Scientific Research Publishing

Case Reports in Clinical Medicine, 2025, 14(8), 385-390
https://www.scirp.org/journal/crcm
ISSN Online: 2325-7083
ISSN Print: 2325-7075

Atypical Localization of Zona in a Four-and-a-Half-Year-Old Previously Vaccinated Boy. Is It a Vaccine Complication?

Abdullah Murat Tuncer, Orhan Pekuz, Bilgen Gencler, Meva Pekuz

Anka Pedia Child Health Center, Ankara, Türkiye
Email: mt@hacettepe.edu.tr

How to cite this paper: Tuncer, A.M., Pekuz, O., Gencler, B. and Pekuz, M. (2025) Atypical Localization of Zona in a Four-and-a-Half-Year-Old Previously Vaccinated Boy. Is It a Vaccine Complication? *Case Reports in Clinical Medicine*, **14**, 385-390.
https://doi.org/10.4236/crcm.2025.148051

Received: July 10, 2025
Accepted: August 1, 2025
Published: August 4, 2025

Abstract

A literature review was conducted on the shingles infection that developed on the left arm of a 4-and-a-half-year-old boy who had been vaccinated against chickenpox at the age of one, and it was discussed as a potential complication of the live vaccine or an alternative explanation. The localization of shingles in our patient, along with its limited dermatomal distribution related to the area where the varicella vaccine was administered, suggests that it may be due to the vaccine virus. Our patient recovered rapidly with the use of antiviral agents. Because shingles, a disease typically seen in adults, is rare in children, and because there are very few cases in the literature that can progress and lead to fatal outcomes, this case is brought to the attention of pediatricians, dermatologists, and family physicians. The fact that the live varicella vaccine is administered uniformly worldwide may provide insight into whether future cases of shingles are related to the vaccine, and suggestions were made in the article.

Keywords

Zona Zoster Infection, Pediatric Zona, Varicella Vaccination, V-Z Infection after Vaccination, Infection with Vaccine Strain

1. Introduction

It was clearly distinguished from chickenpox by Heberden in 1767 [1]. "Chickenpox" either derives from the Old English word "gican," meaning "to itch," or from the Old French phrase "chiche-pois," meaning "chickpea," which describes the size of the vesicle [2]. The diagnosis is based on the clinical presentation, which includes the appearance of the characteristic rash, accompanied by a history of exposure. Although no antiviral treatment has been shown to prevent postherpetic neuralgia entirely, early therapy has been found to reduce the duration. Currently, acyclovir,

idoxuridine, famciclovir, vidarabine, foscarnet, valacyclovir, and interferon alfa have all proven effective in treating Varicella Zoster virüs (VZV) infections [3].

The varicella zoster rash associated with chickenpox can sometimes be mistaken for other viral exanthems, insect bites, scabies, erythema multiforme, papular urticaria, drug eruptions, or other vesicular skin conditions such as dermatitis herpetiformis [4].

Varicella is transmitted through droplet or airborne routes and is highly contagious, with secondary attack rates in susceptible household contacts exceeding 85% [5]. The usual incubation period is 14 to 16 days, with a range of 11 to 20 days. Second cases of chickenpox have been reported in immunocompetent individuals, although they are rare. There is, however, immunologic evidence that subclinical reinfection with VZV is a common occurrence [5] [6].

After a primary varicella (chickenpox) infection, the virus (VZV) establishes latency in dorsal root and cranial nerve ganglia. Herpes zoster ("shingles") is the reactivation of the virus, and it spreads from a single ganglion to the corresponding dermatome and neural tissue of the same segment. The clinical presentation commonly starts with dermatomal pain or abnormal sensations that precede the appearance of the characteristic rash [7].

In immunocompetent children, VZV reactivates within the same dermatome where the vaccine injection was administered and causes herpes zoster [8]. In Weinmann's study, they concluded that HZV incidence in vaccinated children was lower than in unvaccinated children. Among vaccinated children, half of HZV cases were due to wild-type VZV [8].

