Reminder of important clinical lesson

Varicella pneumonitis in an immunocompetent patient

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Summary

Varicella zoster virus is known by many different names, including chickenpox virus, varicella virus, zoster virus and human herpes virus type 3, and it causes chickenpox. Primary chickenpox skin involvement is a benign and self-limiting condition. The incidence in the Western world is on the rise. Varicella pneumonitis is a potentially fatal complication. Immunocompromised patients develop aggressive lung disease, but immunocompetent can have serious pulmonary compromise. Timely ICU support, respiratory intervention and antiviral therapy play a key role in improving outcomes. Aciclovir is an established therapy for treating varicella-related illnesses and early commencement in patients with or at risk of complications can be beneficial. This case demonstrates, healthy individuals with chickenpox can develop varicella pneumonitis. Despite being immunocompetent, the patient had significant radiologic changes.

BACKGROUND

- ▶ Chickenpox is a common self-limiting illness, but varicella pneumonitis is the commonest complication of chickenpox.
- ▶ Varicella pneumonia can be fatal if it is not treated promptly.
- ▶ Healthy individual with normal immunity, developing pneumonitis and shortness of breath is a worrying clinical scenario.
- ▶ Early respiratory intervention and prompt aciclovir treatment are necessary to combat potential death and lung functions deterioration.
- ▶ There is no routine vaccination programme in the UK at present.

CASE PRESENTATION

A 21-year-old lady presented with right-sided pleuritic chest pain, cough and green sputum for 1 week. She vomited once and had had episodes of retching. She described lethargy, malaise and loss of appetite, and also noticed a papular rash on her face, extremities and trunk, 2 weeks prior to developing respiratory symptoms. This rash was initially itchy, and with the time, vesicles and pustules began to crust over and heal. A few fading vesicles in her mouth were noted. As a result, her oral intake started improving. She felt short of breath on climbing up the stairs, but no dyspnoea was reported while walking on the flat. No preceding illnesses were reported, and there were not any recent close contacts with individuals suffering with varicella-like illness. There was no history of travel abroad. She denied any risk factors which might indicate the possibility of immunocompromise. Her past medical history included a pulmonary embolism 18 months prior to this illness, for which she was treated with a 6-month course of anticoagulation and depression. No history of childhood chickenpox was reported. She was on regular fluoxetine. She was a current smoker of 10–15 cigarettes

per day with less than 5-pack years of overall consumption. She was a single mother with one child who was healthy. She was not pregnant.

Clinical examination

On examination, the patient was not pyrexial, and pulse oximetry revealed oxygen saturations of 95% on room air. There were multiple vesicular, papular and crusting lesions over the face, trunk and extremities (figures 1 and 2). A few vesicular lesions were noted on the mucosa of her mouth. Auscultation revealed wheeze throughout the chest. The remainder of the systemic clinical examination was normal.

INVESTIGATIONS

Serum haemoglobin levels was 13.5 g/dl, white cell count $5.1 \times 10^9/l$, neutrophils $2.56 \times 10^9/l$, lymphocytes $2.13 \times 10^9/l$, eosinophils $0.08 \times 10^9/l$, basophils $0.03 \times 10^9/l$ and monocytes $0.35 \times 10^9/l$. Platelet count $190 \times 10^9/l$. D-Dimer was 1.05 mg/l and C reactive protein (CRP) 22.6 mg/l. Liver function tests, serum amylase and electrolytes were normal. A chest radiograph showed miliary nodular opacities (figure 3). Oral aciclovir 200 mg five times a day was started, and infection control precautions were exercised to prevent spread given the ongoing respiratory symptoms. A sputum smear for acid fast bacilli (AFB) was negative. Later, the sputum cultures for AFB were found to be negative. Varicella zoster virus IgM and IgG were detected in the blood. Skin and sputum varicella zoster virus PCR were positive and herpes simplex 1 and 2 PCR was negative. Blood culture did not grow any organisms. A high-resolution CT (HRCT) scan of chest demonstrated multiple, diffuse, small nodular densities measuring 1–5 mm. Some of these densities were well defined and others less so. Some densities were calcified (figure 4). Neither lymphadenopathy nor pleural effusion was seen. Pulmonary function tests were not conducted given the infection risk.

