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Case Report

Varicella-Zoster Virus and its Puzzles in Infants

Le Virus Varicelle-Zona et ses Énigmes chez les Nourrissons

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Abbreviations
VZV: varicella zoster virus
DNA: Desoxiribonucleic acid
HIV: Human immunodeficiency virus
PCR: Polymerase chain reaction

ABSTRACT

Herpes zoster is caused by reactivation of the varicella-zoster virus (VZV) that remains latent in the Gasser node following primary varicella infection. It is exceptional in children. We report the clinical case of an infant, without any previous notion of varicella, who had been in direct contact with a subject with varicella. This was a 23-month-old infant, born at term, who came to the General Hospital in Douala for an itchy rash that has been developing for 06 days. Dermatologic examination found vesicles clustered in clusters with an arrangement along the T1-T2 metamers (upper right hemithorax, taking the upper right limb). The rest of the somatic exam was unremarkable. The mother reported a normal pregnancy, but the baby had a neonatal infection that followed for a few days after birth. The diagnosis of herpes zoster was made by the typical clinical appearance of the lesions. HIV was negative. Treatment was symptomatic with a favorable course without painful sequelae. A few cases of zonas in infants from the literature reported patients from intrauterine exposure. Others had no history of previous exposure to the virus. In our study, it was herpes zoster that started after varicella infection, without any evidence of chickenpox or immunocompromising factors in the patient. Shingles remains a rare condition in immunocompetent infants without a personal history of varicella. Diagnosis is primarily clinical and usually progresses well.

RÉSUMÉ

Le zona est dû à la réactivation du virus varicelle-zona (VZV) qui reste latent dans le ganglion de Gasser après la primo-infection varicelleuse. Il est exceptionnel chez les enfants. Nous rapportons le cas clinique d'un nourrisson, sans notion antérieure de varicelle, qui avait été en contact direct avec un sujet atteint de varicelle. Il s'agit d'un nourrisson de 23 mois, né à terme, qui s'est présenté à l'hôpital général de Douala pour une éruption cutanée prurigineuse évoluant depuis 06 jours. L'examen dermatologique a trouvé des vésicules groupées en amas avec une disposition selon les métamères T1-T2 (hémithorax supérieur droit, prenant le membre supérieur droit). Le reste de l'examen somatique était sans particularité. La mère a rapporté une grossesse normale, mais le bébé a eu une infection néonatale qui s'est poursuivie pendant quelques jours après la naissance. Le diagnostic d'herpès zoster a été posé sur la base de l'aspect clinique typique des lésions. Le VIH était négatif. Le traitement a été symptomatique avec une évolution favorable sans séquelles douloureuses. Quelques cas de zonas chez des nourrissons rapportés dans la littérature font état de patients ayant subi une exposition intra-utérine. D'autres n'avaient pas d'antécédents d'exposition au virus. Dans notre étude, il s'agissait d'un zona qui avait débuté après une infection par la varicelle, sans aucun signe de varicelle ou de facteurs d'immunodépression chez le patient. Le zona reste une affection rare chez les nourrissons immunocompétents sans antécédents personnels de varicelle. Le diagnostic est essentiellement clinique et évolue généralement favorablement.

INTRODUCTION

Varicella zoster virus (VZV) is a double-stranded deoxyribonucleic acid (DNA) virus with an envelope necessary for its virulence [1]. It belongs to the family Herpes viridae [2]. Its reservoir is strictly human [1]. It has a particular affinity for the skin, nervous system and lungs [2]. Herpes zoster is caused by reactivation of latent VZV in the Gasser node following primary varicella infection [2]. It is exceptional in children [1-5]. We report the clinical case of an infant, without any previous notion of varicella, who had been in direct contact with a subject with varicella.

CASE PRESENTATION

This was a 23-month-old male who had come to the General Hospital in Douala for an itchy, painful rash that had been developing for 06 days. The dermatological examination found, on the right, vesiculo-pustules grouped in clusters associated with blackish and mellicerical crust in places, all arranged along the metamers T1-T2 (Figure 1).

