

Prevalence and Outcome of Pneumonia in Children with Measles

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ABSTRACT

Background: Measles still remains as one of the major causes of childhood morbidity and mortality in developing countries. Vaccinated individuals infected with measles can develop nodular pneumonia. The measles virus can infect individuals with waning immunity.

Methods: All patients presenting with clinical diagnosis of measles were enrolled. Children were examined for pneumonia. The severity of illness was later on compared with the outcome in terms of hospital stay or treatment on OPD basis. Indoor treatment included intravenous fluids, antipyretics, antibiotics and Vitamin A and zinc supplementation.

Results: Out of 140 Measles patients enrolled, 64 (45.7%) got pneumonia. There were 40 males and 24 females. Out of 64 patients, 22 received two doses of measles vaccine, 17 had 1 dose and 25 were not vaccinated at all. Out of 64 children diagnosed with pneumonia, 19 were treated on OPD basis while 45 were admitted. Out of them, 43 were discharged, 1 patient left against medical advice and 1 expired due to fulminant pneumonia.

Conclusion: The chances of pneumonia in children with measles are high. If not treated well then severe outcome can occur. Appropriate surveillance & management are necessary for health & benefit of diseased child.

Key words: Pneumonia, measles, vaccination, children, rashes

INTRODUCTION

Measles still remains as one of the major causes of childhood morbidity and mortality in developing countries. In 2013, it was responsible for 2% of total deaths in children under five years of age¹. Measles is a highly contagious viral disease and it resulted in thousands of deaths each year prior to the era of the measles vaccine. Since the introduction of the vaccine, the incidence of measles has dropped significantly². Measles vaccines are given either in form of combined live attenuated measles-mumps-rubella vaccination (MMR) or measles monovalent vaccine alone. MMR has a significant safety range and is not usually associated with any significant side effect³. A live, attenuated measles vaccine is currently available, which is included in EPI schedule of Pakistan. MMR vaccine is given in many countries instead of monovalent measles vaccine. The measles vaccines that are now internationally available are safe and effective and may be used interchangeably in immunization programmes⁴.

When measles virus attacks already vaccinated individuals they can develop nodular pneumonia lacking specific measles IgM and typical symptoms so often misdiagnosed. An effective diagnostic tool is needed.⁵ Measles related pneumonia is the commonest cause of death in children with measles. It may be associated with acute respiratory distress syndrome and pleural effusion^{6,7}. The measles virus can infect individuals with waning immunity and can replicate in local lymphoid tissue, then spread through the blood stream^{2,8}.

Measles vaccination can be a factor that can cause pneumonia. In routine pneumonia is a common problem in children. But not much literature found regarding occurrence of pneumonia in children with measles. So we conducted this study to determine the extent of problem in

local setting. So that in future, we may evaluate measles children for pneumonia and prevent them from its complication.

MATERIAL AND METHODS

The study was carried out in Paediatric Department, Ghurki Trust Teaching Hospital, Lahore for three years (June 2015- June 2018). This research was approved by the Institutional Ethical Board. All patients presenting with clinical diagnosis of measles were enrolled after parental consent. Their demographic data, vaccination status, signs and symptoms and complications were noted on a predesigned proforma. In patients less than 6 months of fulfilling clinical criteria of measles it was confirmed by performing IgM Measles. Based on clinical symptoms Measles was defined as presence of fever with a maculopapular rash and any one of cough, runny nose or red eyes. Pneumonia was defined as fast breathing in a calm child. Fast breathing was labeled as 50 breaths or more/ minute for 2 months to 12 months age, 40 breaths or more/ minute for 12 months to 60 months of age and 30 breaths or more for age 60 months and above. The severity of illness was later on compared with the outcome in terms of hospital stay or treatment on OPD basis. Relevant investigations were performed in admitted patients like complete blood count and X- ray chest. Indoor treatment included intravenous fluids, antipyretics, antibiotics and Vitamin A and zinc supplementation. Vitamin A supplementation was done in both outdoor and indoor patients. 100,000 IU of Vitamin A was given to children less than 1 year and 200 000 IU to those above 1 year on day of presentation then on the next day.

RESULTS

Total of 140 patients were enrolled with Measles. 64(46%) got pneumonia (Fig 1). In 64 children with pneumonia, 7 (10.9%) were age <6months, 9 (14.1%) aged 7-12months,

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35(54.7%) aged 13-60months and 13 (20.3%) aged >60months. There were 40 (62.5%) males and 24(37.5%) females. Out of 64 measles children diagnosed with pneumonia, 22 (34.4%) had two doses of measles vaccine, 17(26.6%) had 1 dose and 25(39.1%) were not vaccinated at all and 31(48.4%) had a contact with measles patient. Table 1

Out of 64 patients, 62 (96.9%) had maculopapular rash, 53 (82.8%) had the typical rash however 11 (17.2%) had atypical rash. Cough and coryza was accompanied with fever in 61 (95.3%) children. Out of 64, 19 (29.7%) were treated on OPD basis while 45 (70.3%) were admitted in pediatric wards. Table 2

Among 45 children admitted in pediatric wads, mean duration of hospital stay was 3.5 ± 0.75 days. Out of them, 43 (95.6%) were discharged alive, 1 (2.2%) left against medical advice and 1 (2.2%) expired due to fulminant pneumonia. Table 3

