PNEUMOCOCCAL INFECTION AND HAEMOLYTIC UREMIC SYNDROME

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RÉSUMÉ

Pré-requis : Le syndrome hémolytique et urémique est une des causes majeures d'insuffisance rénale chez l'enfant. Il s'agit d'une microangiopathie thrombotique associant une anémie hémolytique, une thrombopénie et une insuffisance rénale. Le syndrome hémolytique et urémique associée à la diarrhée est dénommé SHU typique ; le pneumocoque est rarement en cause de syndrome hémolytique et urémique, dénommé SHU atypique.

But : rapporter deux observations d'infections invasives à pneumocoque compliquées d'un syndrome hémolytique et urémique

Observation : le premier enfant a présenté une pleuropneumopathie à pneumocoque et le second une pneumonie et une méningite à pneumocoque. Les enfants étaient âgés de moins de 1an et ont nécessité la dialyse avec amélioration de la fonction rénale dans un cas. L'évolution a été fatale dans l'autre cas

Conclusion : l'infection invasive à pneumocoque peut se compliquer d'une forme sévère de syndrome hémolytique et urémique d'où l'importance de dépister cette complication précocement afin d'améliorer la prise en charge.

MOTS-CLÉS

empyème, syndrome hémolytique et urémique, pneumonie, méningite, pneumocoque, enfant

SUMMARY

Background: Hemolytic uremic syndrome, one of the common causes of acute renal failure in children, is characterized by the triad of microangiopathy, haemolytic anemia, thrombocytopenia and acute renal failure. The diarrhoea-associated Hemolytic uremic syndrome is usually termed as a typical Hemolytic uremic syndrome. Streptococcus pneumoniae is an uncommon etiological pathogen for inducing Hemolytic uremic syndrome, and Streptococcus pneumoniae associated Hemolytic uremic syndrome is also termed as atypical hemolytic uremic syndrome.

Aim: to report two pediatric cases of invasive S pneumoniae complicated with hemolytic uremic syndrome HUS.

Case report: The first patient presented with pneumococcal pneumonia and empyema and the second patient presented with pneumococcal pneumonia and meningitis. The two patients were under one year of age and required peritoneal dialysis with improvement of renal function in one; the other died.

Conclusion: Pneumococcal invasive disease may be a cause of severe HUS, so a high index of suspicion is mandatory to prompt appropriate diagnosis and management.

KEY-WORDS

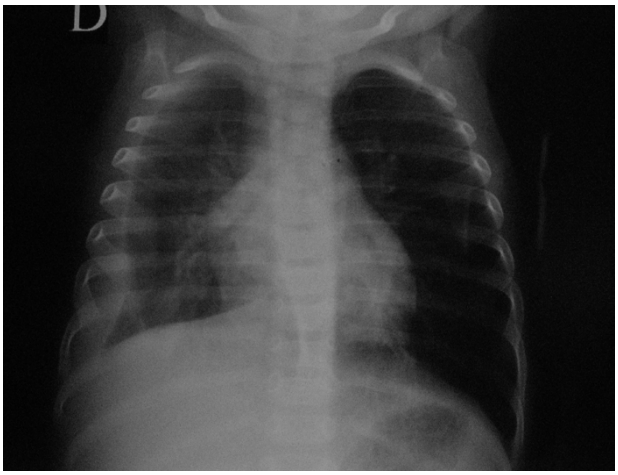
Empyema; Hemolytic-uremic syndrome; pneumonia; meningitis, streptococcus pneumoniae

Hemolytic uremic syndrome is characterized by the triad of microangiopathy, haemolytic anemia, thrombocytopenia and acute renal failure. Streptococcus pneumoniae is an uncommon etiological pathogen for inducing Hemolytic uremic syndrome, and Streptococcus pneumoniae associated Hemolytic uremic syndrome is also termed as atypical Hemolytic uremic syndrome. We report two cases of invasive S pneumoniae associated haemolytic uremic syndrome.

CASE 1

A 7-month-old girl was referred to our department for 7 days history of fever. On admission she was irritable, temperature body was 39°C, respiratory rate was 40 breaths /min, oxygen saturation was normal in room air, and heart rate was 110 beats /min. She had reduced right breath sound. Haemoglobin level was 8.3g/dl, MCV was 79.2 fl , reticulocytes was 25100, direct coombs' test was negative , white blood cells count was 3600, and platelets count was 225000. C reactive protein was 156.9mg/l, creatinine level was 23µmol/l, and her urea level was 2.8mmmol/l. Cerebrospinal fluid (CSF) examination showed a protein level of 0.1g/l and a glucose level of 3.5 mmol/l. White blood cells count was 1/mm3 and culture of CSF was negative. Urine culture was negative. Chest X ray showed right pneumonia with pleural effusion (Figure 1). Aspirated

