International Journal of Contemporary Pediatrics
Kaja R et al. Int J Contemp Pediatr. 2026 Apr;13(4):660-662
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: https://dx.doi.org/10.18203/2349-3291.ijcp20260830

Case Report

Laboratory-confirmed measles in a 5-month-old infant: a case report highlighting early susceptibility and public health implications

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Received: 21 February 2026
Revised: 18 March 2026
Accepted: 19 March 2026

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ABSTRACT

Measles disease is caused by the measles virus, a negative-sense, single-stranded, lipid-enveloped RNA virus of family Paramyxoviridae and genus morbillivirus. Measles in infants under the age of eligibility for Measles containing vaccination (MCV) remains a public health concern in India. We report a laboratory confirmed case of measles in a 5-month-old infant who presented with fever, cough and coryza. Clinical findings, laboratory investigations, and hospital courses were documented. Diagnosis was confirmed by detection of measles-specific immunoglobulin M (IgM) antibodies. This case highlights the vulnerability of infants below 6 months of age to measles despite presumed maternal immunity and the need for strengthened measles control strategies, high community vaccination coverage, and consideration of early preventive measures during outbreaks to protect young infants.

Keywords: Measles, Infant, Maternal immunity, Vitamin A, Vaccine-preventable disease, Public health

INTRODUCTION

Measles is an acute, highly infectious viral disease which enters the body via the respiratory system or the conjunctiva after exposure to either large droplets or small aerosolized droplets.[1] Even though there is a safe and effective vaccine available, measles remains a major public health issue in several low- and middle-income countries, including India.[2]

Infants younger than 9 months old are typically considered protected against measles due to the maternal immunoglobulin G (IgG) antibodies acquired through the placenta during the intrauterine period. However, recent researches have indicated early waning of maternal antibodies, especially in infants born to mothers who have been vaccinated against measles. This opens a crucial period of vulnerability in early infancy, resulting in increased risk for measles before the initial scheduled administration of the measles-containing vaccine (MCV).[3-5]

CASE REPORT

A 5-month-old female infant presented to our pediatric outpatient department with complaints of fever for one day and upper respiratory symptoms in the form of rhinorrhea and sneezing for one day. The fever was low-grade, intermittent, subsided with antipyretics, and the infant remained active during interfebrile periods. There was no history of vomiting or diarrhoea. The infant had been admitted to our institute two weeks earlier for cystitis and had recovered completely. The infant was born at term by lower-segment cesarean section due to maternal ventricular bigeminy, with a birth weight of 2.64 kg. The antenatal and perinatal periods were uneventful. She was exclusively breastfed and immunized as per age up to 10 weeks. She had not yet

received a measles-containing vaccine, in accordance with the National Immunization Schedule.

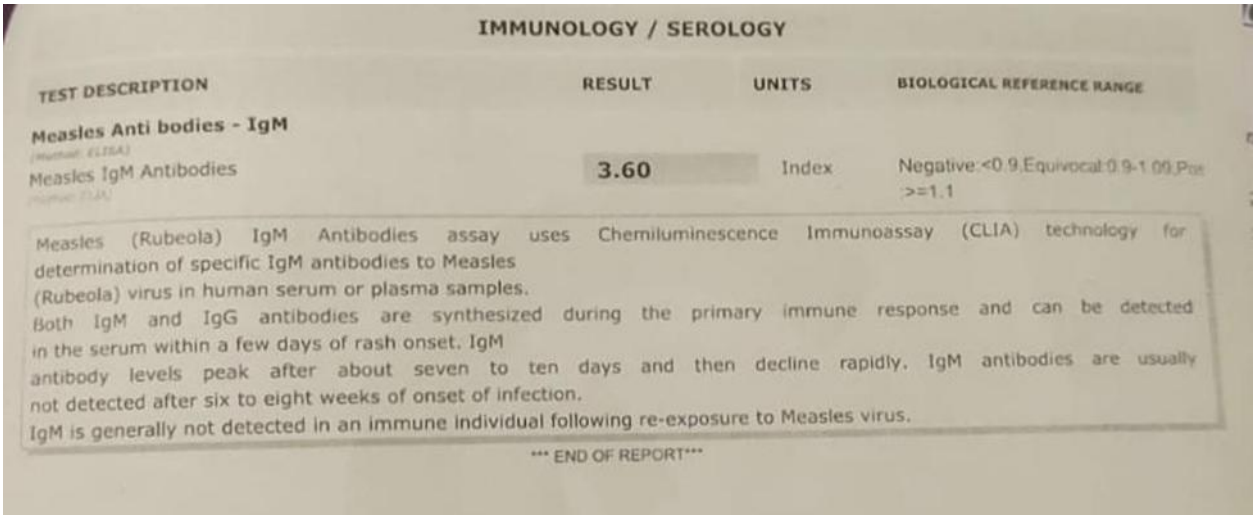
Figure 1: Erythematous maculopapular rash over face.

