

Original Article

ROLE OF ZINC SUPPLEMENTATION IN TREATING MEASLES PNEUMONIA IN CHILDREN

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Objective: To determine the role of zinc supplementation in treating measles pneumonia in children.

Methods: This descriptive study was conducted in the department of Paediatric, Services hospital, Lahore. The duration of the study was 6 months from June 2012 to December 2012. 120 cases of children with measles Pneumonia between 9 months to 15 years of age with both genders were included in this study after taking informed consent from parents. An approval was taken by ethical committee of the hospital. All patients received zinc sulphate (1mg/kg/day) along with conventional treatment in twice daily doses till resolution of measles pneumonia. Patients were assessed daily for fever, rash and tachypnea and findings were recorded till the resolution of measles pneumonia. All these information were recorded on a pre-designed proforma.

Results: In our study, out of 120 cases, 81.67%(n=98) were between 1-10 years of age while 18.33%(n=22) were between 11-15 years of age, mean+sd was calculated as 7.49+3.48 years, 51.67%(n=62) male and 48.33%(n=58) were females, mean duration of illness in children with measles pneumonia receiving conventional treatment with zinc supplementation was calculated as 132.81+8.36 hours.

Conclusion: We concluded that that mean duration of illness in children with measles pneumonia receiving conventional treatment with zinc supplementation was similar to previous studies, however, in absence of any local study, there is a dire need for further trials to validate our findings.

Keywords: measles pneumonia, treatment, zinc supplementation, duration of disease.

Introduction

Measles is highly contagious disease caused by single stranded RNA virus belonging to Paramyxoviridae family. Infection primarily spreads via droplet aerosols. Measles appear as high grade fever, 10 to 20 days after exposure followed by coryza, cough, red and watery eyes, and Koplik's spot at buccal mucosa in prodromal phase. After 4 to 5 days of prodrome, maculopapular rash develops on face and neck and spreads to rest of the body. Over 6 days rash starts fading in descending order,² the cough lasts the longest often up to 10 days.¹ Measles occurs usually in malnourished, unimmunized young children.² Common complications include pneumonia, diarrhea, otitis media, encephalitis, malnutrition, myocarditis, flaring up of tuberculosis. Giant cell pneumonia(measles pneumonia) are the commonest complications complicating 39.7% cases of measles³; it is fatal complication and leading cause of death in measles.⁴

Measles is endemic throughout the world and epidemics occur in spring and winter season. The global incidence of measles is 39.9 million cases 277,000 deaths and 28 millions disability adjusted

life years. In Pakistan, the estimated measles deaths are 81,000 annually among children under 5 years old.⁵ Pakistan witnessed measles outbreak from January 2012 to 2nd February 2013, total No. of 19,048 cases were reported with 463 deaths, most of them were due to measles pneumonia.⁶

Mainstay of Hospital management of Measles with and without complications is supportive including adequate hydration, oxygen Inhalation if required, nutritional rehabilitation, antipyretics, and treatment of secondary bacterial infections.⁷ Measles primarily affects epithelial cells of respiratory tract.⁸ There is definite role of vitamin A in measles, it reduces mortality up to 24% in children aged under 5 years.⁹ Vitamin A exert its clinical effects by enhancing epithelial regeneration, both complications and case fatality rate was higher amongst children who had not received vitamin A.⁹

Zinc is essential for growth and development, immune function, wound healing, and transport of water and electrolytes. Zinc deficiency is quite common in developing world and often associated with malnutrition or other micronutrients deficiencies,

Chronic zinc deficiency is associated with dwarfism, hypogonadism, dermatitis, alopecia and immune deficiency.¹⁰ Administration of the zinc has shown consistent benefits in reducing duration and severity of diarrhea,¹¹ acute lower respiratory tract infection and pneumonia.¹² Oral dose of zinc (20mg/day) helps accelerate recovery from pneumonia.¹³ Zinc clearly has important role in childhood infection diseases. Studies assessing the role of zinc supplementations among persons with HIV, tuberculosis, malaria and nephritic syndrome are being done. One study has assessed the benefit of zinc supplementation for the treatment of measles pneumonia.¹⁴ There is only one study carried out on measles pneumonia in which patients with measles pneumonia was given zinc supplement along with conventional treatment and mean time to cure was 132±64 hours.¹⁵ The rationale of my study is that there is only one published study available internationally and nationally. The sample size in that study was just 42 patients and I have a larger sample size of 120 cases that may generate more reliable results. There is no local study carried out in population so this study may provide results in our population. It may also add in the literature for future researches.

