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Herpes zoster in a 4-year-old child with pulmonary tuberculosis: a case report

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ABSTRACT

Herpes zoster (HZ) is a dermatomal virus infection caused by the reactivation of latent varicella zoster virus (VZV) in sensory ganglia neurons that is previously exposed to primary varicella infection. Herpes zoster is a rare disease experienced in children and is often associated with an immunocompromised condition. A case of a girl four years old with a vesicle on the right chest which spread to the upper armpit and right inguinal was reported. The lessions were obtained on Thoracoaxilla as high as T4 and Inguinal as high as L1 dextra. The patient was treated with acyclovir doses of 30 mg/Kg/day for seven days and showed significant improvements.

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INTRODUCTION

Shingles, or HZ, is an acute vesicular eruption with erythematous base accompanied by pain caused by reactivation of the latent varicella zoster virus (VZV) that attacks sensory ganglia neurons (Menaldi *et al.*, 2016; Paller & Anthony J. Mancini, 2021). The prevalence of children exposed to VVZ in utero and sub-clinical varicella is at risk of developing HZ after birth by 2%. Children who have immunocompromised states, primary intrauterine infections, and exposure to varicella in the first year of life have a greater risk of developing HZ. (Paller & Anthony J. Mancini, 2021; Pandaleke *et al.*, 2018; Peterson *et al.*, 2016). The HZ disease journey in children is milder with fewer systemic symptoms, less severe skin involvement, and faster recovery time than in adults (Mondal *et al.*, 2019).

The VZV will survive in the neurons of the ganglia making a latent infection that persists for life. If the host's immunity decreases, the virus will activate and multiply as well as spread inside the ganglion which will cause nerve necrosis and severe inflammation (Kang *et al.*, 2019). The clinical manifestations of HZ is started with the appearance of prodromal symptoms that last 1-10 days, namely abnormal sensations, local muscle pain, bone pain, soreness, parathesis along the dermatome, itching and burning from mild to severe although rarely prodromal symptoms appear in the case of children (Hoeger *et al.*, 2022; Kang *et al.*, 2019; Menaldi *et al.*, 2016; Paller & Anthony J. Mancini, 2021). Dermatological status can be found in clear vesicles in groups and sometimes found bullae which then breaks up into crusts.

The goal of HZ treatment is to eliminate pain as quickly as possible. Immunocompetent children can heal independently, so the treatment is only through symptomatic. [2,3] The purpose of this case report is to describe cases of HZ in 4-year-old child with pulmonary tuberculosis, from anamnesis to treatment given to the patient.

RESEARCH METHOD

This type of research is qualitative with a case study approach (Sugiyono, 2017, 2018, 2019). This case A 4-year-old 10-month-old girl came to the dermatovenereologist at Sumber Waras Hospital Jakarta. She reported the main complaint of reddish macule accompanied by scabs on the chest since three days before entering the hospital. Alloanamnesis with the patient's mother was found that there were complaints of reddish macule accompanied by vesicle on the right chest to the armpits and thigh folds since four days ago.

RESEARCH AND DISCUSSIONS

When she came to the hospital, the vesicle had already crack, and only a reddish macule left. Complaints are accompanied by heat and pain at the touch, intermittent itching and fever of about 37,8°C. Immunization was carried out according to the Public Health Center schedule until the age of 9 months. The patient has never been a varicella immunization. For the last three months, the patient often have intermittent fever accompanied by two lumps in the right neck. General examination was found that there was no fever, weight of 17 kg, height of 105 cm, but there was two lymph nodes in the colli dextra region, as big as marble, easy to move, well-defined, and not accompanied by any signs of inflammation. Dermatological status on Thorakoaxilla as high as T4 and Inguinal as high as L1 dextra in the form of erythematous papules, multiple, miliary accompanied by erosion and brown crusts, with herpetiformis configuration (Figure 1)

