

Serial Case of MR Immunization Not Carried Out Related to Incidence of Measles Complicating as Pneumonia in Ende East Nusa Tenggara: Awareness of Re-emerging Disease After Covid-19 Pandemics

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Abstract:

BACKGROUND: Indonesia is one of the nations which reported measles outbreaks by the CDC in October 2023. During COVID-19 pandemics in Indonesia reported low MR immunization coverage about 67.32%-68.67%. Several provinces in Indonesia including East Nusa Tenggara has been reported measles outbreak in 2022. This serial case aimed to report two cases of measles complicating as pneumonia in Ende General Hospital during less than two weeks. These cases related to MR immunization not carried out in both of the patient.

CASE: We reported two cases of measles complicating as pneumonia hospitalized during less than two weeks. Both of the them suffered from high grade fever, typical morbiliform maculopapular rash has risen from posterior side of the auricula to body trunk and the rest of the body, purulent eye discharge, cough, and coryza. The MR immunization did not carried out in both of the patients. The similar finding on physical examination showed body high grade fever, typical maculopapular rash, chest wall retractions, and ronchi were heard during auscultation. The laboratory result revealed leucopenia and lymphocytosis, and chest radiography revealed bilateral patchy infiltrate that characterized as pneumonia. Both of patients hospitalized in isolation room, intravenous fluid, parenteral ampicillin and gentamycin, and vitamin A were given.

CONCLUSION: Certain provinces in Indonesia announced measles outbreak in 2022. This deserves strategic plan to overcome. Promoting immunization, expanding basic and advanced immunization coverage and catching up with the target in certain areas are all essential for avoiding measles re-outbreaks.

Keywords: Measles, Pneumonia, MR Immunization, Incomplete Immunization

1. Background

Measles is a highly contagious disease caused by Paramyxovirus, Morbilivirus genus. Measles is characterized by fever, rash, conjunctivitis, coryza, and cough, as well as the presence of Koplik's spots¹⁻³ The rash usually lasts for four to seven days and leaves temporary brown desquamation, although some immunocompromised patients may not develop a rash at all.¹⁻³ The lesion diminishes in the same time range that it appeared.^{1,2} Four days prior to and four

days following the onset of the rash, patients are in an infectious state and may transmit the disease through large droplets and airborne transmission.^{1,2} Measles may cause a decline in the function of cellular immunity, which may predispose patients to complications such as pneumonia, otitis media, laryngotracheobronchitis (croup), diarrhoea, and stomatitis.¹⁻³ Additionally, poor intake brought on by stomatitis, diarrhoea, or both might result in dehydration.⁴ These complications are most found among children younger than 5 years of age and adults 20 years of age and older.⁵

Indonesia was ranked eighth among the top 10 nations with global measles outbreaks by the CDC in October 2023, with 5.175 cases reported to WHO as of the first few days of June 2023.⁶ Between January to April 2023, there were 2.161 suspected measles cases were recorded from 18 provinces in Indonesia.⁷ There was also 32 times increase to 3341 measles confirmed cases between 2021 to 2022 in Indonesia.⁸

Measles is one of the preventable disease can be avoided through immunization. However during the COVID-19 pandemic, there was a significant decline in immunization coverage. In Indonesia the coverage of MR immunization during COVID-19 pandemic was about 67.32%-68.67%. According to Ende's Health Profile 2022, there has also a notable decline in immunization coverage in Ende, East Nusa Tenggara, from 106.2% in 2019 to 48.2% in 2021, and gradually back to 95% in 2022 when the pandemic began to resolve.¹⁰

After the last measles case reported in Ende in 2019, several measles cases began to appear in Ende, which was the cases we present.¹⁰ This shows that despite the presence of preventive measures program, measles cases are still present and increasing after COVID-19 pandemic. This should be taken seriously while developing a strategy to deal with measles outbreak cases in East Nusa Tenggara, especially considering the decline in vaccination coverage that occurred during the COVID-19 pandemic.

In this paper, there are two cases of measles presenting with pneumonia as complication admitted to pediatric ward of Ende General Hospital during less than two weeks.

2. Case Illustration 1

A 5-year-old girl suffered from high grade fever associated with cough, sneezing, and mucopurulent serous from both of her eyes. The diffuse reddish maculopapular morbilliform rash firstly risen from the posterior side of the ears and spread to the neck, and both of the trunk and extremities along the incidence of high grade fever. History of contact with measles patients was denied. The MR immunization not carried out in this patient due to her parents worry about transmission of COVID-19 during pandemic. Her parents work as a fisher, with last education level was junior high school.

