

SEVERE HYPOALBUMINEMIA IN TWO PEDIATRIC CASES WITH PARAPNEUMONIC PLEURAL EFFUSION

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Abstract

Even hypoalbuminemia can be seen in children with pleural effusion, generally this situation is not being considered. The mechanism and pathogenesis of hypoalbuminemia in parapneumonic pleural effusion is unclear. We report two cases aged 8 and 9 years with severe hypoalbuminemia and different amounts of parapneumonic pleural effusions. Both of the patients had dramatic improvement in clinical symptoms after the albumin therapy.

Conclusion: We want to emphasize the importance of albumin in patients with parapneumonic pleural effusions and albumin may be a good parameter for follow-up and therapy in these patients.

Keywords:

Hypoalbuminemia; pleural effusion; pediatrics.

Introduction

The most common cause of pleural effusion in children is pneumonia and half of the pediatric cases with pneumonia have pleural effusion (1). Although hypoalbuminemia is an uncommon cause of pleural effusion (4), hypoalbuminemia may be a finding in patients with pleural effusion (7). The mechanism of hypoalbuminemia in cases with pleural effusion is unclear. We report two cases of lobar pneumonia with pleural effusion having severe hypoalbuminemia regardless of the amount of the effusion.

Case presentations

Case 1

An 8 year old boy hospitalized with respiratory distress, fever and cough continued for 2 days. There was no special history about his own and family. His body weight and length percentiles were normal. A decrease in breathing sounds and tuber strains were heard on the middle and base parts of the right lung. His other examination findings were normal.

There was leucocytosis with a right shift, increase in C-reactive protein (CRP) level (38.2 mg/dl) and erythrocyte sedimentation rate (ESR) (40 mm/h) in his laboratory findings. Liver and renal functions were normal. Chest radiograph revealed a large opacification in the middle and base parts of the right lung

Because of the respiratory distress he was given oxygen with non-rebreathing mask and intravenous (IV) vancomycin (60 mg/kg/day) and ceftriaxone (100 mg/kg/day) treatments were started. In thoracic ultrasound and computed tomography of the chest there were areas of pneumonic consolidations and pleural effusion about 42 mm diameter so a chest tube was placed. An exudative fluid about 1000 ml. was drained and follow-up with tube drainage was continued. Albumin level of the fluid was 2.2 g/dl, serum albumin was 3.2 g/dl and pleural fluid protein/serum protein was 0.76. Stained microscopic examinations of the pleural fluid revealed gram positive diplococci. Between day 4 and 7, extra 500 ml pleural fluid was collected. On day 8, his serum albumin level decreased to 1.7 g/dl. Screenings for the differential diagnosis of hypoalbuminemia for renal, cardiac, nutritional, hepatic or gastrointestinal pathologies were negative.

As the albumin level did not increase during the follow-up, 1 g/kg/dose of IV albumin replacement therapy was given to the patient on day 10. Albumin level increased to 2.6 g/dl and pleural fluid collection decreased dramatically. On day 15, no fluid collection was revealed on the chest ultrasound so chest tube was removed. Antibiotic treatments were continued till day 21. CRP and sedimentation rate decreased to normal levels on day 21. Albumin levels did not decrease in follow-up. Patient was discharged on day 21.

Case 2

A 13 year old male patient was admitted with fever, coughing, respiratory distress and pain in the left chest continued for 3 days. Self and family histories were unremarkable. His body weight and length percentiles were normal. Physical examination revealed decreased breathing sounds in the lower parts of the left lung. Other examinations of the systems were normal.

Increase in ESR (70 mm/h) and CRP levels (46.9 mg/dl) were observed in the laboratory findings. There was an opacification on the middle and base parts of the left lung in the chest radiograph. Thoracic ultrasound of the chest revealed 18 mm pleural effusion and local areas of pneumonic consolidations so he was followed-up with daily ultrasounds and thoracentesis was not made.

IV vancomycin (40 mg/kg/day, t.i.d.) and ceftriaxone (100 mg/kg/day b.i.d.) treatments were started. On day 2 and 3, his albumin levels were found 2.0 g/dl. Hypoalbuminemia was not associated with renal, cardiac, hepatic, nutritional or gastrointestinal pathologies. On day 4, he was given IV albumin infusion of 1 g/kg/dose. His clinical status, tachypnea, respiratory distress, weakness and loss of activity improved dramatically one day after the albumin treatment. According to the ultrasound findings, pleural effusion disappeared on day 8. CRP and sedimentation rate decreased to normal levels on day 12. Albumin levels did not decrease again. A total 14 days of antibiotic therapy was given and patient was discharged on day 14.

Discussion

Pleural effusions are generally due to pneumonia in pediatric cases. Relationship between hydrostatic and oncotic pressures across the pleural membranes cause pleural effusions. Serum-effusion albumin gradient has been evaluated in the occurrence of the effusion (5).

Although pleural effusion due to hypoalbuminemia is rare(2), hypoalbuminemia is a common finding in patients with parapneumonic pleural effusions but pathophysiology is unclear. One previous study demonstrated an acute hypoalbuminemia in a case with pleural effusion and severe pneumonia. This patient was previously healthy and had no other causes hypoalbuminemia. Similar to our first patient, she had reduction in albumin levels during the hospital stay (6). We believe that hypoalbuminemia in our patients were related with acute inflammation or albumin shift into the extravascular space of the chest.

Hypoalbuminemia may be the cause of many acute and chronic conditions such as; defective synthesis (cirrhosis), inadequate intake (protein malnutrition, extravascular loss (nephrotic syndrome, protein losing enteropathy, mucosal disease), hemodilution, heart failure. We found no other differential diagnostic criteria or laboratory findings in our patients.

Amount of the pleural effusion has been associated with the severity of hypoalbuminemia. Hypoalbuminemia did not affect the time of hospital stay but low albumin levels were associated with large amount of pleural effusions so this outcome had an indirect impact on the length of hospital stay (3). We found no correlation between the amount of effusion and severity of hypoalbuminemia. But we found direct correlation between the amount of effusion and length of hospital stay. So, clinical outcomes of our cases were associated with the amount of pleural effusion, not with the severity of the hypoalbuminemia.

Hypoalbuminemia has been found to be a significant marker of morbidity and mortality in critically ill children and albumin therapy has great affect on clinical outcomes (7). Although the relationship between the albumin levels and

pleural effusions are described in few studies, we emphasized dramatic clinical improvement by the albumin therapy.

Hypoalbuminemia may be a good monitoring parameter in pediatric patient with pleural effusion and albumin may be an important additive therapy for clinical improvement.

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