Pneumomediastinum and Subcutaneous Emphysema Following Measles in a Patient with Diabetes and Under Corticotherapy

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Abstract

We presently report the case of measles in a 49-year-old man who was hospitalized at the Infectious Disease Service for fever and maculopapular rash for over four days and who developed pneumomediastinum and subcutaneous emphysema. On physical examination he was febrile (39.5°C), he had exanthematous maculopapular rash on face, anterior trunk, back, upper extremities and conjunctivitis. We also noticed Koplik’s spots in buccal mucosa, which persisted for two days. Laboratory examinations showed leucopenia, anemia and thrombocytopenia. There was also a significant increase in measles virus antibody titer (IgM). The patient suffered from diabetes mellitus and he was under corticotherapy related with vitrectomy after endogenous endophthalmitis. He was treated with oxygen therapy, antibiotics, multivitamins, intravenous fluids and was discharged from hospital in good health condition.

Keywords: Measles; Unusual complications; Case report; Pneumomediastinum; Subcutaneous emphysema

Introduction

Measles is a serious respiratory disease that causes a maculopapular rash and fever. It is transmitted by the respiratory route and is highly infectious. Measles virus infects multiple organs and targets epithelial, reticuloendothelial and white blood cells, including monocytes, macrophages and T lymphocytes which are vital components of our body defense mechanism [1]. Pathological studies of children dying during acute measles have found multinucleated giant cells typical of measles virus infection throughout the respiratory and gastrointestinal tracts and in most lymphoid tissues [2,3]. Measles causes a systemic illness [4]. After an incubation period of 8–12 days, measles begins with increasing fever (39–40.5°C), cough, coryza and conjunctivitis [5]. The rash is usually first noted on the face and neck, appearing as discrete erythematous patches 3–8 mm in diameter. The lesions increase in number within 2–3 days, especially on the trunk and the face, where they frequently become confluent. Discrete lesions are usually seen on distal extremities, and with careful observation, small numbers of lesions can be found on the palms of 25–50% of those infected. The rash lasts for 3–7 days and then fades in the same order as it appeared, sometimes ending with a fine desquamation [6]. Pneumonia is the most common severe complication of measles and accounts for most measles-associated deaths [7]. Case-fatality rates have decreased with improvements in socioeconomic status in many countries but remain high in developing countries. Measles can cause severe complications especially in immunocompromised subjects. Pneumomediastinum and mediastinal emphysema have been reported as complications of measles in several countries [8–10].

Case report

Our case is of a 49-year-old male who was presented to the Infectious Disease Emergency Service in February 2018, with a history of fever, chills, myalgia, abdominal pain, sore throat, headache, diarrhea, for over four days. Three days after the onset of fever the patient started to have rash with itching. On physical examination he was febrile (39.5°C) and he had exanthematous maculopapular rash on face, anterior trunk, back, upper extremities and conjunctivitis (Figure 1). We also noticed Koplik’s spots in buccal mucosa that persisted for two days (Figure 2). Central nervous system examination was normal. He had no lung disease and he was not a smoker. He lived in Tirana and had no travel history abroad. The patient was vaccinated with MMR vaccine

Figure 1: Exanthematous maculopapular rash spread over anterior abdominal area on the fifth day of illness.

Figure 2: Koplik’s spots noticed on oral examination on the fourth day of illness.

(opposite the lower 1st and 2nd molars) and pathognomonic for measles.
Measles IgM Antibody ELISA Test for detection of specific IgM antibodies against Measles in serum and plasma was positive. Chest X-ray resulted with discrete left peribronchial cuffing (Figure 3). Within few days, during hospitalization he presented a serious clinical outcome with a rise in the frequency and liquid component of diarrheic episodes. He showed severe hacking cough, severe dyspnea, fatigue and decrease of oxygen saturation. Total body unenhanced computerized axial tomography that was realized very quickly, showed subcutaneous laterocervical and thoracic wall emphysema, pneumomediastinum, bronchial wall thickness and subtle bilateral centrilobular opacities associated with the “tree-in-bud” pattern, suggestive of bronchiolitis (Figure 4). There were also findings of pansinusitis (Figure 5). Upper gastrointestinal fluoroscopy examination was normal (Figure 6). In these conditions, we made a medical consultation with other physicians such as: anesthesiologist, pneumologist, cardiologist, and we decided to continue the treatment with: oxygen therapy, antibiotic therapy, vitamin therapy (Thiamin, Pyridoxine, L-ascorbic acid) and intravenous fluids for about one week. After this time, he had an improvement of health condition. The value of C-reactive protein decreased to 13.1 mg/l. The patient had severe desquamation (Figure 7). After ten days, it was performed another chest unenhanced computerized axial tomography that showed a
reduction of subcutaneous emphysema and pneumomediastinum and disappearance of pulmonary centrilobular opacities (Figure 8).

Discussion

Despite of the high immunization coverage for MMR, a Measles virus epidemic outbreak has occurred in the last months in Albania where 162 people were confirmed contaminated with measles virus [11]. Some of the cases over 14 years old were hospitalized at the Service of Infectious Diseases in University Hospital Center "Mother Theresa", in Tirana. Measles is considered as a childhood disease, but demographics have shifted. Since 2001, half of the reported cases in the U.S.A were in those 20 years and older [12].

It is a very contagious disease that can cause severe complications, especially in adults and immunocompromised people. Subcutaneous emphysema as a complication of measles is found in approximately 2% of cases [13]. Subcutaneous emphysema, pneumothorax, and pneumomediastinum are components of air leak syndrome. In measles, the pathogenesis of mediastinal emphysema follows the principle of the pressure gradient theory (Macklin phenomenon) [14]. The pressure gradient generated between the alveoli and the perivascular sheaths causes the alveoli to rupture and allows air to leak into the interstitium of the lung and mediastinum. Causes of such gradient include hyperinflation of the alveoli because of airway obstruction from secretions or enlarged lymph nodes. Free air spreads because of the connection among the facial planes of the thorax, neck, face, limbs and abdomen including the perineum [15].

Exclusion of tracheobronchial and esophageal causes of pneumomediastinum is mandatory to exclude concomitant injury [16]. In our case upper gastrointestinal fluoroscopic findings were normal. Pneumomediastinum and subcutaneous emphysema can be completely resolved within 14 days [17].

The prevalence of measles virus pneumonia is higher in immunocompromised patients or in those who take immunosuppressive therapy [18]. An immunodeficient state may be a risk factor of death from pneumonia in adults with measles [19]. High-resolution computerized axial tomography reveals features differing from bacterial pneumonia: bronchial wall thickness, centrilobular nodules in ground glass opacity, interstitial lesions (interlobular septal thickening, fissure thickening, and pleural effusion) and lymphadenopathy. The centrilobular nodules were find in our case, and this may be the most prominent finding in measles pneumonia [20]. Measles pneumonia in previously healthy patients has a good prognosis [21]. Although our patient had diabetes and was under corticotherapy, he discharged on the eleventh day of hospitalization in good health condition. Measles can affect several other organs including gastrointestinal system. Diarrhea is one the commonest complications. Usually, measles associated diarrhea occurs just prior to the appearance of rashes. Feachem and Kohlinsky found that 15–63% of measles cases from community-based studies from developing countries in the prevaccine era were complicated by diarrhea and that 9–77% of all diarrheal deaths was measles-associated [22].

Conclusion

Measles is a disease with varied clinical manifestations and respiratory complications are among the most serious. Pneumomediastinum and subcutaneous emphysema are rare...
complications of this disease. Immunocompromised patients including those with diabetes are more likely to develop a serious clinical outcome.

References

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