



The role of COVID-19 and influenza viruses in the occurrence of acute respiratory infections among patients of Lviv Regional Infectious Diseases Hospital

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Introduction

With the onset of the Covid-19 pandemic, the dominant pathogen of acute respiratory infections (ARI) became the coronavirus. Cases of coronavirus disease are registered throughout the year, with increase in the incidence in the autumn-winter period. Since the fall of 2022, the appearance of the type A influenza virus has been noted, which caused a severe course of the flu in patients.

The aim of our study was to compare the distribution of laboratory-confirmed cases of Covid-19 and influenza.

Methods

From January 2022 to April 2023, 4,205 nasopharyngeal swab specimens from Lviv Regional Infectious Disease Hospital inpatients with suspected ARI were examined for Covid-19 by PCR.

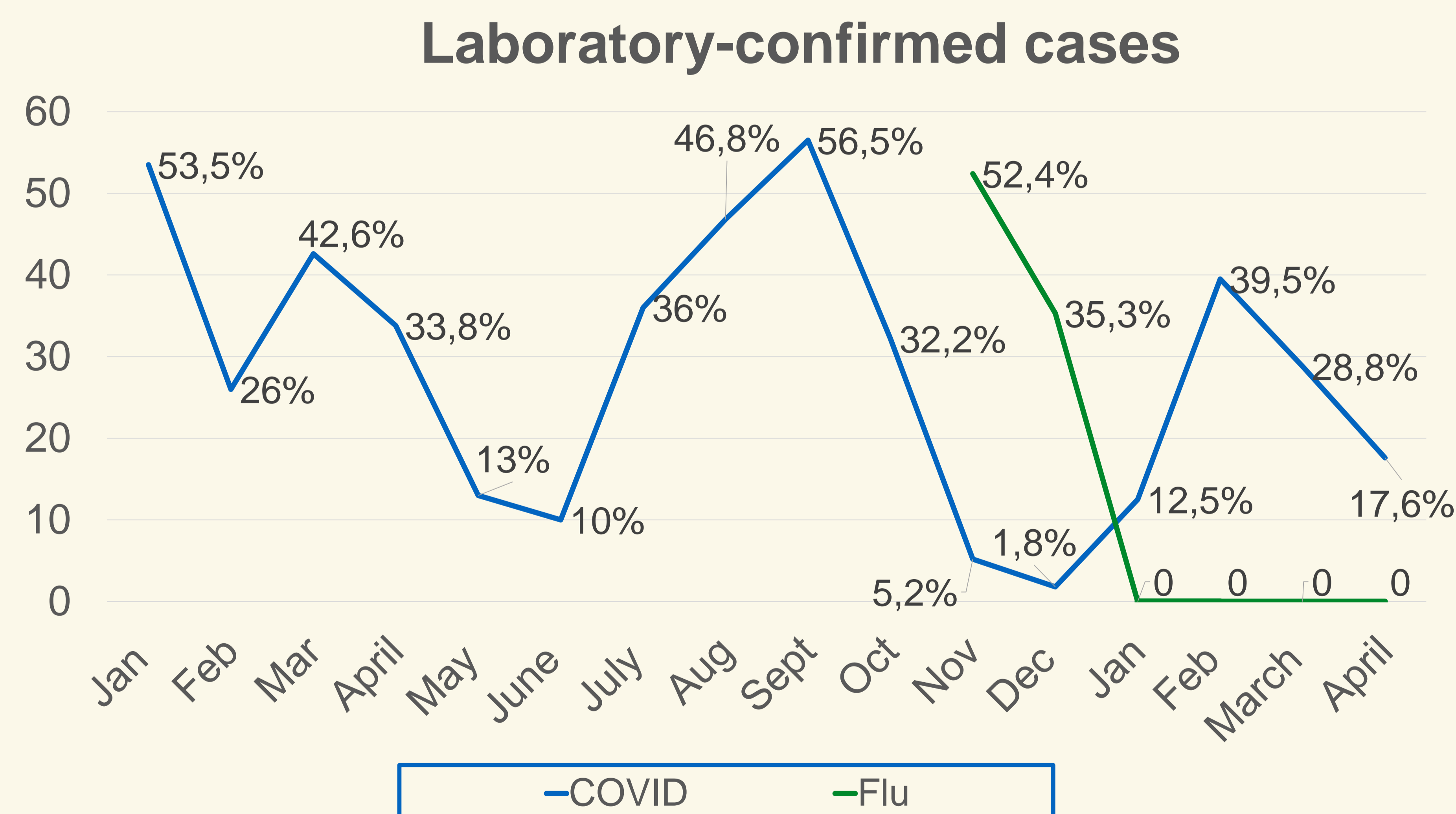
Also, from November 2022 to April 2023, 392 samples from the above-described patients were also examined for influenza by PCR.

