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CASE REPORT

Herpes Zoster Onset 9 Years After First Varicella Zoster Vaccination in an 11-year-old Child - A Case Report

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Abstract: ***Background*:** Herpes zoster (HZ) tends to affect the elderly population and immunocompromised younger patients. However, HZ cases in healthy children have also been reported.

***Objective*:** This paper is a reminder to physicians, that Herpes Zoster can still be present in children, even in the era after the development of the varicella vaccine and its introduction in the national immunization programs globally.

***Methods*:** We present the case of an immunocompetent 11-year old vaccinated male patient, who developed a HZ infection. The child had received two doses of the VZV vaccination (Varivax®), nine years (first dose) and six years (second dose) prior to the infection.

***Results*:** Together with the case presentation, we summarize in this report the most recent published data, concerning the HZ prevalence in healthy varicella zoster vaccinated children.

***Conclusion*:** Vaccinated pediatric patients are not completely free of risk concerning HZ. Physicians, especially pediatricians and dermatologists, should be alert in order to recognize and treat HZ early, so as to avoid further complications.

Keywords: Herpes zoster, vaccination, children, immunocompetent, varicella, complications.

1. INTRODUCTION

Herpes Zoster (HZ) occurs after the reactivation of the Varicella-Zoster-Virus (VZV), a neurotropic virus that remains present in a latent condition in the sensory ganglia of the patient after primary infection [1]. Although HZ most commonly affects the elderly patients, it can rarely also affect younger adults and children in whom the clinical presentation tends to be milder, with a lower incidence of complications such as post-herpetic neuralgia [1, 2]. Despite the changes of the HZ epidemiology after the establishment of the routine varicella vaccination programs, cases of HZ still occur, even among vaccinated immunocompetent children [1, 2]. We present the case of an 11-year old patient, who developed a post-vaccination HZ infection.

2. CASE REPORT

An 11-year old male patient, presented in our clinic due to a sudden eruption of a progressive papulovesicular rash on the left arm and shoulder, with a duration of 24 hours. The child reported a burning pain in the affected area, with an intensity 7/10, as assessed by the patient himself, using a 0–10 Numeric Rating Scale (NRS), where 0 represents "no pain" and 10 "unbearable pain". This burning pain was present four days before the appearance of the skin lesions and was also deteriorating gradually. Within the last 48 hours before the referral to our department, he had a febrile episode, with temperature up to 38.7°C that settled with paracetamol. There was no personal or family history of previous varicella infection. The child had previously received two doses of the VZV vaccination (Varivax®, varicella virus vaccine live; Merck, Whitehouse Station, New Jersey), at the ages of two (first dose) and five (second dose), without any complications, according to the Greek national immunization program, which suggests administering the first dose at the age of 12 to 15 months, and the second dose at the age of 4 to 6 years. Interestingly, the clinical symptoms correlated with the vaccination site. The vaccination site was indicated by the patient's mother as well as the child`s medical records, both of which stated that all vaccinations were performed on the lateral side of upper left arm of the child. As far as the patient's personal history was concerned, the mother reported bilateral hearing-impairment of unknown etiology since the age of 3 years as well as an isolated episode of post-partum convulsions that subdued after short-

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term anti-epileptic treatment. There was no history of recurrent infections and the child had received all the adequate vaccinations as per Greek national vaccination schedule up to that age, a.c.a three doses of the Hepatitis B vaccine, four doses of the Diptheria-Tetanus-Pertussis vaccine, three doses of the poliomyelitis vaccine, four doses of the Haemophilus Influenza 2b vaccine, four doses of the conjugated pneumococcal vaccine, two doses of the Measles-Mumps-Rubella vaccine, two doses of the Hepatitis A vaccine and three doses of the Rota virus vaccine. The initial workup showed a normal blood cell count, hepatic and kidney function and C-reactive protein levels. The viral serology revealed negative HSV (Herpes simplex Virus) I/II IgG and IgM, negative anti-VZV-IgM (VZV-IgM by 0.39 mIU/ml, with positive values > 1mIU/ml) and positive anti-VZV-IgG (3587 mIU/ml, with positive values > 1mIU/ml). T cell subsets were within normal limits for his age.