Figure 1. Clustered vesiculo-pustular lesions (A) associated with blackish and melliceric crust in one spot (B)

Table 1. Infant herpes zoster clinical cases 2014-2024

Source	Sex	Age	Source of exposure	Side	Dermatome	Treatment	Complication
[7] Thomas, 2014 (India)	F	6 months	Mother with history of varicella during the 5th month of pregnancy.	L	T12-L1	Oral acyclovir 10 mg/kg 4 times a day for 7 days	No
[8] Al-Fadhli, 2014 (Kuwait)	M	5 months	Mother with varicella	R	S2-S3-S4	Intravenus acyclovir First generation cephalosporin	No
[17] Kara, 2015 (Turkey)	M	7 months	sister had varicella 5 months earlier	R	L3-L4	Acyclovir suspension therapy, Compression with Burow's solution: 3 times a day for 10 minutes, Topical calamine lotion 3 times a day	No
[21] Yavuz, 2015 (Turkey)	F	5 months	Unknow (the mother was thought to be infected during pregnancy because it was a nurse)	L	T8-T9	Acyclovir syrup Topical fusidic acid cream	No
[22] Van Aelst, 2015 (Belgium)	M	2,5 years	Unclear. An older brother had developed varicella at the time of birth of the patient after a normal pregnancy and full-term normal delivery (the patient did not develop any rash or fever at that time)	L	V1	Intravenous acyclovir Topical acyclovir Intravenous flucloxacillin	No
[9] Nair 2016 (India)	M	1 year	Mother had varicella infection during the 4th month of gestation	L	T4	Oral acyclovir 80 mg/kg per day in 5 divided doses for 7 days Other supportive measures	No
[15] Tepe, 2017 (Turkey)	M	7 months	After postnatally acquired primary varicella infection	R	T8-T9	Oral acyclovir 80 mg/kg Topical treatment	No
[23] Makzal, 2017 (UK)	F	15 months	Unknow (suggestion that there had been in utero exposure)	R	V1	Intravenous acyclovir for 48 hours Complete a further 7 days of oral Acyclovir and,topical treatment	No

[10] Komitova, 2018 (Bulgaria)	M	18 months	In utero (mother with chickenpox in late pregnancy)	R	V1	Intravenous acyclovir 10 mg/kg 3 times daily for 7 days, Topical acyclovir 3% eye ointment Ceftriaxone 50/mg/kg on suspicion of bacterial superinfection	Subconjunctival hemorrhages without corneal scarring → Subsided
[11] Iraqi 2018 (Morocco)	M	8 months	Mother with a history of varicella in the third trimester of pregnancy	R	V1-V2	Intravenous Aciclovir for 10 days Local antiseptic	No
[14] Betiu, 2018 (Moldova)		5 months	Maternal infection with Varicella-Zoster Virus during the third trimester of pregnancy	L	V1		No
[16] Qadim, 2019 (Iran)	M	7 months	Personal history of varicella, 2 months ago	R	V2-C2-C3-C4-C5	ND	No
[2] Agharbi, 2019 (Maroc)	F	6 months	Mother with varicella at 7 months of pregnancy	L	L1	Local care	No
[23] AJ, 2019 (Indonesia)	M	9 months	Unclear (the patient had a fever accompanied by small fluid-filled blisters when he was 6 months old)	R	C5-C7	150 mg oral acyclovir 4 times a day for 5 days	No
(6] Makhija, 2020 (India),	M	3 months	His mother suffered from varicella infection during the 30th week of gestation	L	C2-C3-V3	Topical fusidic acid cream	No
[18] Bouzouba, 2020 (Morocco)	F	2 years	Close contact with a child involving by varicella without any history of varicella previously	R	V1-V2	Acyclovir 10 mg/kg/8H Third generation cephalosporin and Metronidazole Tobramycine collyre: 4 times a day for 7 days Ganciclovir gel 0,15 % : 5 times a day for 5 days Fusidic acid ophtalmic cream	Superinfected follicular conjunctivitis with purulent discharge without signs of keratitis → Subsided
[12] Razmyar, 2020 (Iran)	M	75 days	Mother with varicella 2 years before pregnancy also she has had close contact with the person involving by varicella during the first trimester of her pregnancy	L	T5-T6	ND	No
[25] Sah, 2020 (Nepal)	F	11 months	Unknow (family members, and none of them had any varicella-like illnesses in the past. Parents did not give any history of varicella-like rash in the child previously)	R	T8-T9	Oral acyclovir 20 mg/kg/dose, 5 times a day for 7 days Topical antibiotic (fusidic acid cream) Antipyretic (oral paracetamol).	No
[26] Bakkali, 2021 (Morocco)	M	14 months	No concept of maternal chickenpox during pregnancy and postpartum, and none of those around her had chickenpox in the past	L	T12-L1	Oral acyclovir for 7 days, Oral antipyretic (paracetamol) and local care	No
[19] Abou-taleb, 2021 (Egypt)	M	10 months	Two months ago, he was exposed to his cousin with chickenpox, but he didn't have any manifestations	L	L1, L2, S3, S4-S5	Compresses with local antiseptic lotion Topical antibiotic Analgesic (paracetamol syrup)	No
[27] Biswas, 2022 (Bangladesh)	F	15 days	Unknow (no history of maternal chickenpox infection and varicella vaccination of mother during pregnancy)	R	V1	Homatropine eye drops 2%, 3 times daily; Moxifloxacin eye drops 0.3%,4 times daily; Acyclovir eye ointment 3%, 5 times daily;	Mild edema of lids with matted eyelashes, ciliary Conjunctival congestion