The mother's measles vaccination status is uncertain. Mother reports multiple reported cases of measles in her locality although no certain contact history can be elicited. On examination, the infant was febrile (38°C), with a heart rate of 140/min and respiratory rate of 38/min. Anthropometric measurements were appropriate for age. The infant was irritable but hemodynamically stable. General physical and systemic examinations were unremarkable. Over the next few days, the infant continued to have low-grade fever with worsening coryza and watery discharge from both eyes.

She was managed symptomatically. On day 5 of illness, she developed a generalized erythematous maculopapular rash, initially appearing on the face and retroauricular region and subsequently spreading to the trunk and limbs. There was no lymphadenopathy or hepatosplenomegaly.

Investigations

Initial laboratory investigations revealed mild anemia with a hemoglobin level of 9.1 g/dL and a total leukocyte count of 9,700/mm³. C-reactive protein was elevated at 9.67 mg/dL. Serum electrolytes and complete urine examination were normal.



IMMUNOLOGY / SEROLOGY

TEST DESCRIPTION	RESULT	UNITS	BIOLOGICAL REFERENCE RANGE
Measles Anti bodies - IgM			
Measles IgM Antibodies	3.60	Index	Negative :<0.9,Equivocal:0.9-1.09,Pos :>=1.1

Measles (Rubeola) IgM Antibodies assay uses Chemiluminescence Immunoassay (CLIA) technology for determination of specific IgM antibodies to Measles (Rubeola) virus in human serum or plasma samples.
Both IgM and IgG antibodies are synthesized during the primary immune response and can be detected in the serum within a few days of rash onset. IgM antibody levels peak after about seven to ten days and then decline rapidly. IgM antibodies are usually not detected after six to eight weeks of onset of infection.
IgM is generally not detected in an immune individual following re-exposure to Measles virus.

*** END OF REPORT***

Figure 2: Laboratory investigation showing positive IgM measles antibodies report.

Repeat investigations on day 4 of illness showed hemoglobin of 9 g/dl and a total leukocyte count of 6,400/mm³. Chest radiograph revealed no evidence of pneumonia. Serum measles IgM antibody testing performed on day 5 of illness was positive, confirming the diagnosis of measles.

Management and outcome

The infant was admitted for observation and supportive management. Treatment included antipyretics, adequate hydration, and nutritional support. Vitamin A supplementation was administered as per World Health Organization (WHO) recommendations for infants below 6 months of age (50,000 IU orally once daily for two consecutive days).[6,7] Broad-spectrum antibiotics were initiated empirically considering the elevated inflammatory markers and young age. The fever subsided by the fifth day of illness, and the rash gradually resolved with mild desquamation. No complications such as pneumonia, diarrhea, otitis media, or encephalitis were observed. The infant was discharged after five days in stable condition and remained asymptomatic on follow-up after two weeks.

DISCUSSION

Protection against measles in early infancy is primarily dependent on maternally derived IgG antibodies transferred transplacentally during the third trimester.3 When present above protective thresholds, these antibodies offer temporary immunity. Hence, measles in infants younger than six months has traditionally been considered uncommon. However, recent evidence portrays a significant decline in maternal antibody levels among young infants, particularly those born to mothers with vaccine-induced immunity.[3,4] A prospective cohort

study from Chandigarh, India, demonstrated early waning of maternally transmitted anti-measles antibodies, resulting in susceptibility before the first scheduled vaccine dose.[3] A systematic review and meta-analysis further reported that nearly 70% of infants in low- and middle-income countries are seronegative by four months of age.[5] This creates a window of susceptibility between early infancy and the first measles containing vaccine dose administered at nine months in India.[8] Our case exemplifies this vulnerability and underscores the importance of maintaining high population immunity to protect infants who are not yet eligible for vaccination.

Clinical manifestations of measles in young infants may be atypical or milder due to partial protection from residual maternal antibodies, often leading to delayed or missed diagnosis.[9] Nevertheless, the presence of coryza, conjunctivitis, and the characteristic cephalocaudal progression of rash remain valuable diagnostic clues. Laboratory confirmation using measles-specific IgM antibodies is recommended, particularly in settings aiming for measles elimination.

Vitamin A supplementation has been shown to significantly reduce measles-associated morbidity and mortality and is recommended for all children diagnosed with measles, including infants.[6,7] Our patient responded well to supportive management and vitamin A supplementation, with no complications.

CONCLUSION

Measles should be considered in the differential diagnosis of febrile rash illnesses even in infants younger than six months, particularly in endemic regions. Early recognition, laboratory confirmation, and appropriate supportive management including vitamin A supplementation can lead to favorable outcomes. This case highlights the vulnerability of young infants to measles and reinforces the importance of sustained high vaccination coverage and herd immunity.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Informed written consent was obtained from the parents for publication of this case report

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Cite this article as: Kaja R, Hussain AM, Muthu AR, Surendranath M. Laboratory-confirmed measles in a 5-month-old infant: a case report highlighting early susceptibility and public health implications. Int J Contemp Pediatr 2026;13:660-2.