PP**. Only February 2021 showed a higher number of dispatches in comparison to the before **COVID-PP**. No confirmed COVID-19 cases were transported by the HEMS. There were 23 cases who were not transported by the HEMS after a medical check by a physician. The reasons for

non-transportation were fever, tourist from COVID-19 affected area, unconscious and respiratory failure. Table 1 shows the results of the comparison of the **COVID-PP** and the before. The average age of the **COVID-PP** group was significantly older than that of the before. The rate of requests for dispatch from the local fire department was significantly lower than that other fire departments. Significant differences were observed in the intrinsic diseases of the **COVID-PP** group and the before. Table 2 shows the number of transportations by ground ambulance by SFD in the **COVID-PP** group and the before. The number of transportations by ground ambulance for both intrinsic and extrinsic diseases was also decreased in the **COVID-PP** in comparison to the before **COVID-PP**.

To the best of our knowledge, this is the first report to investigate the details of the dispatch of the HEMS in a rural area in Japan between the **COVID-PP** group and the before **COVID-PP** group. As a result, the number of dispatches in the **COVID-PP** decreased for both intrinsic and extrinsic diseases in comparison to the before.

One possible reason for the decrease in the number of dispatches in the **COVID-PP** was that HEMS dispatches were not requested by the fire department when they encountered signs of infection, such as fever, dyspnea or a low oxygen saturation value, as our hospital decided not to transport the patients with possible COVID-19 infection and instructed fire departments on this decision after receiving the announcement from the JSAS.

One possible reason for the decrease in dispatches for extrinsic diseases in the **COVID-PP** was that people were staying home [9]. As a result, the number of traffic accidents or occupational accidents might have been reduced. The National Police Agency also reported that the number of fatal traffic accidents in 2020 was decreased in comparison to 2019 (<https://www.npa.go.jp/news/release/2021/20210104001jiko.html>).

One possible reason for the decrease in dispatch for intrinsic diseases in the **COVID-PP** in eastern Shizuoka Prefecture was due to the absence of an influenza epidemic in the winter season of 2020. Based on the data from infection information center in Shizuoka Prefecture (<http://www.pref.shizuoka.jp/kousei/ko-420a/center.html>), the number of confirmed influenza cases from October 2019 to March 2020, including the winter season, was 23,547. In contrast, there were only 18 confirmed influenza cases from October 2020 to March 2021. This dramatic decrease in influenza patients may be the result of changes in personal actions to prevent COVID-19 infection. Influenza is also associated with the increased occurrence of vascular events [10–13]. Accordingly, the lack of influenza during the **COVID-PP** may have result in a decrease in the number of patients with intrinsic disease being transported by the HEMS in the **COVID-PP**.

Our hospital is located in the jurisdiction of the SFD, which also reported a decreased number of transportations by ground ambulance for both intrinsic and extrinsic diseases. This trend was the reverse of the recent trends in transportation by this fire department because the number of transportations had been increasing year by year, with the aging of society in Japan. In addition to the number of air

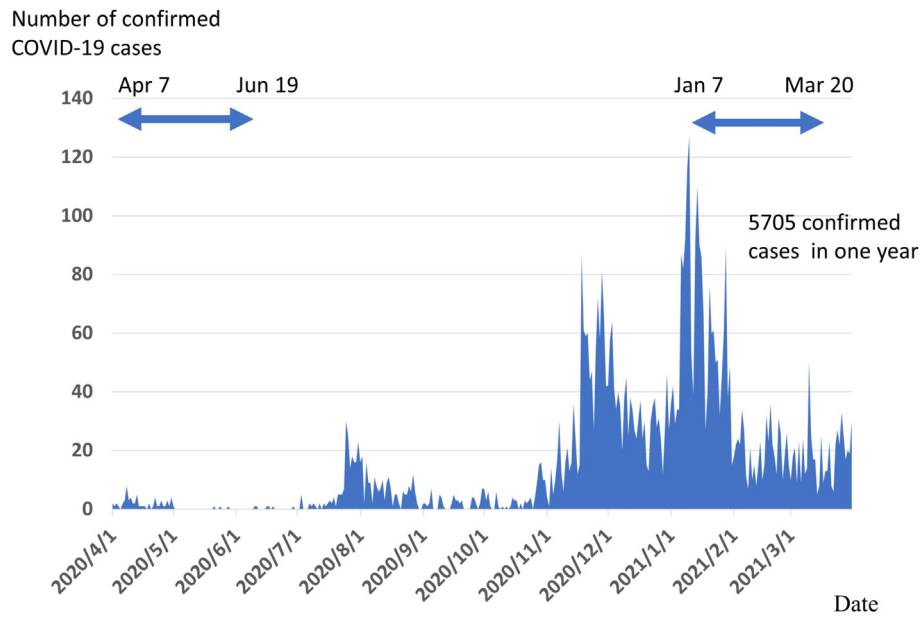


Fig. 1. Trends in confirmed COVID-19 cases in Shizuoka Prefecture. The number of confirmed COVID-19 cases per day in Shizuoka Prefecture from April 1, 2020 to March 31, 2021. The first wave was in April 2020, the second was in August 2020, and the third was in January 2021. Arrows indicate the duration of the Declaration of a State of Emergency in response to COVID-19.

