CASE REPORT

Unusual case of hemidiaphragmatic paralysis secondary to cervical herpes zoster

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SUMMARY

Hemidiaphragmatic paralysis is usually caused by surgery, malignancy or trauma and rarely by viral infections. Herpes zoster (shingles) results in varied neurological complications, but peripheral motor involvement or diaphragmatic paralysis is rare. We report the case of an 87-year-old male who presented with worsening breathlessness soon after an episode of shingles, affecting his right neck and upper chest. He had no alarm symptoms, history of trauma or malignancy. Skin lesions resolved after a few weeks, but his breathing did not improve. Chest X-ray revealed a new finding of elevated right hemidiaphragm; diaphragmatic ultrasound confirmed paradoxical cranial movement of right hemidiaphragm on sniff testing. CT scan showed no lung mass and complete collapse of right lower lobe due to elevated right hemidiaphragm. Patient has required no treatment and is under regular follow-up with the ventilation clinic.

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INVESTIGATIONS

Chest X-ray (CXR) showed elevated right hemidiaphragm, which was normal on previous chest imaging, performed 2 months before developing shingles (figure 1). Diaphragmatic ultrasound confirmed paradoxical cranial movement of right hemidiaphragm on sniff testing. CT scan showed no lung mass and complete collapse of right lower lobe due to elevated hemidiaphragm (figure 1).

Pulmonary function testing showed a restrictive deficit with normal gas transfer, reduced maximal inspiratory pressure and sniff nasal inspiratory pressure (−45 cm H₂O). Electromyography (EMG) and nerve conduction study (NCS) showed changes consistent with inflammation of upper cervical nerve roots and mild degree of brachial neuritis affecting the upper trunk of brachial plexus.

BACKGROUND

Motor complications following herpes zoster (shingles) are very rare, accounting for only 5% of cases. Diaphragmatic paralysis (DP) after herpes is even rarer. To the best of our knowledge, about 30 cases have been reported in the literature. Mostly, unilateral DP is an incidental finding on chest radiograph, and most patients are asymptomatic. The purpose of this case report is to increase awareness among clinicians to recognise the motor complications of herpes that can result in respiratory compromise in patients with no previous lung pathology.

CASE PRESENTATION

We report the case of an 87-year-old male, retired dentist, who was referred to respiratory clinic with worsening breathlessness on exertion over a period of few months. He was an ex-smoker (10 pack year history) and had no history of occupational exposure. His medical history included moderate chronic obstructive pulmonary disease (COPD), temporal arteritis and provoked deep vein thrombosis. He had no previous history of trauma or malignancy.

He first noticed breathing difficulty 2 weeks after an episode of shingles, affecting right neck and upper chest. He had no alarm symptoms of note. He was treated with acyclovir, started a week after the onset of symptoms. The skin

OUTCOME AND FOLLOW-UP

In this patient, new onset hemidiaphragm paralysis shortly after an episode of ipsilateral cervical herpes with no other obvious cause including malignancy, trauma or neuromuscular condition led us to the diagnosis.

Patient has required no treatment and is under regular follow-up with the ventilation clinic.

DISCUSSION

Herpes zoster, commonly known as shingles, is caused by varicella zoster virus (VZV). It presents as a painful vesicular rash following a dermatomal distribution. It manifests years after remaining dormant in dorsal root ganglia and other sensory ganglia. The virus reactivates due to suppression of host's immune system. Patients at risk are those with malignancy, on chemotherapy, elderly and patients with history of rheumatoid arthritis, inflammatory bowel disease, COPD, asthma and depression.¹

VZV can affect any part of the central nervous system, but it has a predilection for the sensory system. Other complications include meningoencephalitis, myelitis, cerebellitis and cranial nerve palsies. It can also rarely affect peripheral motor system resulting in limb weakness, bowel or bladder dysfunction and DP.² It is postulated that motor system is affected either due to direct invasion of anterior horn cells by the virus or diffusion of virus from dorsal route ganglia.³

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Figure 1 Chest X-ray before and after shingles, CT scan before and after shingles and diaphragmatic ultrasound.

DP after VZV infection is a rare entity; very few cases have been reported worldwide. Increasing age and immunosuppression are the most important risk factors for developing DP. It has been reported in patients with HIV, after chemotherapy for lung cancer and renal transplant patients on immunosuppressive treatment.^{4–6}

Patients with hemidiaphragmatic paralysis may remain asymptomatic; some develop exertional dyspnoea or reduction in exercise tolerance especially if there is underlying lung pathology.

Other causes of unilateral DP include malignancy, cervical trauma, cervical spondylosis, phrenic nerve injury during cardiothoracic surgery, viral infections, myopathy including motor neuron disease, neuralgic amyotrophy and spinal degenerative diseases.⁷ These conditions should always be excluded as part of work up.

CXR, thoracic CT with or without bronchoscopy and full pulmonary function tests with muscle/ventilation profile should be routinely performed as part of diagnostic work up in patients with DP. Diaphragmatic ultrasound with sniff testing is the gold standard to diagnose unilateral DP. MRI cervical spine is usually reserved for patients with history of cervical trauma or spondylosis. EMG and NCS are requested if there is any suspicion of neuromuscular disorder.

Management of DP is usually supportive and mainly guided by the patient's symptoms. Some patients may need transient non-invasive ventilation during period of acute illness. Surgical plication of diaphragm has shown good results in a cohort of patients with improvement in tidal volume, vital capacity and oxygenation.⁸

Prognosis of unilateral DP is variable. Regular follow-up is needed as most of these patients recover without needing ventilatory support or surgical correction.

Learning points

- ▶ Postherpetic diaphragmatic paralysis is rare but may be an underdiagnosed condition.
- ▶ Patient with unilateral diaphragmatic paralysis can be symptomatic especially with coexisting lung pathology. Management should be aimed at managing the underlying lung condition.
- ▶ Regular follow-up is needed as most of these patients recover without needing ventilatory support or surgical correction.
- ▶ Malignancy should always be excluded in the diagnostic workup of DP.

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