The physical examination showed high grade fever for last 5 days (body's temperature 39,5°C), mucopurulent eyes discharge along with conjunctival injection, diffuse exanthematous morbilliform maculopapular rash was found all over her body, ronchi in both of lungs. There was no lymphadenopathy found in this case. The anthropometric assesment classified as undernourished. A complete blood count revealed leucocyte level 5600, with

predominance lymphocyte 4816 cells (86%). Chest x-ray showed bilateral patchy infiltrate in the lungs characterized as pneumonia.

Based on history taking, physical examination and laboratory examination we diagnosed patient as measles complicating as pneumonia and undernourished. The patient got intravenous fluid, broad spectrum antibiotic for pneumonia using ampicillin and gentamicin, vitamin A, and placed the patient in isolation room. Patient was discharged from hospital after five days of hospitalization.



Figure 1. Maculopapular rash all over the body



Figure 2. Chest X-Ray showed pneumonia

3. Case Illustration 2

A 5-year-old girl suffered from high grade fever associated with cough, sneezing and itchy red eyes. The diffuse morbiliform maculopapular rash manifested during the fever period started from posterior side of the auricle, followed by neck, face, trunk and rest of her body. Her parents denied history of contact with measles patients. The MR immunization not carried out because of COVID-19 pandemic. Her parents work as a fisher, with low education level as high as senior high school.

The physical examination showed high grade fever (body's temperature 39,8°C), bilateral periconjunctival injection in both of her eyes, diffuse exanthematous morbilliform maculopapular rash was found all over her body, and bilateral ronchi in both of lungs during auscultation. There was no lymphadenopathy found in this patient. The patient's nutritional status is classified as normal. The laboratory result showed leucocyte count 4800 with predominance lymphocyte 4272 cells (89%). Chest radiography showed bilateral patchy infiltrate in both of the lungs characterized as pneumonia.

Based on history taking, physical examination and laboratory examination we diagnosed patient as measles complicating as pneumonia. The patient got intravenous fluid, broad spectrum antibiotic for pneumonia using ampicillin and gentamicin, vitamin A, and placed the patient on isolation room. The patient was discharged from the hospital after day five of hospitalization.



Figure 3-4. Maculopapular rash all over the body



Figure 5. Conjunctivitis

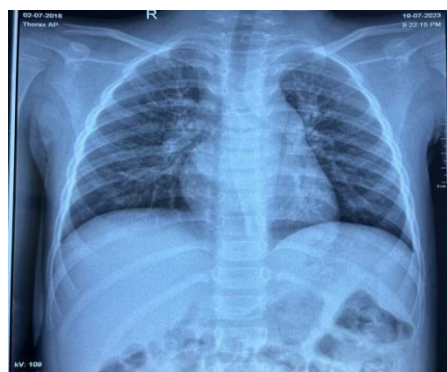


Figure 6. Chest X-Ray showed pneumonia

4. Discussion

Indonesia Ministry of Health reported about 3,341 confirmed cases was found from 2021 to 2022. Confirmed-case stands for acute fever rash disease accompanied by at least one of the following indicators: measles virus isolation from a clinical specimen; positive PCR test; IgG seroconversion or a notable increase in measles IgG antibody; positive IgM test; or epi-linked to a laboratory-confirmed case, while probable case stands for the patient who does not have a more plausible diagnosis, fits the clinical case description, has non-contributory measles laboratory testing, and is not epi-linked to a lab-confirmed case.^{4,11}

The re-emergence of measles in Indonesia in 2022 was affected by many factors. Through this case series, we aim to highlight the recent re-emergence of measles in Ende and three important contributing factors including low immunization coverage during the COVID-19 pandemics, nutritional state of the patient, and low immunity status.

Immunization is one of the methods for preventing measles outbreaks. It is intended to develop protection to infection. As demonstrated in many countries, increased vaccination coverage is a crucial factor that may solve this problem.^{2,12} Unfortunately, there has been a considerable decrease in immunization coverage during the last three years.^{13,14}

There was a decline in the Ende's immunization coverage from 106.2% in 2019 to 48.2% in 2021, and a gradual rise to 95% in 2022 when the pandemic began to resolve.¹⁰ Of the confirmed cases in 2023, 75% had not received any dosage of MR, 11% had received one dose, 10% had received both doses, and 3% had not received any vaccinations.⁷ In summary, children who have had two or more doses of the vaccine still have the potential to get measles. In these cases, both patients had no history of measles vaccination before.

