Case Reports

Management of severe measles related pneumonia, acute respiratory distress syndrome and pleural effusion with intravenous methyl prednisolone, immunoglobulin and oral vitamin A

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Introduction
Measles still remains as one of the major causes of childhood morbidity and mortality in developing countries¹. In 2013, it was responsible for 2% of total deaths in children under five years of age². Measles related pneumonia (MRP) is the commonest cause of death in children with measles³. It may be associated with acute respiratory distress syndrome (ARDS)⁴ and pleural effusion (PE)⁵. We describe a case of severe measles related pneumonia with bilateral pleural effusion and ARDS in a 10 month old girl, successfully treated with high dose of methyl prednisolone, vitamin A and intravenous (IV) immunoglobulin during the outbreak in 2013.

Case report
A ten month old girl who was not vaccinated against measles presented to the Sirimavo Bandaranaike Specialized Children’s hospital with five days history of high fever, irritability, cough, runny nose, bilateral conjunctivitis and one episode of febrile convulsion. On the third day of the illness a maculopapular rash appeared on the face and neck. On admission, child was drowsy and tachypnoeic with a respiratory rate of 50/min. Initial full blood count showed a white cell count of 5,300/cu mm with 32% lymphocytes and 60% neutrophils. Her platelet count was 315,000/cu mm with an erythrocyte sedimentation rate (ESR) of 30 mm in the first hour. Child was managed with IV cefuroxime, IV cloxacillin and oral erythromycin with a presumptive diagnosis of MRP with bacterial lower respiratory tract infection. Over the next 48 hours, child's condition deteriorated with increasing respiratory distress, increased work of breathing and hypoxia. Then the patient was intubated and transferred to the medical intensive care unit (MICU) on 7th day of the illness. Physical examination on admission to MICU revealed generalized maculopapular rash, pulse rate of 167/min and blood pressure of 80/50 mmHg. Chest examination revealed bilaterally reduced breath sounds with dull percussion note. Supine chest radiograph showed bilateral opacities with pleural effusion (Figure 1) which was confirmed by ultrasound scan of the chest.

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Figure 1: Chest x-ray showing bilateral opacities with pleural effusion
There was no cardiac cause for pleural effusion and 2-dimensional echocardiogram showed a small ostium secundum atrial septal defect (ASD). Patient
underwent mechanical ventilation with a positive end
eexpiratory pressure (PEEP) of 8 and peak inspiratory
pressure (PIP) of 22. Arterial blood gas with FiO2 of
80% revealed pH of 7.36, pCO2 of 42.2 mmHg, pO2
of 56.4 mmHg and PaO2/FiO2 ratio was 70.5 and
patient was managed as ARDS. Pleural effusions
were tapped bilaterally and 250cc of pleural fluid was
drained. Pleural fluid analysis revealed protein of
255.7mg/dl, sugar 130mg/dl, pus cells 3-4/ high
power field and red cells 1-2/high power field. Pleural fluid gram stain revealed occasional
polymorphs, paucity of bacterial organisms and no
acid fast bacilli with acid fast stain. Pleural fluid
culture yielded no growth. Polymerase chain reaction
for tuberculosis DNA (TB PCR) of the pleural fluid
was negative. Her C reactive protein was normal (1.8
mg/L). Child was treated with IV vancomycin, IV
meropenem, oral clarithromycin and Oseltamivir
(Tamiflu) while awaiting investigation reports. Blood
cultures, cold agglutinin, mycoplasma antibody and
real time PCR for influenza A and Influenza B were
negative. The enzyme-linked immunosorbent assay
(ELISA) for measles specific IgM antibody was
positive and serum immunoglobulin concentrations
were within normal limits. With no improvement of
initial supportive therapy, two doses of oral vitamin
A 100,000 IU with IV methyl prednisolone 30mg/kg/day and IV immunoglobulin 0.5g/kg/day
were started and continued for three consecutive
days. After initiation of new regime, patient's chest
radiograph and clinical examination of lungs were
markedly improved as shown in Figure 2.

**Figure 2: Chest x-ray after initiation of new regime**

Mechanical ventilation was continued for another 5
days and then she was weaned off from the
ventilator. She was extubated after 7 days of
ventilation and discharged after 12 days of MICU
stay.

**Discussion**

The high mortality rate associated with MRP may be
due to its immunosuppressive effects, multisystem
involvement and secondary bacterial infection. Irrespective of recent advancements in medicine,
there are still no management guidelines except
supportive treatment for MRP. Although there is no
established treatment protocol, intravenous methyl
prednisolone showed some positive results in adults
but not in children.

Corticosteroids such as IV methyl prednisolone have
proven to reduce inflammation in many diseases. Methyl prednisolone induces transcription of many
genes which produces anti-inflammatory proteins and
switch off genes responsible for activation of
inflammatory process. A randomized controlled trial
in USA revealed that methyl prednisolone
administration during early severe ARDS is
associated with significant improvement in pulmonary and non-pulmonary organ dysfunction,
which in turn reduces the duration of mechanical
ventilation.

Vitamin A has been used for decades against measles
and showed to have beneficial effects. Furthermore
vitamin A deficiency is known to cause many
infectious diseases and measles itself reduces the
serum vitamin A levels. Current recommendation is
to give two doses of Vitamin A to all children with
measles.

Intravenous immunoglobulins have been effectively
used for the post exposure prevention of measles
pneumonia but it’s effectiveness for the treatment of
MRP is not proven. Because of high mortality, there
are some recommendations that hospitalized patients
with severe measles may receive a trial of IV
Immunoglobulins. As measles itself causes
depression of immune system intravenous
immunoglobulin may have a positive effect on
measles pneumonia.

With this supportive evidence we initiated treatment
with IV methyl prednisolone, oral vitamin A and IV
immunoglobulins. After initiation of the treatment,
patient’s condition significantly improved both
clinically and radiographically as shown in Figures 1
and 2. In conclusion, this patient was successfully
treated with intravenous methyl prednisolone,
vitamin A, immunoglobulin treatment with pleural
tap and ventilator support. Rapid response to this
treatment should be further investigated as a
treatment regime for measles related pneumonia.

References


