Open Journal of
Clinical & Medical
Case Reports

Volume 10 (2024)
Issue 22

Research Article ISSN: 2379-1039

A two-year comparative study on varicella-zoster virus incidence before and after COVID-19

Daryuş Heydari; Çağdaş Kaya*; Ayli Heydari; Gülbüz Sezgin

***Corresponding Author: Çağdaş Kaya**
Faculty of Medicine, Maltepe University, Istanbul, Turkey.
Email: cagdaskaya54@gmail.com

Abstract

Background: Varicella-Zoster Virus (VZV) reactivation, causing herpes zoster infections, exhibits a wide range of clinical presentations, from mild to severe complications, particularly affecting immunocompromised individuals. The COVID-19 pandemic has been linked to an uptick in VZV reactivation rates, potentially influenced by viral factors, stress associated with the pandemic, and vaccination efforts.

Objective: This study aimed to assess and compare the prevalence and characteristics of herpes zoster cases before and after the COVID-19 pandemic, focusing on the potential impact of SARS-CoV-2 infection and COVID-19 vaccination.

Methods: A retrospective analysis was conducted on herpes zoster cases diagnosed in 2019 and 2022. Data collected included patient demographics, lesion distributions, COVID-19 PCR test results, and vaccination statuses. Statistical analyses using SPSS were performed to compare findings between the two periods.

Results: In 2019, 25 out of 1578 patients (1.584%) were diagnosed with herpes zoster, whereas in 2022, the number rose to 40 out of 3024 patients (1.322%), reflecting a 60% increase in case numbers but a 0.262% decrease in incidence rate. The average patient age decreased from 62 years in 2019 to 58.6 years in 2022. Among the 2022 cases, 35% tested positive for COVID-19, and vaccination statuses varied, with 27.5% having received four vaccine doses.

Conclusion: The study indicates a significant rise in herpes zoster cases post-COVID-19 pandemic and vaccination era, despite a decrease in incidence rates. This surge may be linked to direct and indirect effects of SARS-CoV-2 infection, vaccine-induced immune responses, and pandemic-related stress. Further investigation is warranted to delve into underlying mechanisms and potential causal relationships in greater depth.

Introduction

Herpes zoster infections, caused by the reactivation of the Varicella-Zoster Virus (VZV), are characterized by numerous unilateral vesicles that often develop on a single dermatome. Although typically a mild illness, immunocompromised individuals are more likely to develop severe complications such as pneumonia, encephalomyelitis, and disseminated cutaneous eruptions [1]. Following the onset of the COVID-19 pandemic, an increased number of VZV reactivation cases have been reported, mirroring trends seen in other diseases such as cardiovascular and neurological disorders.

COVID-19 infections can present with a range of symptoms, from asymptomatic or mild cases to severe illness and death [2]. Factors such as advanced age, immunosuppression, mechanical damage, and psychological stress can lead to the reactivation of dormant VZV infections [3]. The increase in VZV reactivation during the pandemic may be attributed to these factors, along with the direct effects of COVID-19 and its associated treatments and vaccinations.

Methods

We analyzed the prevalence and characteristics of herpes zoster cases referred to us in 2019 and 2022. The data collected included patient demographics, lesion locations, COVID-19 PCR test results, and vaccination statuses. Statistical analyses were performed using SPSS to assess the differences between the two years.

Results

In 2019, a total of 1578 patients were referred, of which 25 patients (1.584%) were diagnosed with herpes zoster (VZV). Among these 25 patients, 17 were female (68%) and 8 were male (32%). The average age of the patients was 62 years (SD: 16.90), with a median age of 64 years (Charts 1,2)

