CASE REPORT

Fatal measles presenting as acute respiratory distress syndrome in an immunocompetent adult

Suman S Karanth,¹ Krishna Chaitanya Marupudi,¹ Anurag Gupta,²
Nileshwar Radhakrishna Rau¹

¹Department of Internal Medicine, Kasturba Medical College, Manipal, Karnataka, India

²Department of Neurosurgery, Fortis Memorial Hospital, Gurgaon, Gurgaon, Haryana, India

Correspondence to

Dr Suman S Karanth,
drsumansk@gmail.com

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SUMMARY

Fatal measles is known to occur among immunocompromised adults. We report a rare case of an immunocompetent non-pregnant young lady who suffered from fatal acute respiratory distress syndrome due to measles. Physicians must be vigilant to this deadly presentation of measles even in immunocompetent individuals. We emphasise the inadequacies of vaccination programmes in India reflected not only by the existing high measles-related childhood mortalities, but also an emerging rise in deaths among adults.

BACKGROUND

Measles is a highly contagious disease continuing to retain its position as one of the leading causes of death among young children worldwide, despite the availability of effective vaccines for the past 40 years.¹ India alone contributes to one-third of measles deaths in the world.² While a lot of literature exists on childhood measles, there remains a paucity of data regarding the prevalence of adult measles, particularly severe measles. Deaths due to pneumonia and acute respiratory distress syndrome (ARDS) have been reported in the immunosuppressed.³ However, fatalities among immunocompetent adults are extremely rare with only a handful of reported cases in the literature.

CASE PRESENTATION

We present a case of a 24-year-old parous Indian woman who presented to our emergency department with a 10-day history of high grade fever with chills. Five days later, she developed dry cough, coryza and diarrhoea. This was followed by the appearance of maculopapular rashes over the face, trunk and upper and lower limbs. She denied a history of headache, nausea, vomiting or bleeding tendencies. She was immunocompetent with no history of substance abuse. Vaccination details were not available. She received empirical intravenous antibiotics, ceftriaxone and doxycycline for 5 days at another hospital. The patient was referred to us with progressive breathlessness.

On admission (day 1), she was tachypnoeic and hypoxic with oxygen saturation improving from 78% at room air to 90% after providing oxygen via oxygen venturi mask. She was conscious, with a pulse rate of 116/min, blood pressure of 90/60 mm Hg and body mass index of 20 kg/m². Erythematous morbilliform rash was visible all over her face, trunk and upper and lower limbs. Koplik's spots were not visible. Few 0.5×0.5 cm,

round, tender, mobile upper deep cervical lymphadenopathy was palpable bilaterally. There were fine crepitations at bilateral lower lung bases. There were no signs of cardiac failure, meningitis or focal neurological deficits. Fundus examination was normal.

INVESTIGATIONS

The patient's baseline investigations were normal with a total white cell count of 7100 cells/mm³ (neutrophils 91.3%, lymphocytes 5%) and a platelet count of 126 000 cells/mm³. Liver, renal and coagulation parameters were within normal limits. Repeated blood cultures were sterile. Tests for malaria, enteric fever, scrub typhus, leptospirosis and HIV were negative. Her urine pregnancy test was negative. Ultrasonography of the abdomen was normal. Chest radiography showed bilateral diffuse interstitial infiltrates suggestive of ARDS. The ratio of alveolar partial pressure of oxygen (PaO₂) to the fraction of inspired oxygen (FIO₂) was 145.8, confirming the diagnosis of ARDS.⁴ At this juncture, we suspected either measles or H1N1 fever to be the diagnosis.

DIFFERENTIAL DIAGNOSIS

- Measles with ARDS
- Influenza A H1N1 fever

TREATMENT

Pending test results for measles and influenza A H1N1, we initiated therapy with oseltamivir for influenza A H1N1, intravenous antibiotic therapy with piperacillin-tazobactam and azithromycin to combat secondary bacterial infection, supportive therapy with inotropes (norepinephrine and dopamine) and non-invasive ventilation. On day 3, the patient was intubated in view of worsening oxygenation. She received two 75 mg tablets of oseltamivir, which was then stopped due to a negative influenza A H1N1 report using the haemagglutination inhibition test. Serum IgM using enzyme immunoassay and a throat swab for real-time-PCR detection of measles were positive.

OUTCOME AND FOLLOW-UP

At this stage, the patient progressed to multiorgan dysfunction with anuria, renal failure, acidosis and frank disseminated intravascular coagulation. We refrained from using intravenous ribavirin as its clinical efficacy in measles remains debatable. Continuous renal replacement therapy and intravenous meropenem were started in a final attempt

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to save the patient. She succumbed to complications and died on day 4.