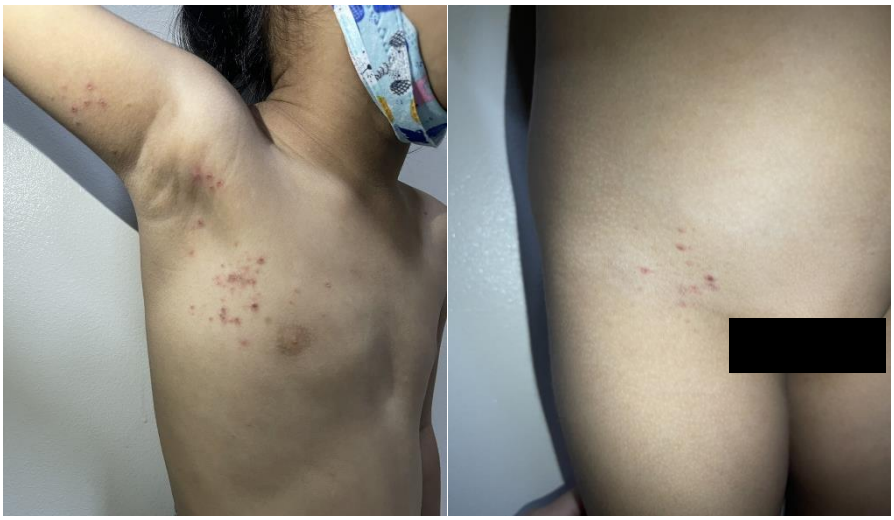

Figure 1. Lesions in the Thoracoaxilla Region as High as T4 and Inguinal as High as L1 Dextra

Supporting examinations were carried out in the form of thorax examination with Anteroposterior (AP), and complete blood laboratory. Laboratory results indicated that Erythrocyte Sedimentation Rate (ESR) increased by 70 mm/h, hemoglobin 10.3 g/dL. AP thorax photos show suspicion of tuberculosis (Figure 2). Skin lesions are treated with acyclovir 30 mg/KgBB/day for 7 days. This case administered 510 mg/day divided into 4 doses for 7 days.

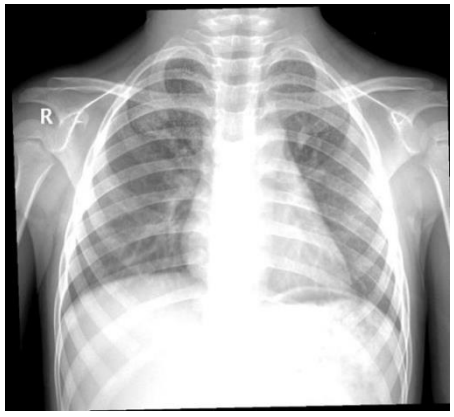

Figure 2. Photo of Thorax Anteroposterior with Tuberculosis Suspect

After acyclovir therapy, lesion repair was obtained in the form of post-inflammatory hyperpigmentation without any complaints. (Figure 3)

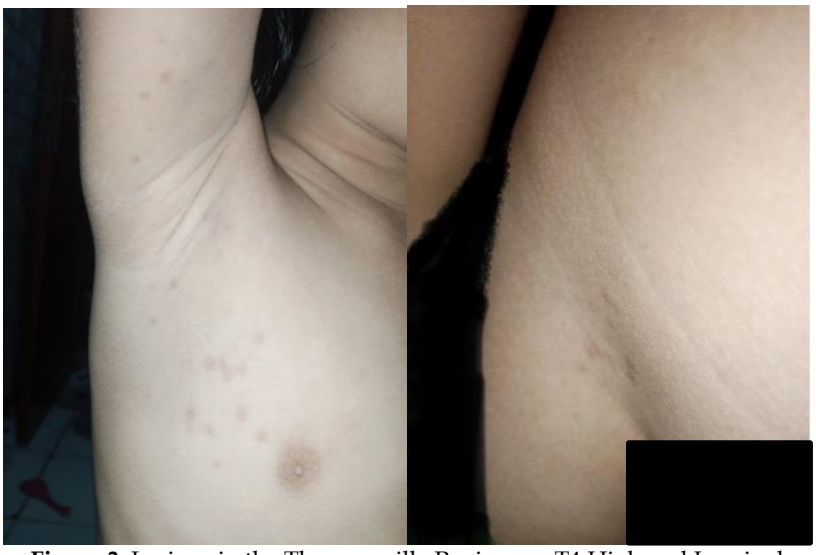

Figure 3. Lesions in the Thoracoaxilla Region are T4 High and Inguinal as High as L1 Dextra After Treatment