Methods

This descriptive study was conducted in the department of paediatric medicine, Services Hospital, Lahore. Sample size of 120 cases is estimated using 95% confidence interval level, d=0.12, with an expected mean duration of measles-pneumonia as 132+64 in patients treated with zinc along with conventional treatment.¹⁵ Inclusion criteria were children presenting with measles pneumonia as per operational definition, both genders and age 9 months to 15 years. Children already having symptoms of pneumonia prior to developing measles rash assessed on history and examination, patient needing inotropic / Ventilators support or children having congenital anomalies, metabolic disorders, chronic diseases and severe malnutrition were excluded from the study. 120 cases of measles Pneumonia meeting the inclusion criteria were selected, informed consent from parents/attendants were taken. An approval was taken by ethical committee of the hospital. Cases were registered for the study and demographic information of the patients (name, age, sex, address) was obtained.

All patients received zinc sulphate (1mg/kg/day) along with conventional treatment in twice daily doses till resolution of measles pneumonia.

Patients were assessed daily for fever, rash and tachypnea and findings were recorded till the resolution of measles pneumonia. Duration of disease measles-pneumonia were noted (as per operational definition). All the data was entered on a well defined proforma (Annexed). The collected information was entered in the SPSS version 14 and analyzed. Qualitative data i.e. sex was presented as frequency and percentages. Quantitative data (age, durations of measles Pneumonia) were presented as mean, standard deviation.

Results

A total of 120 cases were enrolled to determine mean duration of illness in children with measles pneumonia receiving conventional treatment with zinc supplementation. Age distribution of the patients was done which shows that 81.67% (n=98) were between 1-10 years of age while 18.33% (n=22) were between 11-15 years of age, mean+sd was calculated as 7.49+3.48 years. **(Table No. 1)** Gender distribution of the patients was done showing 51.67% (n=62) male and 48.33%(n=58) were females. **(Table No. 2)**

Mean duration of illness in children with measles pneumonia receiving conventional treatment with zinc supplementation was calculated as 132.81+8.36 hours. **(Table No. 3)** Stratification for age shows that 133.21+8.62 hours between 1-10 years of age and 131.00+6.98 hours in children with 11-15 years of age, p value was 0.263 showing insignificant difference between the two age groups.**(Fig-1)**

Table-1: Age Distribution (n=120).

| Age (in years) | No of Patients | Percentage |
|----------------|----------------|------------|
| 1-10 | 98 | 81.67 |
| 11-15 | 22 | 18.33 |
| Total | 120 | 100% |
| Mean SD | 7.49 3.48 | |

Table-2: Mean duration of illness in children with measles pneumonia receiving conventional treatment with zinc supplementation.

| Mean duration of illness (Hrs) | Mean | SD |
|--------------------------------|--------|------|
| | 132.81 | 8.36 |

Table-3: Stratification for gender (n=120).

| Mean duration of illness (Hrs) | Male | | Female | |
|--------------------------------|--------|------|--------|------|
| | Mean | SD | Mean | SD |
| | 132.34 | 7.77 | 133.31 | 8.99 |

P value=0.526

Stratification for gender shows that 133.21±7.77 hours in male and 133.31±8.99 hours in female children, p value was 0.526 showing insignificant difference between male and females groups.(Fig- 2)

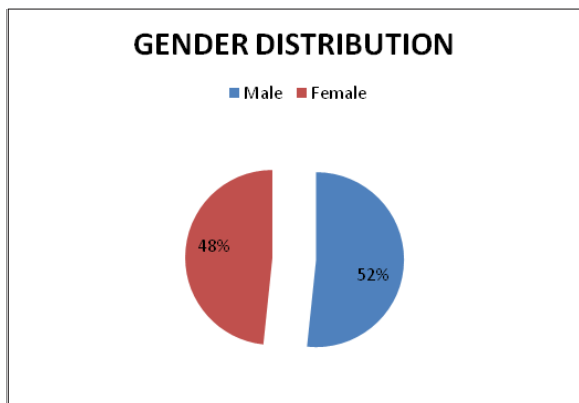


Fig-1: Gender distribution.