Testing was performed at the State Institution Lviv Oblast Center for Disease Control and Prevention of the Ministry of Health of Ukraine.

Results

Covid-19 was laboratory confirmed in 1238 cases (29.5%). The age of the patients ranged from 2 to 94 years. One of the highest levels of laboratory-confirmed cases was recorded in January 2022 where 309 positive out of 578 collected cases (53.5%), with a decrease to 10% in June.

An increase of morbidity was observed in August (46.8%) and September (56.5%). Since October, a decrease in the indicator (32.2%) was registered, followed by a drop in the level of laboratory-confirmed cases of the coronavirus disease to 5.2% in November and 1.8% in December. Since January 2023, there has been an increase in incidence rates with a peak (39.5%) in February and a subsequent gradual decline to 17.6% in April 2023.



However, since November, the number of confirmed cases of influenza has increased sharply to 53.4% and 35.3% in December. Hospitalized patients with influenza had a severe course of the disease. Three patients had positive tests for Coronavirus and influenza A at the same time. From January to April 2023, no laboratory-confirmed cases of influenza A were reported, which corresponds to the increase in the incidence of Covid-19.

Conclusions

Thus, in the structure of ARI, along with the coronavirus, the type A influenza virus plays an active role, both in terms of the number of cases and the severity of the course. That is, it can be possible that these pathogens compete with each other.

References

1. Chow EJ, Uyeki TM, Chu HY. The effects of the COVID-19 pandemic on community respiratory virus activity. *Nat Rev Microbiol.* 2023 Mar;21(3):195-210. doi: 10.1038/s41579-022-00807-9. Epub 2022 Oct 17. PMID: 36253478; PMCID: PMC9574826.
2. Takashita E, Watanabe S, Hasegawa H, Kawaoka Y. Are twindemics occurring? *Influenza Other Respir Viruses.* 2023 Jan;17(1):e13090. doi: 10.1111/irv.13090. Epub 2022 Dec 25. PMID: 36567444; PMCID: PMC9835431.
3. Terrier O, Si-Tahar M, Ducatez M, Chevalier C, Pizzorno A, Le Goffic R, Crépin T, Simon G, Naffakh N. Influenza viruses and coronaviruses: Knowns, unknowns, and common research challenges. *PLoS Pathog.* 2021 Dec 30;17(12):e1010106. doi: 10.1371/journal.ppat.1010106.
4. Krumbein H, Kümmel LS, Fragkou PC, Thölken C, Hünerbein BL, Reiter R, Papathanasiou KA, Renz H, Skevaki C. Respiratory viral co-infections in patients with COVID-19 and associated outcomes: A systematic review and meta-analysis. *Rev Med Virol.* 2023 Jan;33(1):e2365. doi: 10.1002/rmv.2365.

Limitations

Examination of patients for influenza was carried out only from November 2022 to April 2023 in the infectious disease hospital, limiting our ability to capture the competition between covid-19 and influenza viruses.

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