						Dexamethasone eye drops 0.1% 4 times daily in her right eye, for over 1 month Mupirocin skin ointment 2 times daily Oral acyclovir (syrup) 30 mg/kg in 3 divided doses for 7 days for over 1 month	Conjunctival chemosis Hazy cornea → Subsided
[27] Biswas, 2022 (Bangladesh)	M	20 days	Unknow (no History of maternal chicken pox infection and varicella vaccination of mother during pregnancy)	R	V1	Homatropine eye drops 2%, 3 times daily; Moxifloxacin eye drops 0.3%, 4 times daily; Ganciclovir eye ointment 0.15%, 5 times daily for over 1 month Dexamethasone eye drops 0.1% 4 times daily in her right eye; for over 1 month Mupirocin skin ointment 2 times daily Oral acyclovir (syrup) 30 mg/kg in 3 divided doses for 7 days.	Conjunctival and ciliary congestion Stromal keratitis without irs detail → Subsided
[13] Megha, 2022 (India)	F	8 months	Exposure to a household contact with a case of herpes zoster 10 days before the onset of the rash history of vesicular rash in the mother at 34 weeks of gestation	L	V1	Oral acyclovir 120 mg (20 mg/kg) 4 times a day for 5 days Mupirocin ointment 3% acyclovir eye ointment Tobramycin eye drops	Conjunctival congestion → Subsided
(28] Ndour, 2024 (Senegal)	F	2 years	Unknow (no family history of varicella, the mother had not developed chickenpox or shingles, either during pregnancy or in the post-partum period. Her father also had no known pathology)	L	T5-T6	Antiseptic baths Application of desiccants	No
Ekambi, 2024 (Cameroon)	M	23 months	Close contact with a child involving by varicella without any history of varicella previously	R	T1-T2	Antiseptic baths Macrolid antibiotics : 2 times a day for 6 days Healing cream	No

There was no fever, the growth curve was normal, and the rest of the somatic examination was unremarkable. The child was born at term, with no evidence of maternal exposure to chickenpox during pregnancy. There was a history of neonatal infection in children with a favorable outcome within a few days. There was no evidence of previous chickenpox, but recent direct contact with a close subject with chickenpox. Because of the typical clinical appearance of the lesions, the diagnosis of shingles was made. HIV was negative.

The treatment instituted was local (antiseptic and soothing/drying cream) and oral (analgesic and 6d macrolide antibiotic therapy). The outcome was favorable without painful sequelae after one year of follow-up. In our study, the treatment was local. There was a skin superinfection that required an antibiotic. The course was marked by slight depigmentation with no painful sequelae or recurrences after one year of follow-up (Figure 2).

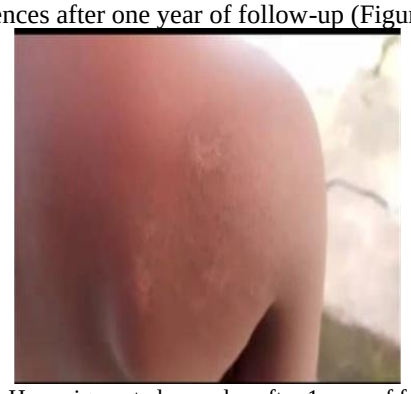

Figure 2. Hypopigmented sequelae after 1 year of follow-up (posterior view)

Table 1 summarizes the various clinical cases of herpes zoster in infants that have been reported in the literature since 2014, except in cases where the action of the vaccine was strongly suspected.