2. Case Report

The chickenpox vaccine is included in the national vaccination program based on the ACIP Recommendations [9]. In Türkiye, the Ministry of Health administers Varicella vaccines free of charge to all children aged one year and above. A four-and-a-half-year-old boy GÇ (was born on 31.12.2020), presented with a painful vesicular rash on his left arm, spreading over C5 and C6 dermatomes (**Figure 1** and **Figure 2**). He had received one dose of VZV vaccine (Sinovac, Dalian, Varicella-Zoster Live virüs vaccine, Vero cell, China) at the age of 12 months. Sinovac obtained clinical research approval for its proprietary Varicella vaccine candidate from the China Food and Drug Administration (CFDA) in September 2015 and completed phase I clinical trials in 2016. The phase III trial was completed in 2017, with preliminary phase III data showing that Sinovac's varicella vaccine was 87.1% (95% CI: 69.7%, 94.5%) efficacious against chickenpox caused by Varicella-zoster Virus (VZV). The results of the lot consistency study indicated that the immunogenicity of the three vaccine lots was consistent. The Company filed the production license application with the CFDA before the end of 2017 [10].

The child was immunocompetent, with no history of frequent, unusual, or recurrent infections. In his history, there was pain in the left arm, left forearm, and left shoulder that started 5 - 6 days before admission. One day after the pain,

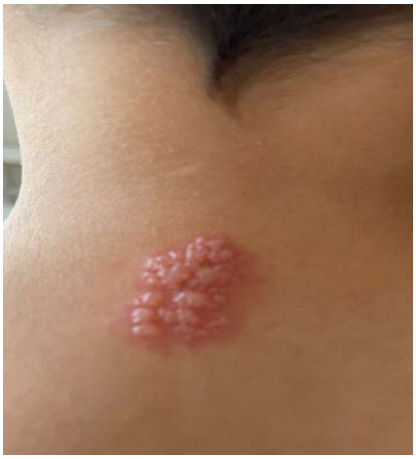

Figure 1. Shingles rash below the nape of the neck (C5 dermatome) on day 2.

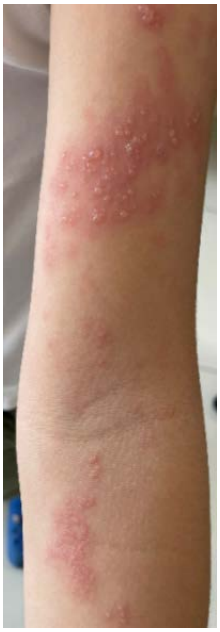

Figure 2. Shingles rash on the outer side of the left arm(C5, C6 dermatome) on day 4.

rashes appeared in the painful areas and at the base of the neck. His physical examination revealed typical clustered hyperemic and small vesicular rashes on the left arm, forearm, and neck. Oral acyclovir and painkillers were started with a preliminary diagnosis of shingles. One day later, the rashes started to crust.

He was fully immunized against other vaccinations. There was no known contact with varicella.

His basic laboratory tests were normal. Hb:12.9 gr/dL, RBC:4.6 m/mm^3, MCV: 80.9 fL, RDW: %12, WBC: 6000/mm^3 with %24.6 lymph, %67 pmnl, platelets: 286.000/mm^3 with the normal peripheral smear morphology.

Screening was negative for varicella IgM antibodies, but IgG for Varicella was positive. He was afebrile and otherwise well.

IgG and IgM were normal. 25-*hydroxy Vitamin D3 was lower than normal* (22

microg/L), *Vitamin B*\12 *and ferritin were also normal. Vit D therapy was started.*

Herpes zoster was clinically diagnosed, and treatment with acyclovir and analgesics was started. The lesions started to crust two days after treatment, and gradually, the pain subsided, and the child recovered completely without any further complications.