Discussion

Herpes zoster is an infectious disease caused by latent reactivation of VZV latent dormant in neuronal cells. Sometimes found in satellite cells of the dorsal radix ganglion and sensory ganglion of the cranial nerve and spreads to the nerve tissue and skin following the segments it innervates. The incidence of HZ case in children who have been vaccinated on varicella is 14 cases per 100.000 people per year, compared to 20 to 63 cases per 100.000 people per year after both natural and subclinical varicella infections (Leung *et al.,* 2006). This creates a typical picture of group vesicles. Herpes zoster in childhood is rare case. This case can occur in children with immunocompetence and immunodeficiency. Factors that could potentially lead to reactivation are previous VZV exposure (chickenpox, vaccination), immunosuppressive drugs, Human Immunodeficiency Virus (HIV), age over 50 years, bone marrow transplantation, malignancy, long-term steroid therapy, psychological stress, trauma, surgical procedures, and immunocompromised states (Pusponegoro *et al.,* 2014). The risk factor for the occurrence of HZ in this patient is that she newly suffered tuberculosis. This was according to the risk factors for HZ, including cellular immunity dysfunction.

Patients with immune suppression have a 20-100 times greater risk than immunocompetent patients (Jannah & Yulisna, 2020). This is also in line with Ayuningati's research who argued that diabetes mellitus, Systemic Lupus Erythematosus (SLE) disease, tuberculosis disease are predisposing factors to HZ (Ayuningati & Indramaya, 2015). In children risk factors increase especially in children who experience varicella in the first year of life (or in the womb) at higher risk of developing HZ. Intrauterine exposure to VZV and the occurrence of subclinical varicella (occurs in 2% of children) are at risk of developing HZ after birth. This is because the immune system is rudimentary, the number of lymphocytes, natural killler cells, cytokines, and virus-specific immunoglobullins are still low. Maternal antibodies to VZV are transferred through the placenta, levels of which drop when the baby is 6-9 months old and disappear around the age of 12 months, causing susceptibility to the disease (Mikhael San Putra W, 2021). Young children affected by VZV prodormal symptoms, such as fever, shiver, malaise, headache, anorexia, back pain, and in there can be rarely sore throat and cough in some patients. In unvaccinated people, the rash usually begins on the face and scalp then spreads to the torso and relatively little on the extremities that sometimes it could not be realized by the patient's mother (Kang *et al.,* 2019). The younger age during primary disease, the more likely it is to develop HZ in childhood or early adulthood (Mikhael San Putra W, 2021).

The study by Katakam, stated that of the 26 children diagnosed with HZ, more were experienced by females aged between 2-12 years. In children who were not vaccinated, there was a history of varicella infection in 46% of children and no history of infection at an early age. In these cases, the patient is a girls, have not been vaccinated and have never experienced varicella before (Katakam *et al.,* 2016).

After 48-72 hours of prodormal symptoms, a reddish maculae will form, then develop into papules, and clear vesicles in groups for 3-5 days. Subsequently, the contents of the vesicles become cloudy and eventually break into crusts (lasting 7-10 days). Skin eruptions have involution after 2-4 weeks. In most cases of HZ, skin eruptions heal spontaneously without sequelae. (Menaldi *et al.,* 2016). Skin eruptions are almost always unilateral and are usually confined to the areas innervated by a single sensory ganglion. Eruptions can occur throughout the body, most often in the area of the thoracic ganglion (Pusponegoro *et al.,* 2014). It is not uncommon to find multiple randomly dispersed vesicular lesions exceeding the primary dermatome involved. However, these scattered lesions are not HZ disseminates (Mikhael San Putra W, 2021). Children with immunocompromised can be involved in several dermatomes at once or in rare dermatoms. Disseminated lesions can also be found whose description is more like acute varicella and there is unclear dermatomal component.

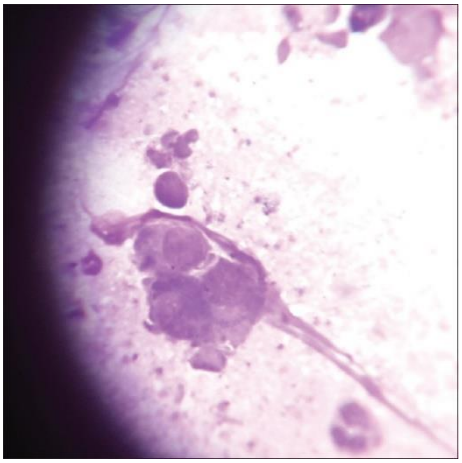

Figure 4. Tzank test shows Multinucleated Giant Cells (Giemsa, x100)

The diagnosis can be established from careful clinical diagnosis. Besides, it can be carried out in laboratory examination in the form of Tzank test where changes in the cytological of epithelial

cells were found, seen multinucleated giant cells (Figure 4) or identification of VZV nucleic acids/antigens with the Polymerase Chain Reaction (PCR) method (Katakam *et al.,* 2016). In this case, Tzank examination was not carried out because no new vesicles were found during the examination.