DISCUSSION

Herpes zoster is a characteristic vesicular rash that then appears in the metamer corresponding to the spinal ganglion colonized during the primary infection [2]. According to Sentinels network data [4] for the year 2015, the age group 0 to 19 years accounted for 13.3% of herpes zoster cases, of which 4.7% for 0 to 9 years. Herpes zoster in infants is a rare situation [1-5] and may be due to several factors. Fetal exposure to VZV is a risk factor for early-onset herpes zoster [1]. Herpes zoster in infants is probably the result of an immature immune response to transplacental infection with VZV) [5]. Low levels of lymphocytes, natural killer cells, specific cytokines and immunoglobulins in the fetus and neonate could result in the inability to maintain VZV latency and lead to the development of shingles [5]. Makhija et al. in 2020 in India had found a 3-month-old infant with herpes zoster with evidence of varicella in the mother at the 30th week of pregnancy [6]. This same pattern of VZV exposure was noted in other clinical cases [2, 7-14]. Early exposure to the varicella virus is a major risk factor for the development of herpes zoster. The younger the age of chickenpox, the greater the risk of herpes zoster in children [1]. We found in the literature infants with a history of varicella, having had shingles [15, 16]. Contamination can also occur by direct contact with a person with chickenpox (respiratory droplets or fluid from the vesicles) or a person with shingles (fluid from the vesicles) [2]. This pattern was consistent with our study in which shingles occurred in an infant who had been in close contact with someone who had chickenpox, and had never had chickenpox himself. Kara et al in Turkey, Bouzouba et al in Morocco and Abou-Taleb et al in Egypt in 2015, 2020 and 2021, respectively, had reported studies with similar exposure [17-19]. Immunocompromised children are more likely to develop shingles [1]. Non-malignant diseases include inflammatory bowel diseases, systemic lupus and inflammatory rheumatism, without knowing the relative share of the disease and immunosuppressive treatments usually prescribed to increase the risk of herpes zoster. Human immunodeficiency virus (HIV) infection also increases the risk of developing shingles [1]. In our patient, there was a history of neonatal infection with favorable outcome without sequelae, but no factors for recent immunosuppression. HIV was negative. Asthma also appears to be associated with a 2-fold increase in the risk of herpes zoster in children among documented non-immunodeficient diseases compared to non-asthmatic children [1]. Herpes zoster can occur in children vaccinated against chickenpox because OKA is able to establish a latent state and reactivate [2]. In such cases, the shingles lesions most often affect the side of the body into which the vaccine was injected. This vaccine is not included in the Expanded Program for Childhood Immunization in Cameroon [20]. Sometimes no clear exposure factor is identified. This was the case, among others, of the clinical cases reported by Ndour et al, in 2024 in Senegal and Biswas et al, in Bangladesh in 2022 [21-28]. Asymptomatic infection in the mother during pregnancy could explain the occurrence of such cases [5] or any unnoticed exposure to the virus. There may also be genetic factors that predispose to shingles and racial factors with white, black, and asian children in decreasing order of susceptibility [1]. Laboratory confirmation is required for shingles when the characteristic rash is missing. Polymerase chain reaction is the technique of choice [1]. Tzanck cytodiagnosis, done by scraping the base of the lesion, may show giant cells, and may be an argument for confirming the diagnosis [3]. In view of the typical lesions of our case, no confirmatory evaluation was requested. Treatment of herpes zoster in children is based on local care and prevention of superinfections [1]. Itching can be managed with antihistamines. Acyclovir is the only oral antiviral drug that can be used to treat VZV infections in children [1, 2]. There is no consensus for antiviral treatment of herpes zoster in children, but it should be given intravenously to immunocompromised children [1]. Postherpetic neuralgias are exceptional, if present [1]. Recurrences are rare. The most common complications are local and benign: skin superinfections, depigmentation, and scarring. In our study, the treatment was local. There was a skin superinfection that required an antibiotic. The course was marked by slight depigmentation with no painful sequelae or recurrences after one year of follow-up .

CONCLUSION

Shingles remains a rare condition in infants, particularly immunocompetent and without a personal history of varicella. When lesions are typical, diagnosis is primarily clinical. Treatment is usually symptomatic and progresses well, with no major sequelae.

DECLARATIONS

Authors' contributions

All authors contributed to the design, analysis and interpretation of the data, the writing of the paper, or the critical review of its intellectual content. All authors have read and approved the final version of the manuscript.

Conflicts of interest

The authors declare no conflict of interest

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Ethical considerations

All stages of the work were carried out in compliance with the Declaration of Helsinki. Consent was obtained prior to publication.

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