Figure 1 Varicella rash on the back, ruptured and dry blisters with crusts and scabs.

TREATMENT

Seven-day course of aciclovir 200 mg five times a day.

OUTCOME AND FOLLOW-UP

After completion of a 7-day course of aciclovir, there was resolution of respiratory symptoms and CRP settled to normal. Six-week follow-up chest x-ray (figure 5) demonstrated further recovery, and transfer factor was 74%. Patient reported no further shortness of breath. Smoking cessation advice was given, and she was discharged from the respiratory clinic.

DISCUSSION

Varicella zoster virus is known by many different names, including chickenpox virus, varicella virus, zoster virus and human herpes virus type 3, and causes chickenpox. Rhaze (865–925), a Persian scientist, first described chickenpox,

and later Giovanni Filippo (1510–1580) of Palermo provided a more detailed account of the disease.¹ Primary chickenpox involving the skin is a benign and self-limiting condition. The incidence in the Western world is on the rise. There is no real scientific explanation for this upward trend.^{2 3} It spreads by droplet infection from the nasopharynx and the respiratory tract and is highly contagious with high secondary attack rates. It rapidly spreads among humans with close proximity like, members with this condition in the home environment. There is no strong evidence to suggest that the close contact with individuals suffering with varicella-related illness predisposes to varicella pneumonitis. However, isolation can be observed as a good clinical practice to combat the transmission of chickenpox to the healthy individuals and minimise the chance of further complications, like, pneumonitis.⁴ In countries where varicella zoster is included in their vaccination

Figure 2 Healing varicella rash on the face.

Figure 3 Chest x-ray at presentation – multiple miliary nodular shadows.

programmes, data are available to support the key role of varicella vaccination in reducing morbidity and preventing complications in all age groups.⁵ However, there is no routine vaccination in the UK at present.⁶

Varicella pneumonitis is the most common complication of the virus and can be fatal.⁷ It is more prevalent among adults. According to one analysis, the incidence of varicella pneumonitis is less than 1.5 per 100 000 per year.⁷ Pregnancy

and immune deficiency increase the risk of varicella pneumonitis. Also, a high number of skin lesions (>100), prior contact with varicella-related illnesses, prolonged duration of fever and pre-existing lung diseases can predispose to the varicella pneumonitis. Immunocompromised patients may develop aggressive lung disease and undergo a considerable deterioration of pulmonary function.⁸ Smoking increases the risk of pneumonitis and makes the illness

Figure 4 High-resolution CT scan showing well- and ill-defined, multiple, diffuse, nodular and some calcified densities.

Figure 5 Chest x-ray 6 weeks after admission showing improved lung fields.

more severe.⁹The diagnosis rests on the presence pulmonary infiltrates in the presence of varicella in the skin. Radiology examination may be omitted because of isolation procedures or unremarkable respiratory examination. Varicella pneumonitis in chest radiographs has been described more frequently and clearly in the literature.

However, the CT chest description is less well described. The calcifications on HRCT can be of variable intensity and do not reflect the severity of the pneumonitis. The calcification may persist for longer.^{10 11}

There are reports of acute severe respiratory compromise with this condition, but the provision of timely ICU

support, prompt respiratory specialist service and early antiviral therapy all play a key role in improving outcomes.^{12 13} In the long term, monitoring of transfer factor is thought to be the best method to ascertain the degree of lung injury.¹⁴ Aciclovir is an established therapy for treating varicella-related illnesses. There are no randomised control trials to quantify its exact level of benefit in varicella pneumonitis. However, there are trials which have demonstrated the need of a timely commencement of aciclovir to avoid the further complications of the varicella infection.^{8 15}

Our case of varicella pneumonitis presented with respiratory symptoms 2 weeks after the emergence of chickenpox. Despite being immunocompetent, the patient had significant radiologic changes.¹⁰ Eventual outcome was favourable in this case, but it demonstrates that otherwise healthy individuals with chickenpox can develop varicella pneumonitis.

Learning points

- ▶ Varicella pneumonitis is a recognised complication of chickenpox.
- ▶ It can occur in healthy and immunocompetent patients.
- ▶ Index of suspicion should be high in patients with persisting symptoms.
- ▶ Prompt antiviral treatment is necessary to avoid further complications and preserving normal lung functions.

Competing interests None.

Patient consent Obtained.

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