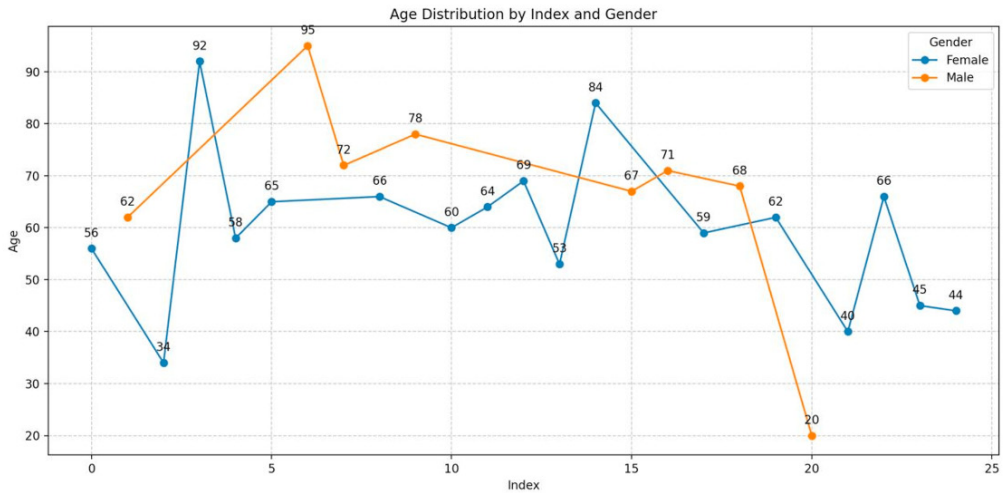

Chart 1: Age/Gender distribution, 2019.

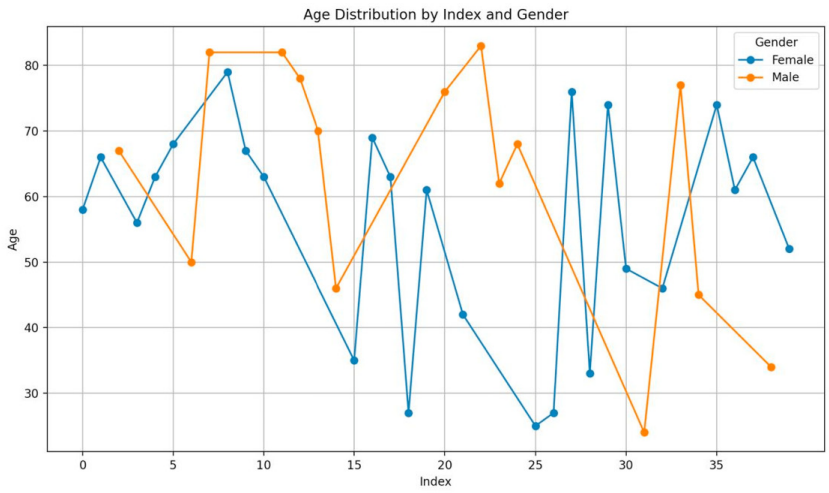

Chart 2: Age/Gender distribution, 2022.

The distribution of lesion locations was as follows: 16 patients had lesions on the upper torso, 3 on the lower limbs, 1 on the upper limbs, 2 on the head and neck, and 3 on the lower torso (Chart 3).

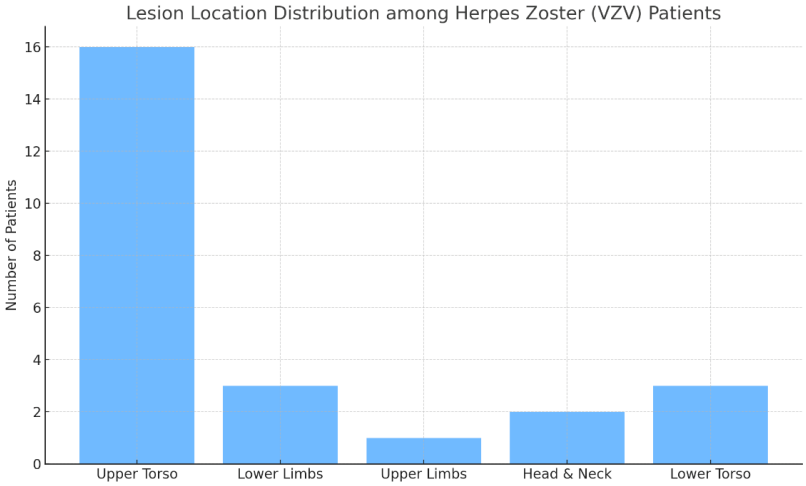

Chart 3: Lesion sites 2019.

The distribution of lesion locations was as follows: 16 patients had lesions on the upper torso, 3 on the lower limbs, 1 on the upper limbs, 2 on the head and neck, and 3 on the lower torso (Chart 3).