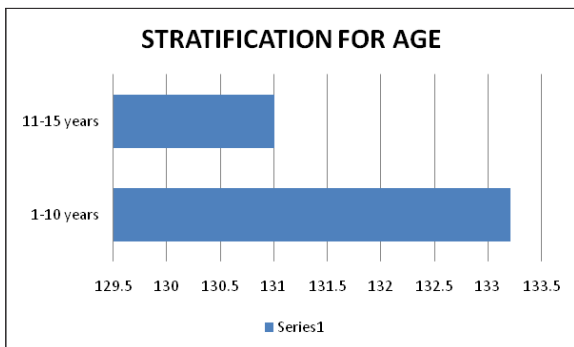


Fig-2: stratification for age, p value: 0.263.

Discussion

Zinc is an essential trace element required for maintaining intestinal cells, bone growth, and immune function. Children who are living in low-income settings are often undernourished and zinc deficient. Severe zinc deficiency has been associated with stunting of growth, impaired immunity, skin disorders, learning disabilities, anorexia and developing measles pneumonia. Studies of zinc supplementation for the treatment or improved management of acute lower respiratory tract infections, including measles pneumonia have had mixed results.¹⁶ We planned this study with the view that there is only one published study available internationally and nationally. The sample size in that study was just 42 patients while we enrolled a larger sample size of 120 cases that may generate more reliable results. In our study, out of 120 cases, 81.67%(n=98) were between 1-10 years of age while 18.33%(n=22) were between 11-15 years of age, mean±sd was calculated as 7.49±3.48 years,

51.67%(n=62) male and 48.33%(n=58) were females, mean duration of illness in children with measles pneumonia receiving conventional treatment with zinc supplementation was calculated as 132.81±8.36 hours. Adcock LM carried out a study on measles pneumonia in which patients with measles pneumonia were given zinc supplement along with conventional treatment and mean time to cure was 132±64 hours.¹⁵ These findings are similar with the above findings. A recent review and meta-analysis of existing studies, for example found that the beneficial effects of zinc supplementation have been most clearly demonstrated in south Asia, when children were given at least 70 milligrams of zinc per week.¹⁷ However, this review was not able to determine, whether zinc supplementation would be less effective if lower doses were given or if supplementation would have less of an impact on measles pneumonia infectious viruses. In resource-limited settings, it has also been difficult to determine zinc deficiency and as such, it can be difficult to effectively target populations most at risk.¹⁸ Another systematic review has demonstrated that zinc supplementation was significantly associated with reducing rates of measles pneumonia, and recommended supplementing zinc intake in deficient populations. Routine zinc administration lowers the risk of acute lower respiratory illnesses and clinical pneumonia in children from low-income countries. However, therapeutic trials of zinc given to hospitalized patients with severe measles pneumonia have yielded inconsistent results, ranging from a positive effect to no overall effect,¹⁹ while our study gives a beneficial effect for the management of measles pneumonia. The limitation of our study was that we did not include a control group for comparison of significant effect in patients treated without zinc supplementation, another limitation was that we did not include any side effects of the drugs, though, no case found during the study with such complaints. However, as, there is no local study carried out in our population, so, our findings are primary. It may also add in the literature for future researches and other trials may validate our findings.

Conclusion

We concluded that mean duration of illness in children with measles pneumonia receiving conventional treatment with zinc supplementation was similar to previous studies, however, in absence of any local study, there is a dire need for further trials to validate our findings.

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