Varicella Pneumonia in an Elderly Patient

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Abstract

Varicella pneumonia is a common complication in adults, while it is a mild and self-limiting disease in children. Elderly patients may have severe manifestations compared to adults due to the weakening of their immune system in clearing the virus. Treatment with intravenous acyclovir and varicella-zoster immunoglobulin (VZIG) offers a good prognosis, while the use of steroids is still debated. Despite standard management, our case presents a fatality in an older woman with varicella pneumonia.

Keywords: *Varicella pneumonia, ARDS, septic shock, elderly, Indonesia*

Introduction

Varicella is a highly contagious disease with the airborne transmission. Adults have more chance to develop severe cases affecting multiorgan manifestations of which most common is liver and lung involvements[1]. Studies in England and Wales showed a death rate of 4-9 per 100.000 population, 80% more are adults[2,3]. Epidemiology study reported tropical countries to yield less immunity to varicella in adult general populations, with only 42-76% being immune[4]. With the elderly being susceptible to infection compared to healthy adults, more severe forms of complications might occur and potentially lethal[5]. It is imperative to encourage vaccination in the elderly who has not contracted varicella before as a preventive measure.

Case Report

A 65 years old female presented to us with a chief complaint of cough and shortness of breath. The patient also had a fever for three days, diffuse skin rash turning into fluid-filled vesicles for five days, nausea, and abdominal pain for one day before hospitalization. As an elderly, she was independent without known comorbid, and her grandchild was discharged two weeks prior due to varicella. The patient had no history of varicella infection nor vaccinated before.

Vital signs on her admission was as follow: BP 110/70, tachycardia 120 beats/min, tachypnea 32 times/mins, fever at 38.7°C, pulse oximetry at 89% under high concentration mask at 12 L/m, bilateral basal rhonchi on auscultation with diffuse papulovesicular rash on her skin. The arterial blood gas before intubation and mechanical ventilation was as follows: pH 7.42, PaO_2 74, $PaCO_2$ 43, HCO_3 27.9, BE 3.4, SO_2 95% and after pH 7.36, $PaCO_2$ 42, pO_2 108, HCO_3 24.2, BE -1.4 SO_2 98%. The laboratory showed hemoglobin 15 g/dL, leukocytosis 16160/µL, granulocyte 62.9%, lymphocyte 15.6%, thrombocyte 101000/µL, random blood glucose 98 mg/dL, albumin 3,28 g/dL, CRP 165 mg/L, AST 550 U/L, ALT 441 U/L, mildly increased direct bilirubin 1.27 mg/dL, SC 1.14 mg/dL, BUN 17 mg/dL and normal APTT 25.2 (23.5) and PPT 10.6 (10.9).

She was admitted to an isolation intensive care unit with an initial diagnosis of acute respiratory distress syndrome (ARDS) due to varicella pneumonia dd severe bacterial pneumonia with hepatic dysfunction due to varicella infection. Treatment of 800mg/8h intravenous acyclovir was started along with levofloxacin 750mg/24h and methylprednisolone 62.5mg/8h. Due to unavailability, VZIG was administered on the 2nd day of care. Tzanck smear showed multinucleated

giant cells. Abdominal ultrasound showed mild hepatic enlargement, the serologies viral hepatitis and HIV were negative.

Her chest X-ray showed worsening infiltrate. Leukocyte count was increased to 19.110/µL, granulocyte 80.5%, AST and ALT were lowered to 130 U/L and 104 U/L, direct bilirubin was normal 0.4 mg/dL, and lactate 1.9 mmol/L on the 3rd day. During the care we were able to reduce the FiO2 down to 0.6 from the initial 1.0 and the positive end-expiratory pressure (PEEP) at 12 down to 6 cmH_2O with SIMV mode to maintain oxygenation. Later on that day, she had a decline in her condition, and vasopressor was started. On the 4th day, she passed away due to septic shock. Sputum and blood culture came back negative both on the 1st and 3rd day.