In 2022, the number of patients referred, increased to 3024. Of these, 40 patients (1.322%) were diagnosed with VZV, indicating a rise in the number of cases despite a slight decrease in incidence percentage. Among the 40 diagnosed patients, 25 were female (63%) and 15 were male (37%). The average age of the patients in 2022 was slightly younger at 58.6 years (SD: 17.38), with a median age of 63 years. The distribution of lesion locations differed from 2019, with 15 patients having lesions on the upper torso, 10 on the lower torso, 3 on the upper limbs, and 12 on the head and neck (Chart 4).

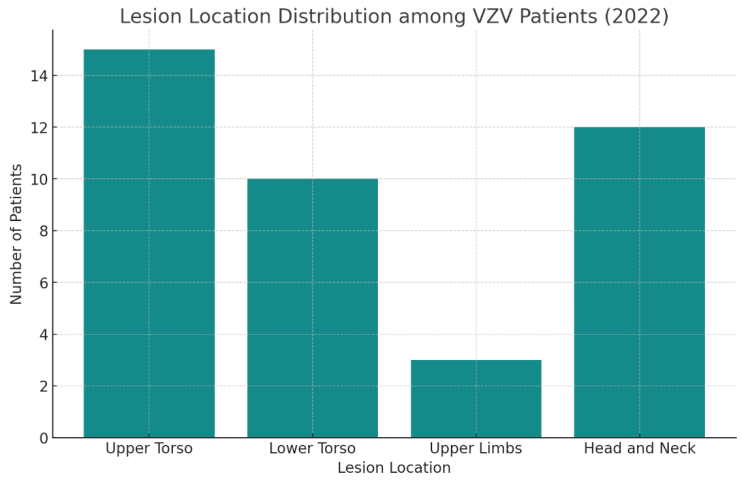

Chart 4: Lesion sites 2022.

In addition to demographic and clinical data, COVID-19 PCR test results and vaccination statuses were collected for the patients diagnosed with VZV in 2022. Among these patients, 14 (35%) tested positive for COVID-19, 13 (32.5%) tested negative, and 13 patients were not tested. Regarding vaccination status, 5 patients (12.5%) were not vaccinated, 2 patients (5%) had received a single dose of the COVID-19 vaccine, 8 patients (20%) had received two doses, 11 patients (27.5%) had received three doses, another 11 patients (27.5%) had received four doses, and 3 patients (7.5%) had received five doses (Chart 5).

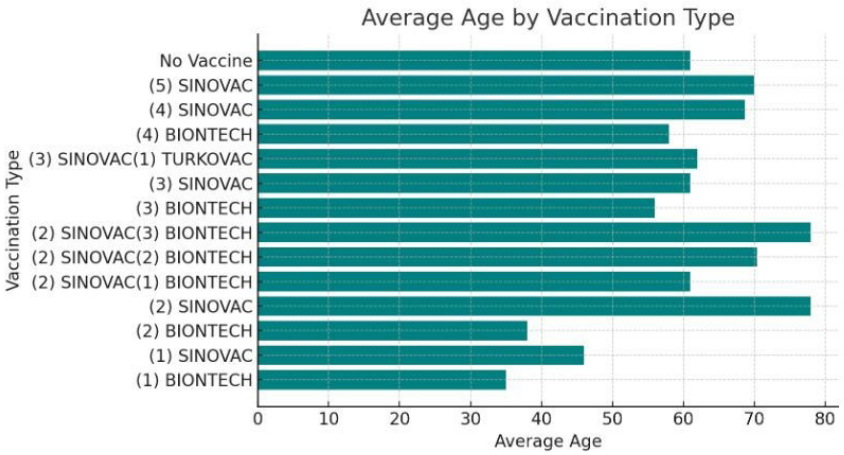

Chart 5: Vaccination/Age chart. Number of each vaccination written in parentheses (e.g. (2) SINOVAC (3) BIONTECH = patient has 2 SINOVAC and 3 BIONTECH shots).