DISCUSSION

Measles is an RNA virus belonging to the paramyxoviridae family that spreads from person to person via contact with respiratory secretions. It is highly contagious with a secondary attack rate of approximately 90% in susceptible contacts. Typical measles presents as fever, cough, coryza and conjunctivitis after an incubation period of 8–12 days. The onset of the classical measles comprising of maculopapular erythematous eruptions, begins 2–4 days though the prodrome accompanied by intensification of fever. They involve the head and face at first, later on spreading over the entire body, persisting for 4–5 days, before fading by fine desquamation in the order of appearance. The greatest infectivity is 3 days prior to and 4 days after the onset of rash.⁵

Complications are well known to occur depending on the presence of predisposing factors, as measles has a predilection to affect multiple organs. The measles virus leads to a decline of CD4 counts, immunosuppression and disruption of the epithelium. Pneumonias are the most common serious complication in measles infection. The causative agent can be the virus alone or superimposed secondary bacterial infection. Implicated bacteria are *Staphylococcus aureus*, *S. pneumonia*, *Haemophilus influenza* and rarely *Pseudomonas* and *Klebsiella* species.⁶ There are, however, only a few reported cases of severe measles pneumonia. Near fatal pneumonias in immunocompetent adults have been reported by Uzun *et al*⁷ and Rupp *et al*.⁸

Although deaths have been reported in the immunocompromised,³ fatal measles pneumonia occurring in an immunocompetent adult has rarely been reported in the literature. Chapnick *et al*⁹ described one such case in a 32-year-old patient suffering from bipolar disease, which was diagnosed by autopsy. A case of fatal intractable ARDS without the typical measles rash in a 29-year-old immunocompetent female patient has been reported by Lupo *et al*.¹⁰ In our patient, we instituted supportive therapy as opposed to specific therapy for measles. Ribavirin has been instituted in a few cases,^{7 10} as have vitamin A and corticosteroids,⁸ but their role remains debateable and, in our patient, was probably too late to be instituted due to her rapid deterioration.

With the resurgence of cases of measles in the world, especially in a developing country like India, where the deaths due to measles have reduced by only 26% as compared with 78% in the rest of Southeast Asia, it still remains a herculean task to curb mortality.¹¹ A second dose strategy of measles vaccine was initiated WHO, given between 15 and 18 months. The initial dose of measles vaccine achieves a protective immunity of 85% if vaccinated at 9 months of age and of 90–95% at 12 months of age. The second dose of vaccine compensates for primary vaccine failure and immunisation of children who missed their first dose.¹²

This case report underscores the awareness of fatal measles in adults to facilitate prompt diagnosis. It also unveils the

inadequacy in the immunisation programmes in India. To the best of our knowledge, this is the first case of fatal ARDS due to measles in an immunocompetent adult in India.

Learning points

- ▶ Measles is a highly contagious disease known to cause fatal pneumonias in immunocompromised patients.
- ▶ Fatal ARDS can occur due to measles in an immunocompetent individual. A high degree of suspicion on the part of the physician is essential to speedy diagnosis.
- ▶ The role of Ribavirin as a definitive treatment for measles needs to be defined.
- ▶ Efforts must be made to facilitate better immunisation programmes to target measles during childhood especially in developing countries like India.

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Competing interests None.

Patient consent Obtained.

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REFERENCES

- 1 World Health Organization. Global burden of disease: disease and injury country estimates. 2008. Available at: http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/index.html
- 2 Simons E, Ferrari M, Fricks J, *et al*. Assessment of the 2010 global measles mortality reduction goal: results from a model of surveillance data. *Lancet* 2012;379:2173–8.
- 3 Okamura A, Itakura O, Yoshioka M, *et al*. Unusual presentation of measles giant cell pneumonia in a patient with acquired immunodeficiency syndrome. *Clin Infect Dis* 2001;32:E57–8.
- 4 Bernard GR, Artigas A, Brigham KL. The American-European Consensus Conference on ARDS. Definitions, mechanisms, relevant outcomes, and clinical trial coordination. *Am J Respir Crit Care Med* 1994;149(3 Pt 1):818–24.
- 5 Robbins FC. Measles: clinical features. *Am J Dis Child* 1962;103:266–73.
- 6 Hussey GD, Clements CJ. Clinical problems in measles case management. *Ann Trop Paediatr* 1996;16:307–17.
- 7 Uzun O, Şalk M, Findik S, *et al*. Severe measles pneumonia in an immunocompetent adult. *Turk Respir J* 2002;3:32–4.
- 8 Rupp ME, Schwartz ML, Bechard DE. Measles pneumonia: treatment of a near-fatal case with corticosteroids and vitamin A. *Chest* 1993;103:1625–6.
- 9 Chapnick EK, Gradon JD, Kim Y, *et al*. Fatal measles pneumonia in an immunocompetent patient—case report (letter). *Clin Infect Dis* 1992;15:377–9.
- 10 Lupo J, Bernard S, Wintemberger C, *et al*. Fatal measles without rash in immunocompetent adult, France. *Emerg Infect Dis* 2012;18:521–3.
- 11 Centers for Disease Control and Prevention (CDC). Global control and regional elimination of measles, 2000–2011. *Morb Mortal Wkly Rep* 2013;62:27–31.
- 12 World Health Organization. WHO position on measles vaccines. *Vaccine* 2009;27:7219–21.

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