The most frequent complications in a child are secondary bacterial infections, depigmentation, and scarring (Leung *et al.,* 2006). Scarring is rare, unless it is caused by trauma by the patient e.g. scratching on the lesion area so that superinfection with bacteria occurs and healing can leave maculae hiperpigmentation that can last in a matter of weeks to months (Kang *et al.,* 2019). In the case of a child without complications, perfect recovery can occur gradually after one to three weeks (Mikhael San Putra W, 2021). In immunocompromised individuals, the disease is more severe and prolonged. Other rare complications include encephalitis, ventriculitis, sclerokeratitis, anterior uveitis, Ramsay Hunt syndrome, and motor nerve paresis (Leung *et al.,* 2006).

Management includes specific symptomatic and antiviral therapy. Antiviral therapy with oral acyclovir selection at a dose of <12 years 30 mg/kgBB/day for 7 days, children >12 years 60 mg/kgBB/day for 7 days, famcyclovir, and valaciclovir approved for the treatment of HZ in adults but not in children. Symptomatic administration can be given with paracetamol 10-15 mg/day or Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) for pain (Perdoski, 2017). Symptomatic treatments keep lesions clean by bathing regularly to prevent bacterial superinfection (Mikhael San Putra W, 2021). Vesicular stage can be given 2% with salicil powder to prevent vesicles from bursting or calamine whipped powder to reduce pain and itching. When the vesicles become crack and wet, it can be applied open compresses with antiseptic solutions and antiseptic/antibiotic creams. If a wound arises with a secondary sign of infection, an antibiotic cream/ointment can be given (Perdoski, 2017).

Based on alloanamnesis, physical examination, and laboratory test in this patient, the potential factors for the occurrence of HZ can be correlated with immunocompromised conditions, namely pulmonary tuberculosis disease. The HZ without any prior history of VZV can occur due to the presence of subclinical varicella that the mother may not be aware. Lesions in patient were found in two different dermatoms, namely Thoracoxilla regio as high as T4 and Inguinal as high as L1 dextra where in HZ with immunocompromised, the symptoms can attack several dermatomes at once in rare dermatoms. Antiviral therapy with the choice of acyclovir drugs 30 mg/KgBB/day for 7 days. In this case, 510 mg/day is given, divided into 4 doses for 7 days. Topical therapy is applied twice a day on the part of the lesion with an indication of a secondary infection, namely chloramphenicol cream to inhibit the growth of bacteria. The patient's healing process appears macular hyper pigmentation due to a secondary infection in the lesion. Education that must be given to this patient includes maintaining hygiene by take a bath twice a day and washing hands, not scratching lesions to prevent secondary infections by trimming nails, taking medication regularly, getting enough rest and eat well, no dietary restrictions, as well as wearing comfortable and loose clothes.

CONCLUSION

Herpes zoster is a disease that is quite rarely encountered in childhood. Shingles (herpes zoster) is a painful skin rash. It's caused by the virus that causes chickenpox. Risk factors increase in a child who has varicella in the first year of life (or in the womb). The appearance of HZ in a child does not necessarily mean an immunodeficiency or malignancy. However, it is very important to identify HZ with or without immunodeficiency in order to consider prognostics and give treatment. A case of HZ has been reported in a girl 4-year-old experienced pulmonary tuberculosis with lesions in the form of erythematous papules, multiple, miliary accompanied by erosion and brown crusts, with herpetiformis configuration on Thoracoaxilla as high as T4 and Inguinal as high as L1 dextra. Lesions was started with fever accompanied by pain when touching. The treatment is acyclovir 30 mg/KgBB/day for 7 days. In this case, 510 mg/day was given, divided into 4 doses for 7 days. There is a shingles vaccine for older adults, but not for children. This is because shingles is more severe in

older adults. But a child who has had the chickenpox vaccine may have milder symptoms of shingles. If child has not had chickenpox, talk with the healthcare provider about the chickenpox vaccine.

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