The comparison of data from 2019 and 2022 reveals several noteworthy trends. There was a substantial increase in the absolute number of herpes zoster cases from 25 to 40, representing a 60% rise, though the incidence rate saw a marginal decrease from 1.584% to 1.322%. The proportion of female patients remained higher in both years, with a slight decrease in 2022. The average age of patients decreased slightly in 2022, suggesting a younger demographic being affected post-pandemic. The lesion distribution showed a notable increase in cases involving the head and neck in 2022, contrasting with the dominance of upper torso lesions in 2019. The addition of COVID-19-related data in 2022 highlights the potential influence of the pandemic on VZV reactivation, with a significant portion of patients either having contracted

COVID-19 or being vaccinated, underscoring the need for further investigation into the interplay between SARS-CoV-2 infection, vaccination, and herpes zoster reactivation.

Discussion

Numerous studies have reported an increase in the prevalence of VZV cases in individuals who have received the COVID-19 vaccine or contracted the virus. According to Lamprinou et al. (2023), despite the advantages of COVID-19 vaccinations, there are extremely rare side effects linked to the vaccines, including VZV reactivation [4]. However, none of the patients in the current study experienced such adverse side effects.

The reactivation of VZV is often influenced by factors such as age, stress, trauma, and immunosuppression, which can cause ganglia inflammation and vesicular skin eruptions. Four vaccines, Ad26.CoV2.S (Janssen/Johnson & Johnson), AZD1222 (Oxford/AstraZeneca), BNT162b2 (Pfizer/BioNTech), and mRNA-1273 (Moderna), have been associated with VZV reactivation. According to current knowledge, three hypotheses explain this phenomenon:

1. Impact of SARS-CoV-2 infection: Patients already infected with SARS-CoV-2 have a greater risk of VZV reactivation due to the influence of the virus on the host immune system [5].

2. Effect of mRNA vaccines: mRNA vaccinations cause the release of proinflammatory cytokines, which may suppress the T-cell-mediated immune response, potentially leading to viral reactivation [6].

3. Susceptibility in older or comorbid individuals: Older individuals or patients with comorbid conditions, who were more likely to receive vaccinations earlier, are also more susceptible to VZV reactivation [7].

Our study revealed a 60% increase in the number of patients diagnosed with VZV in 2022 compared to 2019, though there was a 0.262% decrease in incidence. For instance, Sato et al. (2021) found an increase in shingles cases following COVID-19 vaccination, whereas Furer et al. (2021) concluded that vaccination might not have a direct impact on VZV reactivation rates [8,9].

The decrease in the incidence of herpes zoster (VZV) from 1.584% in 2019 to 1.322% in 2022, a reduction of 0.262 percentage points, warrants careful examination. Several factors could contribute to this trend. Firstly, the implementation of widespread vaccination programs for herpes zoster in recent years, particularly with the recombinant zoster vaccine (Shingrix), may have contributed to reduced incidence rates. Studies have demonstrated that Shingrix is over 90% effective in preventing shingles across various age groups, including older adults who are at higher risk.

Secondly, the COVID-19 pandemic has had a significant impact on healthcare behaviors and practices. During the pandemic, people may have delayed or avoided seeking medical care for non-COVID-related issues due to fear of infection, which might have led to underreporting of VZV cases in 2022. Additionally, the increased focus on COVID-19 could have shifted medical resources and attention away from other

conditions, potentially affecting the diagnosis and reporting of herpes zoster cases.

Another factor to consider is the possible influence of the COVID-19 virus itself and its interactions with the immune system. Some research suggests that viral infections, including COVID-19, can trigger immune responses that may either increase susceptibility to VZV reactivation or, conversely, boost immune surveillance and temporarily suppress VZV activity. The mixed outcomes of COVID-19 PCR tests among VZV patients in 2022 further support the need for more research into the interplay between these infections.

Finally, changes in demographic patterns and health behaviors over the three-year period, such as improved overall public health measures, increased awareness, and better management of chronic diseases, could also play a role in the observed decrease in herpes zoster incidence . Further investigation into these factors, including longitudinal studies and comprehensive data analysis, is essential to fully understand the dynamics behind the changing incidence rates of VZV.

Conclusion

The COVID-19 pandemic and subsequent vaccination campaigns have had widespread health impacts beyond the primary infection, including potential effects on the reactivation of latent viruses such as VZV. This study aimed to analyze and compare the prevalence of herpes zoster cases before and after the COVID-19 pandemic and vaccination efforts. The findings indicate a significant increase in herpes zoster cases post-COVID-19 pandemic and vaccination period, possibly due to the direct and indirect effects on the immune system. However, further research is necessary to explore the underlying mechanisms and potential causative relationships in greater detail.