The physical examination revealed a patient in a good overall condition with a papulovesicular rash, with distribution on the lateral left forearm and shoulder (dermatomes C4-C5). The affected area was tender on palpation and the reported pain appeared to have neuropathic characteristics, such as superficial burning sensations. The sensory and motor functions were unaffected, and there was no sign of associated lymphadenopathy. The clinical symptoms were interpreted as an HZ infection, the patient was admitted and treated with intravenous acyclovir for 5 days and analgesic treatment with ibuprofen, to which he responded rapidly and eventually discharged without complications or residual pain.

3. DISCUSSION

After the introduction of the live attenuated Oka varicella vaccination in the national immunization schedules in 1995, the incidence of HZ in vaccinated children is significantly lower than in non-vaccinated children [3]. This is especially observed in patients under 10 years of age, where the estimated risk was calculated to be 4 to 12 times lower than among pediatric patients of the same age with a history of varicella infection [3, 4]. When it comes to patients between 10 and 19 years of age, while there was an increased risk observed in the period 2000-2006, in the following years, the increase in the HZ incidence not only seemed to reach a plateau, but also lower rates were observed in 2010 compared to 2006 in the United States [2]. Epidemiologic data from other countries, such as Germany, seem to be in accordance with the latter, demonstrating a decreasing trend in the incidence of HZ in 5 to 9 year olds from 2010 and onwards and in the 10 to 14 year olds after 2013 [5].

Both the vaccine as well as the wild-type strain have been isolated in the affected patients [6, 7] and in particular, the Oka-VZV strain seems to be responsible for approximately half of the cases of HZ in the vaccinated pediatric population [1]. A recombining of the two strains has been also reported, but only on rare occasions [1].

The time-interval between immunization and HZ infection can generally vary between 3 months and 11 years [8]. The impact of vaccination on the clinical presentation of HZ in pediatric patients, especially regarding the severity of skin manifestations and pain, shows contradicting results among the different meta-analyses and studies [1, 3]. HZ in vaccinated children generally tends to manifest with less pain and fewer vesicles, compared to non-vaccinated children [4,7]. Consequently, the decrease in the frequency of HZ infection after the vaccine introduction, as well as the milder clinical presentation of the infection when it does take place, have both contributed to a significant decrease in the hospitalization rates due to varicella reactivation almost by half [9]. There are data supporting that the cases of HZ in vaccinated children, that are attributed to the Oka-strain are more likely to present in the site where the vaccination was given, probably due to the higher virus concentration in the area and the subsequent infection of the regional cutaneous sensory nerves [1, 6]. In contrary, HZ in children under 10 years of age, that is caused by the wild-type VZV strain, tends to manifest in the thoracic area, a fact which can theoretically be attributed to the central distribution of the rash during varicella infection [4]. When it comes to a comparison between the adult and the pediatric population, cranial involvement or dissemination of HZ tends to be much less frequent in children compared to adults [10]. Furthermore, while in adults a HZ infection has been traditionally regarded as a potential indicator for immunosuppression or underlying tumor, an association with malignancy is only rarely seen in children [10].

CONCLUSION

In conclusion, despite the decrease in the prevalence of HZ in children, and especially in the varicella-vaccinated population, pediatricians should be aware of this possibility in order to recognize HZ early and treat accordingly, so as to avoid hospitalization or long-term complications.

LIST OF ABBREVIATIONS

HZ	=	Herpes Zoster
NRS	=	Numeric Rating Scale
VZV	=	Varizella-Zoster-Virus

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Informed consent has been obtained from the patient.

STANDARDS OF REPORTING

CARE guidelines and methodology were followed in this study.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Kerasia-Maria Plachouri and Despoina Gkentzi designed the study.

Kerasia-Maria Plachouri performed research and wrote the paper.

Sophia Georgiou, Anastasia Varvarigou and Gabriel Dimitriou contributed important reagents.

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