3. Discussion and Conclusion

Susceptible individuals have no antibodies to VZV at the time of exposure, unless they have acquired them transplacentally or through the administration of immunoglobulin or blood products. Antibodies to VZV proteins may act to neutralize the virus directly, or with complement, or to mediate the lysis of infected cells by antibody-dependent cell-mediated cytotoxicity [3].

It has been reported that in some immunized children, the virus reactivates within a few years, causing the dermatomal exanthem known as herpes zoster [11]. Herpes zoster, caused by the vaccine virus, often reactivates within the same dermatome as the site of the original varicella vaccine injection. After receiving a chickenpox vaccine, the virus in the vaccine can replicate in the skin and spread to the nerves [6]. Once the virus reaches nerves, it can hide from the immune system and reactivate later, leading to the development of shingles [12].

VacciOne strain of varicella zoster infection has been described in a 15-month-old girl who developed a varicella-like rash 20 days after varicella vaccination that lasted for two months despite acyclovir treatment. The rash was confirmed to be due to vaccine-strain varicella-zoster virüs [13]. Caro-Gutierreza and colleagues have presented eight cases of HZ; all patients were under 5 years of age, healthy, and had been vaccinated for VZV. Although cases of reactivation of the Oka strain of VZV have been reported, recent studies have found no increase in the incidence of HZ in vaccinated children [14]. These cases confirm that live VZV vaccines can also cause disease.

In Merck's postmarketing study (Sharrar, 2000), the overall reporting complication rate was 5.0 per 10,000. A varicella zoster virus (VZV) identification program detected the presence of the Oka vaccine strain in three individuals with immune deficiency, including two with pneumonia and one with hepatitis, as well as in three instances of secondary transmission from vaccinees with vesicular lesions to susceptible household contacts. The Oka vaccine strain was present in 23 patients, and wild-type VZV was present in 15 patients with herpes zoster. Vesicular rashes that occurred within 2 weeks of vaccination were more likely to contain the presence of wild-type VZV, while vesicular rashes that occurred more than 2 weeks post-vaccination were more likely to contain the Oka vaccine strain [15].

The varicella vaccination program is crucial for public health, offering significant benefits in preventing disease and reducing mortality. Continued scientific research and technological innovations keep the promise for enhancing the public health benefits of VZV vaccines, strengthening global immunization efforts, and

promoting long-term disease control [16].

In our case, low vitamin D levels may be a contributing factor. Research suggests a link between vitamin D deficiency and respiratory tract infections, such as the common cold, bronchitis, and pneumonia, but not zoonotic infections in a meta-analysis [17]. However, a deficiency in vitamin D is associated with increased autoimmunity as well as an increased susceptibility to infection. The absence of any other frequent infection findings or history in our patient suggests that this condition is not serious in relation to shingles.

Although varicella vaccine complications are rare, we strongly recommend that the WHO ensure the varicella vaccine is administered to the deltoid region of the left or right arm, consistently, everywhere in the world, to monitor the findings associated with shingles.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Jr., T.E.C. (1970) The First Description of Chickenpox as a Disease, By William Heberden the Elder (1710-1801) in 1767. *Pediatrics*, **45**, Article 588. https://doi.org/10.1542/peds.45.4.588

[2] McCrary, M.L., Severson, J. and Tyring, S.K. (1999) Varicella Zoster Virus. *Journal of the American Academy of Dermatology*, **41**, 1-16. https://doi.org/10.1016/s0190-9622(99)70398-1

[3] Arvin, A.M. (1996) Immune Responses to Varicella-Zoster Virus. *Infectious Disease Clinics of North America*, **10**, 529-570. https://doi.org/10.1016/s0891-5520(05)70312-3

[4] Tuncer, M.A., Evis, B., Kunak, B., Akcayoz, N. and Ertem, U. (1989) Erythroblastopenia and Leukopenia in a Patient with Severe Herpes Zoster treated with Intravenous Acyclovir. *The Turkish Journal of Pediatrics*, **31**, 317-321.