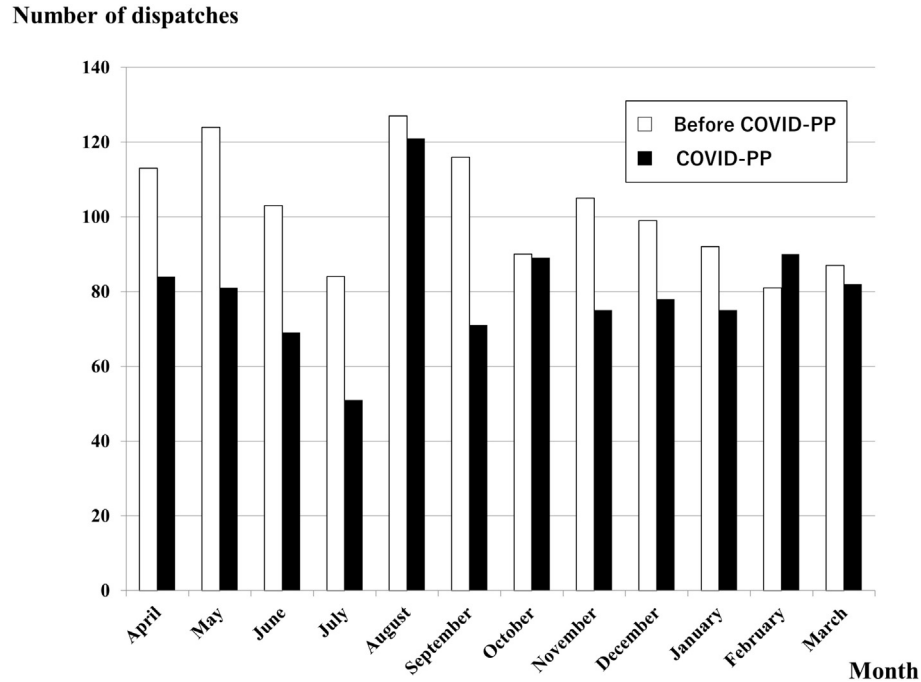


Fig. 2. Monthly number of dispatches in eastern Shizuoka Prefecture in before the COVID-PP and during the COVID-PP. February 2021 was the only month in the COVID-PP in which the number of dispatches exceeded that in the before COVID-PP. This trend was the reverse of the recent trends in transportation by HEMS because the number of transportations had been increasing year by year, with the aging of society in Japan.

Table 1
Characteristics of the dispatches in the control and corona periods

	Before COVID-PP (n = 1221)	COVID-PP (n = 966)	p value
Age	58.4 ± 24.0	60.5 ± 23.1	<0.05
Sex (male/female)	819/399 (3?)	675/290 (1?)	n.s.
Dispatch request (local/outside)	429/792	284/682	<0.01
Scene/interhospital	988/233	786/180	n.s.
From request to hospital (minute)	46.3 ± 53.3	43.1 ± 21.3	n.s.
Intrinsic/extrinsic	645/576	492/474	n.s.
Cardiac arrest (yes/no)	119/1102	80/886	n.s.
Contents of intrinsic disease			<0.05
Cardiovascular	297	219	
Neurological	167	134	
Others	125	82	
Digestive	32	38	
Respiratory	23	6	

?: missing data.

COVID-PP: COVID-19 pandemic period, from April 2020 to March 2021.

Before COVID-PP: from April 2019 to March 2020.

Table 2
Number of transportations by ground ambulance reported by the Sunto-Izu Fire Department (http://www.suntoizufd119.jp/tokei/r3/03_kyukyuu.pdf)

	Before COVID-PP (n = 24,810)	COVID-PP (n = 22,014)
Intrinsic disease from scene	15,072	13,251
Extrinsic disease from scene		
Injury except traffic accident	3752	3579
Traffic accident	1385	1278
Interhospital transportation	3661	3043
Other	940	914

COVID-PP: COVID-19 pandemic period, from April 2020 to March 2021.

Before COVID-PP: from April 2019 to March 2020.

transportations, the number of ground transportations decreased for both intrinsic and extrinsic diseases during the **COVID-PP**. Accordingly, the transformation of personal actions to prevent infection in all seasons may be a useful countermeasure for preventing the occurrence of both intrinsic and extrinsic diseases.

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Presentation

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