Figure 1: Chest X ray showing right pneumonia with pleural effusion



pleural fluid revealed empyema. Cephotaxime and vancomycin were empirically started. Blood cultures grew subsequently S pneumoniae which was resistant to penicillin and susceptible to vancomycin. Pleural fluid culture was negative. This patient was treated conservatively without chest drain. On the 5th hospital day she was afebrile and presented upper digestive bleeding. Haemoglobin level dropped to 4g/dl and she received blood transfusion. Hemoglobin level raised to 11g/dl. On the 7th hospital day, the patient became oedematous and anuric. She presented dyspnea and vomiting. Blood urea nitrogen rose to 46 mmol/l, creatinine level to 360µmol/l, hemoglobin level dropped to 8.8g/dl and platelets count to 75 000. A smear of the peripheral blood demonstrated fragmented red blood cells and schistocytes consistent with microangiopathic hemolytic anemia. Prothrombin time was 81%. The patient was anuric and did not respond to furosemide. Renal ultrasound/doppler revealed two kidneys of normal size with hyperechogenic renal cortex. She required peritoneal dialysis for four months without any improvement of her renal function and died.

CASE 2

A 11-month-old boy was hospitalized for one week history of fever, dyspnoea and wheezing. He received antibiotics and steroids without improvement. On admission, he was sleepy; temperature body was 39°C, respiratory rate was 60 breaths /min, oxygen saturation was 86% in room air, and heart rate was 180 beats /min. This patient presented seizures which were controlled with treatment by Phenobarbital and Clonazepam. Haemoglobin level was 8.3g/dl, MCV was 79.2 fl, white blood cells count was 12900, and platelets count was 226000. C reactive protein was 304 mg/l. Cerebrospinal fluid (CSF) examination showed a protein level of 4.74g/l and a glucose level of 0.04g/l. White blood cells count was 300/mm3 and C-reactive protein in CSF was positive for S pneumomiae. Chest X-ray showed right pneumonia. Cephotaxime and vancomycin were started. This patient needed respiratory assistance for his respiratory distress. He was oligo-anuric and developed hypertension. Blood urea nitrogen was 35 mmol/l, creatinine level was 346µmol/l. Hemoglobin level dropped to 6g/dl and platelets count to 23 000. A smear of the peripheral blood demonstrated fragmented red blood cells and schistocytes consistent with microangiopathic hemolytic anemia. The prothrombin time was 100% and fibrinogen was 7 g/l. This patient required peritoneal dialysis, platelets and packed red blood cell transfusions. Renal function improved after 11 days of peritoneal dialysis. However, his clinical course was further complicated by subdural hematoma which was evacuated and by hydrocephaly which was derived. At 4 months of follow up, this patient had a normal renal function, haemoglobin level and platelets count; however he had right hemiparesia.

DISCUSSION

S. pneumoniae-associated HUS is rare; however its incidence seems to be increasing [1]. S pneumonia associated HUS patients commonly had a presentation of pneumococcal pneumonia or meningitis [2]. HUS is less common after pneumococcal meningitis than pulmonary disease [2]. The pneumococcal organism produces a neuramidase enzyme, which can expose an antigen (T-antigen) present on erythrocytes, platelets, and glomeruli. Antibodies to the T-antigen , normally found in human serum, bird the exposed T-antigen , and the resultant antigen-antibody reaction (T-activation) can lead to HUS and anemia [3,4]. T-antigen activation occurs more frequently in infants and small children. This suggests that age-related antigen-antibody reaction may contribute to the tendency for the development of S pneumoniae associated HUS in very young children [5]. Pneumococcal serotype 14 has been previously associated with HUS, in addition to 6B, 9V, 19, 3, 8 and 23F[2,3];There are no

current data about whether specific serotypes or virulence factors, a part from neuraminidase, are important in the pathogenesis of HUS. Detection of red cell T-antigen activation was not performed in the patients because the tests were not available in Tunisia. The diagnosis of HUS in our patients was made on the association of thrombocytopenia, microangiopathic anemia, and renal insufficiency. HUS was distinguished from disseminated intravascular coagulation by a normal fibrinogen level and or normal prothrombin time and partial thromboplastin time. Treatment of S pneumonia-associated HUS is aimed at supportive care and treatment of underlying infection [6]. Generally S pneumonia associated HUS patients are more likely to require dialysis (range 75% to 100%) , had more severe renal and haematological disease and a longer hospital stay than typical HUS patients[7]. Acute mortality remains high in S pneumonia- associated HUS cases [6]. Most patients died during the early phase of the disease from severe infection and neurological complications. However mortality appears to have been reducing in recent years. This can be attributed to early recognition of the disease, advances in the intensive care and dialysis intervention. In the first case, the infant had impairment of renal function after three months of peritoneal dialysis. In the second case, the renal function normalized at 11 days of dialysis; however, the infant developed neurological complications: subdural hematoma, hydrocephaly and hemiparesia.

HUS remains a rare but a severe complication of invasive pneumococcal disease. Children with pneumococcal disease and severe haematological or renal abnormalities should be investigated for evidence of HUS.

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