Fig 1: Distribution of diagnosis of pneumonia

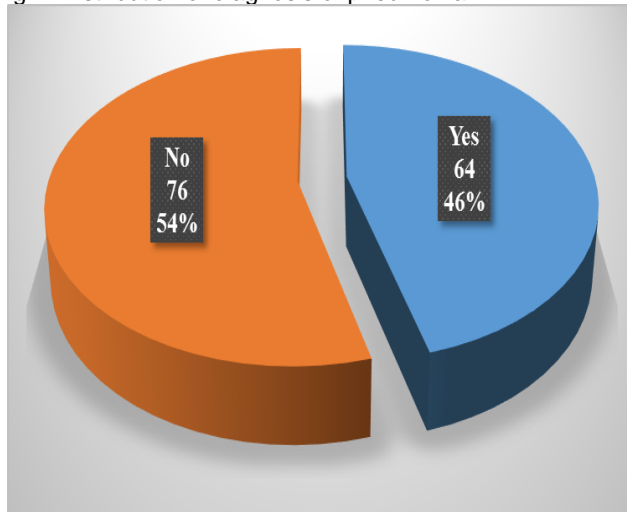


Table 1: Characteristics of measles children diagnosed with pneumonia (n=64)

Age	F (%)
<6months	7 (10.9%)
7-12months	9 (14.1%)
13-60months	35 (54.7%)
>60months	13 (20.3%)
Gender (M:F)	40 (62.5%); 24 (37.5%)
Not vaccinated	25 (39.1%)
Only 1 does of measles vaccination	17 (26.6%)
>1 dose of measles vaccination	22 (34.4%)
Contact with measles patients	31 (48.4%)

Table 2: Symptoms of measles

Symptoms	F (%)
Maculopapular rash	62 (96.9%)
Typical rash	53 (82.8%)
Atypical rash	11 (17.2%)
Cough & coryza accompanied with fever	61 (95.3%)
Treated in OPD basis	19 (29.7%)
Admitted for pneumonia	45 (70.3%)

Table 3: Outcome of admitted patients

Average days of hospital stay	3.5±0.75
Discharged alive	43 (95.6%)
Patient left against medical advice	1 (2.2%)
Expired due to fulminant pneumonia	1 (2.2%)

DISCUSSION

Measles virus used to infect 95%–98% of children before 18 years of age before the inclusion of measles vaccine as part of vaccination schedule. Parents were keen to expose their children in early school years to measles patients to get their children lifelong immunity as many complications of measles were seen if they get measles for first time in adulthood^{9,10}.

Measles remained the major cause of mortality and morbidity in children worldwide even after four decades of approval of measles vaccine. Measles virus effects many systems of our body respiratory being on the top (pneumonia, croup and otitis media) though measles encephalitis is usual cause of death and has long term sequelae (Subacute Sclerosing Panencephalitis)¹¹.

In our study, out of 140 screened patients of measles, 64 (46%) were diagnosed with pneumonia during clinical examination. Among them, 22 (34.4%) had two doses of measles vaccine, 17 (26.6%) had 1 dose and 25 (39.1%) were not vaccinated at all and 31 (48.4%) had a contact with measles patient.

According to a study conducted by Rashid et al., Pneumonia was the major complication accounting for 68% in children with measles.¹² These results are in accordance with those of studies conducted by Sultana et al., and Joyce et al., where pneumonia was observed in 63.6% and 75% cases respectively^{13,14}.

In our study, out of 64 children with pneumonia, 19(29.7%) were treated on OPD basis while 45(70.3%) were admitted in pediatric wards. Among 45 children admitted in pediatric ward, mean duration of hospital stay was 3.5 ± 0.75 days. Out of them, 43 (95.6%) were discharged alive, 1(2.2%) left against medical advice and 1 (2.2%) expired due to fulminant pneumonia. Rashid et al., found that 3(3%) died during their stay in the hospital while 97 (97%) recovered and were discharged from the hospital¹².

Often, pneumonia and diarrhea increase the risk of death in the measles-infected individual. Over the last few decades, a substantial decline has been reported in the incidence of measles and measles related mortality in many countries. Yet, it remains a significant cause of child mortality globally and has caused about 2 percent of child deaths in 2013¹⁵. Immunodeficiency, malnutrition specially vitamin A deficiency, severe complicated measles and poor vaccination status of children are predisposing factors leading to increase fatality rate of measles. Only by improving socioeconomic status many developed countries have overcome the problem but it still remains the big issue in developing countries¹¹.

Measles infects the respiratory tracts of nearly all affected persons. Pneumonia is the most common severe complication of measles and accounts for most measles-associated deaths.¹⁶ Streptococcus pneumoniae is one of the most frequent pathogen causing bacterial infection in patients with measles, it is also proved to be the major

bacterial pathogen in other cases of impaired cellular immune response, e.g. AIDS^{11,17,18}. A recently published review summarized the role of impaired immune pathways in influenza virus infection, which induces susceptibility to secondary bacterial pneumonia¹⁹.

CONCLUSION

The chances of pneumonia in children with measles are high. If not treated well then severe outcome can occur. Appropriate surveillance and management are necessary for health and benefit of diseased child. Along with measles vaccination, vaccination of prevention of pneumonia should also be administered to prevent children from complications.

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