References

1. Nagel MA, Gilden D. Complications of varicella zoster virus reactivation. Current Treatment Options in Neurology. 2013; 15(4): 439-453. https://doi.org/10.1007/s11940-013-0258-2

2. Lovato A, de Filippis C, Marioni G. Upper airway symptoms in COVID-19. American Journal of Otolaryngology. 2020; 41(3): 102474. https://doi.org/10.1016/j.amjoto.2020.102474

3. Algaadi SA. Herpes zoster and COVID-19 vaccine: A rare case of reactivation. The Journal of Dermatology. 2021; 48(7): e292-e293. https://doi.org/10.1111/1346-8138.15855

4. Lamprinou E, Dimitroulia E, Delicha EM, Kalodimou V, Liaskonis K. Herpes zoster reactivation after COVID-19 vaccination: A systematic review. Vaccines. 2023; 11(1): 69. https://doi.org/10.3390/vaccines11010069

5. Acharya, S, & Wang, P. The SARS-CoV-2 pandemic and the need for a shift in neuropsychiatry. Current Psychiatry Reports. 2021; 23: 49. https://doi.org/10.1007/s11920-021-01243-6

6. Bostan E, Yalici-Armagan B. Herpes zoster following inactivated COVID-19 vaccine: A coexistence or coincidence? Journal of Cosmetic Dermatology. 2021; 20(6): 1566-1567. https://doi.org/10.1111/jocd.14245

7. Fathy RA, McMahon DE, Lee C, Rosenbach M. Herpes zoster and COVID-19 vaccination in the elderly. Journal of the American Academy of Dermatology. 2021; 85(4): 765-767. https://doi.org/10.1016/j.jaad.2021.04.087

8. Sato K, Mano T, Iwata A, Toda T. Neurological manifestations of herpes zoster: Trigeminal herpes zoster and vaccine-related herpes zoster. Journal of Neurological Sciences. 2021; 428: 117603. https://doi.org/10.1016/j.jns.2021.117603

9. Furer V, Zisman D, Kaufman I, Arad U, Shalev T, et al. Herpes zoster following BNT162b2 mRNA COVID-19 vaccination in patients with autoimmune inflammatory rheumatic diseases: A case series. Rheumatology. 2021; 60(SI): SI90-SI95. https://doi.org/10.1093/rheumatology/keab345

10. Centers for Disease Control and Prevention. (n.d.). Shingrix efficacy. https://www.cdc.gov/vaccines/vpd/shingles/public/shingrix/index.html

11. Czeisler MÉ, Marynak K, Clarke KEN, Salah Z, Shakya I, et al. Delay or avoidance of medical care because of COVID-19-related concerns-United States. 2020. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7462523/

12. Banerjee A, Pasea L, Harris S, Gonzalez-Izquierdo A, Torralbo A, et al. Estimating excess 1-year mortality associated with the COVID-19 pandemic according to underlying conditions and age: a population-based cohort study. 2020. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7360967/

13. Galván JM, Martinez L, Menéndez R. Impact of COVID-19 on non-COVID conditions. 2020. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7386072/

14. World Health Organization. (n.d.). Herpes zoster and public health measures during the COVID-19 pandemic. https://www.who.int/news-room/q-a-detail/herpes-zoster

Manuscript Information: Received: August 22, 2024; Accepted: September 19, 2024; Published: September 27, 2024

Authors Information: Daryuş Heydari[1]; Çağdaş Kaya[2]*; Ayli Heydari[2]; Gülbüz Sezgin[3]
[1]Department of Neurology, Private Hospital, Istanbul, Turkey.
[2]Faculty of Medicine, Maltepe University, Istanbul, Turkey.
[3]Department of Internal Medicine, Faculty of Medicine, Maltepe University, Istanbul, Turkey.

Citation: Heydari D, Kaya C, Heydari A, Sezgin G. A two-year comparative study on varicella-zoster virus incidence before and after COVID-19. Open J Clin Med Case Rep. 2024; 2286.