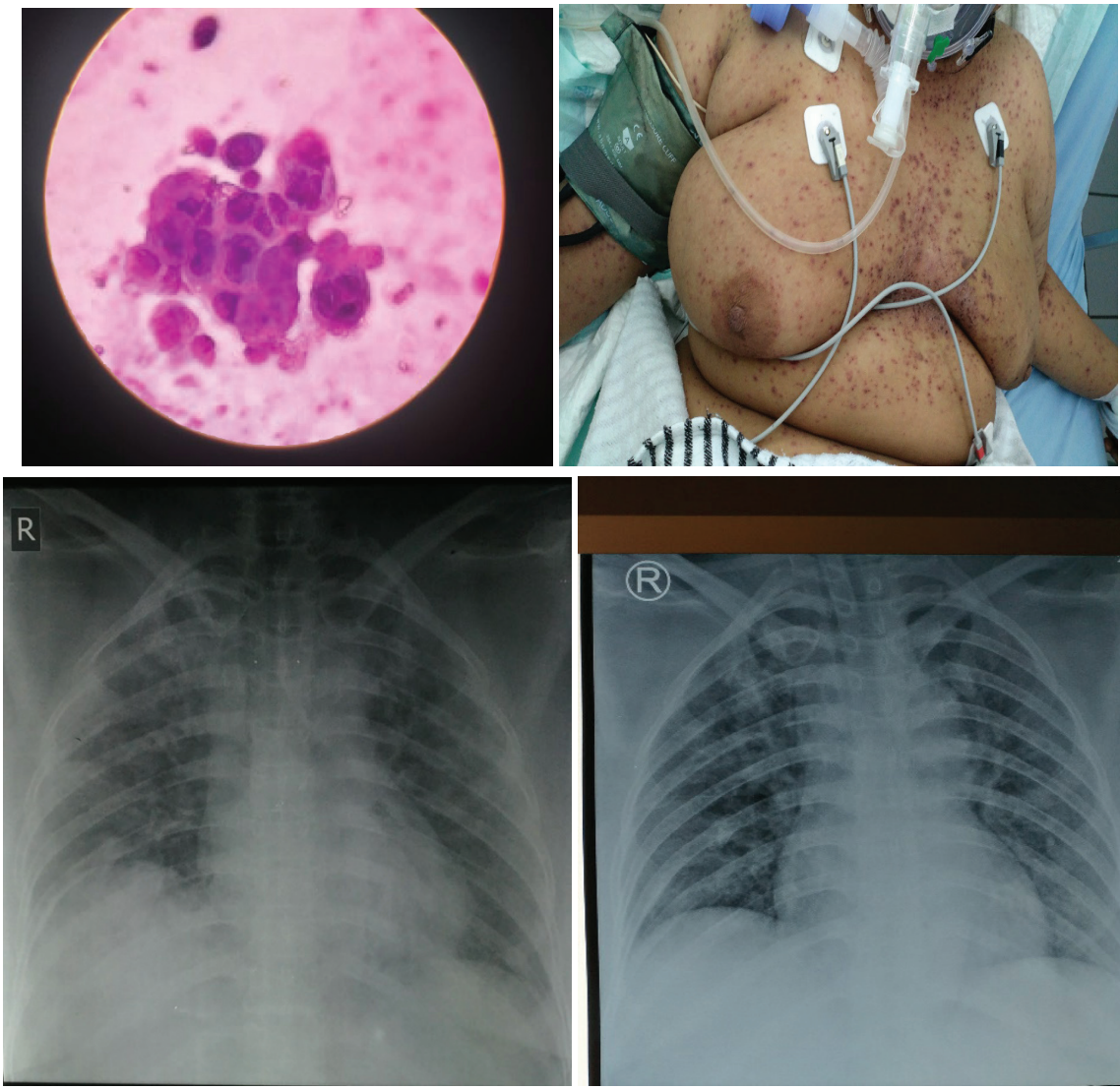

Figure 1. Tzanck test showing multinucleated giant cell

Figure 2. Skin appearance of the patient

Figure 3. Chest X-Ray on 1st day (left), Chest X-Ray on 3rd day (right)