[5] Wharton, M. (1996) The Epidemiology of Varicella-Zoster Virus Infections. *Infectious Disease Clinics of North America*, **10**, 571-581. https://doi.org/10.1016/s0891-5520(05)70313-5

[6] Hope-Simpson, R.E. (1965) The Nature of Herpes Zoster: A Long-Term Study and a New Hypothesis. *Proceedings of the Royal Society of Medicine*, **58**, 9-20. https://doi.org/10.1177/003591576505800106

[7] Burgoon Jr., C.F., Burgoon, J.S. and Baldridge, G.D. (1957) The Natural History of Herpes Zoster. *Journal of the American Medical Association*, **164**, 265-269. https://doi.org/10.1001/jama.1957.02980030041010

[8] Weinmann, S., Chun, C., Schmid, D.S., Roberts, M., Vandermeer, M., Riedlinger, K., *et al.* (2013) Incidence and Clinical Characteristics of Herpes Zoster among Children in the Varicella Vaccine Era, 2005-2009. *The Journal of Infectious Diseases*, **208**, 1859-1868. https://doi.org/10.1093/infdis/jit405

[9] Marin, M., Güris, D., Chaves, S.S., Schmid, S. and Sewardet, F.J. (2007) Prevention of Varicella: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recommendations and Reports*, **56**, 1-40.

[10] Sinovac Files 2017 Annual Report on Form 20-F and Reports Unaudited Second Half,

Audited Full Year 2017 Financial Results.
https://www.sinovac.com/en-us/news/id-2807

[11] Moodley, A., Swanson, J., Grose, C. and Bonthius, D.J. (2019) Severe Herpes Zoster Following Varicella Vaccination in Immunocompetent Young Children. *Journal of Child Neurology*, **34**, 184-188. https://doi.org/10.1177/0883073818821498

[12] Pelekouda, E., Papagiannis, D., Tsiaousi, I. and Maltezou, H.C. (2019) Herpes Zoster after Vaccination with One Dose of the Varicella Vaccine in a 4-Year-Old Child. *Le Infezioni in Medicina*, **4**, 449-451.

[13] Leung, J., Siegel, S., Jones, J.F., Schulte, C., Blog, D., Scott Schmid, D., *et al.* (2013) Fatal Varicella Due to the Vaccine-Strain Varicella-Zoster Virus. *Human Vaccines & Immunotherapeutics*, **10**, 146-149. https://doi.org/10.4161/hv.26200

[14] Caro-Gutiérrez, D., López-Estebaranz, J.L., Naz-Villalba, E. and Ayala-Bernaldo de Quiros, L. (2015) Herpes Zoster in Children Vaccinated against Varicella-Zoster Virus: Experience in Our Hospital. *Actas Dermo-Sifiliográficas* (*English Edition*), **106**, 329-331. https://doi.org/10.1016/j.adengl.2015.03.012

[15] Sharrar, R.G., LaRussa, P., Galea, S.A., Steinberg, S.P., Sweet, A.R., Keatley, R.M., *et al.* (2000) The Postmarketing Safety Profile of Varicella Vaccine. *Vaccine*, **19**, 916-923. https://doi.org/10.1016/s0264-410x(00)00297-8

[16] Liu, H., Cui, L., Zhang, S., Wang, H., Xue, W., Li, H., *et al.* (2025) Research Progress on Varicella-Zoster Virus Vaccines. *Vaccines*, **13**, Article 730. https://doi.org/10.3390/vaccines13070730

[17] de Haan, K., Groeneveld, A.J., de Geus, H.R., Egal, M. and Struijs, A. (2014) Vitamin D Deficiency as a Risk Factor for Infection, Sepsis and Mortality in the Critically Ill: Systematic Review and Meta-Analysis. *Critical Care*, **18**, Article No. 660. https://doi.org/10.1186/s13054-014-0660-4