According to these cases, the patients were not vaccinated because of frequent common cold, which they believed that vaccination during common cold can increase the side effect of immunization. This fact shows a lack of knowledge and misperception in community regarding measles immunization leading to reluctance to vaccinate. This may be due to low health education efforts and low parent's educational background, which was shown in several studies to be correlated with low vaccination rates.^{2,15,16} Level of education was shown to influence modification of health-seeking behaviours including vaccination.¹⁷ Parents with better educational backgrounds were equipped with better consideration skills and were fully aware of the benefits and risks in deciding whether or not to give their children the MMR vaccine.^{16,17} In these cases we found low education level in parents can be the contributing factor for the patient not getting proper immunization.

The COVID-19 pandemic has also significantly decreased Indonesia's coverage rate for immunizations. This is also influenced by numerous variables, such as parents' anxiety about taking their children to health facilities to get their children immunized since they are already frightened that their children would contract COVID-19, therefore they decide to postpone their child's immunization, the community's restricted mobility during a pandemic and the lack of readiness of healthcare institutions.¹⁸⁻²⁰ In these cases, we found both of the patients not getting measles immunization due to anxiety during the COVID-19 pandemic. So, the number

of children who weren't given basic immunization has increased.¹³ This re-emergence pattern was caused by the occurrence of an immunity gap in the unimmunized age group, as well as inconsistencies in the age distribution of those who were not vaccinated in geographic areas.²

Nearly half of patients may experience complications, which are more frequent and severe among the very young, very old, pregnant, immunocompromised, and malnourished individuals.² In the first case, patient classified as undernutrition. According to published data, undernourished children have a clearly increased risk of infectious morbidity and mortality. Severely malnourished patients have a poor immune response and intrinsic host defense mechanisms.²¹ Therefore, in areas with high burden of malnutrition such as East Nusa Tenggara, prevention and early detection of measles become crucial, as malnutrition predispose to complications of measles.

We also found the similarity of pneumonia complication on measles in these cases. It divided as two main forms, primary measles pneumonia, associated with immunosuppression caused by the virus itself and secondary measles pneumonia associated with bacterial infections.²²

Children under five years old are more susceptible to infectious diseases. It is believed that there is a relation in immunological immaturity at the time the child was infected.¹⁶ Previously, the children received passive IgG antibody trans placentally and through breast milk from their mother. When it disappears, they become more vulnerable to infections, though they are better armed with maturing innate and adaptive immune systems. Vaccines, which trigger protective immunological responses in the maturing immune system, have significantly reduced the risks of infection.²² In this cases we found the age of both patients was five years old that can be contributing factor of severe measles due to lack of immunity.

A certain level of immunity is needed among the entire population to achieve protective efficacy (herd immunity). With two doses of the measles vaccine, the precise vaccination coverage needed to prevent measles is between 93% and 95%.¹⁴ To be effective and useful, immunizations should ideally be administered on time. If it is, however, missed, it can still be treated through catch-up immunizations. Children as young as 36 months old can receive a catch-up immunization.²⁴ This is done to ensure that children continue to receive immunity in order to avoid illness.

During outbreaks, anybody who does not exhibit presumed immunity should get their MMR vaccine updated to strengthen their immunity to illness. After got exposed to measles or during an outbreak, MMR vaccine can be given within 3-6 days to protect against further exposure.^{25, 26} In these cases, both patients got administered MMR vaccine within 6 days after exposure.

5. Conclusion

The recurrence of a measles outbreak until certain provinces announced an outbreak, deserves strategic plan to overcome this outbreak. Measles is a preventable disease that can be preventing with immunization. Children under five are recommended to receive two doses of MMR vaccine, as it is already proven to prevent measles cases and outbreak.

Promoting immunization, expanding basic and advanced immunization coverage, and catching up with the target in certain areas are all essential for avoiding measles re-outbreaks. Good cooperation from stakeholders is needed to achieve the eradication, including officeholders, religious leaders, health professionals and the community itself.

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