Discussion

Varicella or chickenpox is an airborne disease caused by the VZV. Despite primary infection usually occurring in childhood, adult cases are often seen with more severe manifestations. Symptoms usually begin 10-21 days after exposure[6]. The diagnosis of varicella is usually made by generalized vesicular skin rashes manifestation along with a history of exposure. IgM anti-VZV can be used to confirm the infection, but it may be negative on early infections[7]. Tzanck smear is a quick, accurate, and useful addition in confirming varicella diagnosis. Microscopically, multinucleated giant cells with or without intranuclear inclusion bodies can be seen[8]. The onset of symptoms, in this case, was around 9-15 days. The diagnosis of varicella was obvious by the skin manifestation and history of contact supported by Tzanck tests done showing multiple nucleated giant cells.

A previous study mentioned common complications in varicella infection are raised ALT, thrombocytopenia, pneumonia, secondary skin infection, and meningitis[1]. Pulmonary symptoms, which are shortness of breath, cough, pleuritic chest pain, and hemoptysis, may appear 1-6 days after the onset of the rash[9,10]. Hepatic involvement in varicella showed symptoms of vague epigastric pain, nausea, vomiting, and a possible increase in liver volume[11]. An increase in liver function test panel is expected, a couple of studies reported AST raised higher than ALT along with the increase of INR and bilirubin[12,13]. Risk factors for complications in varicella are newborns, adults, immunocompromised, males, smokers, and pregnant women. While references are not mentioning the elderly as immunocompromised, immunosenescence in the elderly causes susceptibility to infection due to thymic involution, altered innate, and adaptive immunity, which would result in more severe infection[5]. In this case, we suspected the infection had caused the liver involvement, excluding the cause of ischemic hepatitis and viral hepatitis.

Radiologic chest X-ray features of varicella pneumonia are multiple bilateral nodules 5-10mm with unclear margin and can be overlapped but not always present. High-resolution CT-Scan might enhance the feature along with ground glass halo appearance, which diffusely spread on both lungs. Lymphadenopathy, reticular opacity, and pleural effusion can be found on occasion. On recovery progress, calcification can be found[14]. In this case, we found only infiltrate on both lungs.

Intravenous acyclovir 10mg/kg/8h for 7-10 days is the standard treatment of severe varicella and should be started immediately after diagnosis is made. After 48 hours of rash onset, there is no evidence of the benefit of acyclovir[15]. The role of corticosteroid is still debated and is thought to alter the uncontrolled immune host response to the virus by inhibiting T cells function and neutrophil adherence to epithelial cells[16]. Some studies showed clinical improvement, but some mentioned at risk of superinfections[16,17,18,19]. Reports showed that use of steroids prior varicella infection might cause fulminant hepatitis[12,13]. Nevertheless, the use of steroids remains a clinical decision[19]. Our decision to add another antibiotic and stop the steroid was based on clinical judgment regarding the occurrence of bacterial superinfection. The increase of leukocyte and granulocytosis might be attributable to the use of the steroid. We found a reduction level in our liver test functions on the 3rd day with the use of high dose steroid in our initial therapy.

The use of VZIG for severe varicella may be useful if administered 72 hours after exposure and indicated for immunocompromised patients, seronegative VZV antibody, and after significant exposure to individuals with varicella[16]. A study showed severe varicella mortality is attributed to ARDS, MODS, septic shock, and fulminant hepatitis. Multiple organs involvement increases mortality and morbidity[18]. In this case, acyclovir and VZIG administration were way past the guidelines recommendation and resulted in unfavorable outcomes in this patient. Adults in Indonesia are presumed to be immune to varicella because most have contracted it in childhood. Hence, society often forgets the importance of vaccination, especially in the elderly.

Conclusion

We reported a fatal case of an elderly patient with no comorbidities with several complications due to the infection. Immunosenescence in the elderly may be the cause of this severe infection due to the weakening of the immune system in eliminating the virus causing severe complications. Vaccination is encouraged in the elderly who has no prior history of primary varicella infection and has not been vaccinated before to avert severe manifestation of the disease.

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Ethical Clearance : No ethical clearance required for case report.

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