CASE REPORT

A CASE SERIES OF ACUTE RESPIRATORY DISTRESS SYNDROME IN CHILDREN WITH PLASMODIUM FALCIPARAM MALARIA

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Abstract

Occurrence of acute respiratory distress syndrome (ARDS) is a relatively rare complication in paediatric patients with malaria. During the time of increase transmission we had three children, from Kanpur city that developed ARDS as a fatal complication of falciparum malaria. In all cases, ARDS was diagnosed by the presence of hypoxia with PaO2 / FiO2 ratio < 200 and bilateral pulmonary infiltration, and by excluding cardiac disease by echocardiography. Treatment with intravenous quinine with early mechanical ventilation was life saving in all the three cases.

Key words: Acute respiratory distress syndrome; mechanical ventilation.

Introduction

Malaria due to Plasmodium falciparum is responsible for the majority of deaths among non-immune patients, and its treatment should be considered an emergency, as severe complications may appear within a matter of hours. (1) Acute respiratory distress syndrome (ARDS) may develop as a severe complication of malaria, and ARDS has a high mortality (80%). (1-3) Some authors consider ARDS the principal cause of death in children with malaria. (4) We present three children, who developed ARDS as a fatal complication of falciparum malaria.

Case 1:

A 4 years old girl presented with fever, vomiting, loss of appetite and breathlessness. On examination child was febrile, pale, was in respiratory distress and cardiovascular system (CVS) examination showed ejection systolic murmur. There was hepatosplenomegaly. Peripheral smear showed gametocytes of P. falciparum. Investigations and antimalarials used are depicted in Table 1. Child also received packed cell transfusion, oxygen with mask. On second day of admission, distress increased and child was started with nasal continuous positive airway pressure (CPAP). X-ray picture showed bilateral alveolar interstitial infiltrates (Fig. 1). Echocardiography was normal. Arterial blood gas (ABG) analysis showed PaO2 47 mmHg on 50% FiO2, PaCO2 36 mmHg, bicarbonate 22.3 meq/l. Pao2/ FiO2 was 97. Child was intubated and put on synchronized intermittent mandatory ventilation (SIMV) mode of mechanical ventilation. Injection Vancomycin was added. Intravenous fluid was restricted to 2/3rd of the maintenance. Gradually with this treatment the child improved and FiO2 requirement reduced, child was extubated after 72 hours. Child was discharged after 2 weeks of hospital stay.

Case 2:

An 11 yrs old boy presented with fever for 5 days and was breathless on admission. On examination he had pallor, respiratory rate of 32/min and hepatosplenomegaly,. Respiratory system examination was normal. Dengue serology was negative and peripheral smear was positive for P. falciparum. Investigations and antimalarials are depicted in Table 1. Patient was put on bilevel positive airway pressure (BPAP). On third day of admission, he developed respiratory distress and crepitations. Chest X-ray showed bilateral diffuse infiltrates with no cardiomegaly. Echocardiography was normal. PaO2/Fi02 was 57.1. Patient was put on SIMV mode of ventilation with fluid restriction, furosemide. After 72 hours of mechanical ventilation the patient was shifted to BPAP that was gradually withdrawn.

Case 3:

A 6 year old boy presented with gasping respiration. He was immediately intubated and put on mechanical ventilation. The attendants gave the history of high grade fever for 3 days followed by respiratory distress for 12 hours. ABG showed PaO2-58 mmHg, PaCO2 57 mmHg, Ph-7.28. They had a report of P. falciparam on peripheral smear. Chest X-ray showed bilateral pulmonary infiltrates with no cardiomegaly. PaO2 / FiO2 ratio was < 200. Echocardiography was normal. Investigations and antimalarials are depicted in Table 1. Packed cell transfusion was given. Patient was extubated after 48 hours, shifted to oral quinine and successfully discharged.

Table 1: Clinical profile of all 3 patients

	Patient 1	Patient 2	Patient 3
Hemoglobin (gm%)	2.4	8.7	4
White cell count (cells/ cumm)	8700	16000	7800
Platelet count (cells/cumm)	1,00,000	80,000	1,50,000
SGOT (IU/ml)	940	550	110
S. creatinine (mg/dl)	0.6	0.9	0.5
Parasitic Index	10%	5%	4%
Blood culture	Sterile	Sterile	Sterile
Treatment	Quinine + lindamycin	Quinine + Clindamy-cin	Quinine + Clindamy-cin

Figure 1: Chest X-ray of first patient showing white out lung

Discussion

Acute lung injury (ALI) is seen in patients with other complications of malaria including acute renal failure, hypotension and cerebral malaria. From the western literature, ALI secondary to P. falciparum malaria, is not uncommon in adults, and has been reported to occur in up to 30% of malaria patients who require admission to the intensive care unit. In contrast, ALI is a relatively rare complication in pediatric patients. (5) According to the Indian published data, about 5% patients with uncomplicated falciparum malaria and 20-30% patients with severe and complicated malaria requiring intensive care unit (ICU) admission may develop ARDS. (6)

The pathogenesis and pathophysiology of ARDS secondary to malaria are still unclear although they may be due to a pulmonary microvascular dysfunction secondary to the liberation of inflammatory mediators, which increase vascular permeability. (1) Sarkar S et al have published ARDS associated with P. vivax malaria which is a rare complication however they used chloroquine for the treatment. (7) Since our patients had falciparum malaria, we treated all of them with quinine and clindamycin. There is a case report of ARDS with P. falciparam malaria in a 12 year old girl, who had returned to UK from Nigeria. She was treated with IV quinine, with mechanical ventilation for 4 days. She also had mild renal impairment. (5) Renal functions were normal in all our patients. In a study done on children with a primary diagnosis of severe malaria requiring endotracheal intubation, it was concluded that outcome of children requiring intubation for malaria depends more on clinical presentation and progression towards organ failures than on critical care complications per se. (8) In none of the our cases there were features of multiple organ system involvement, which was also responsible for favourable outcome.

Conclusion

ARDS without other organ dysfunctions is associated with favourable outcome in children with malaria. Intravenous Quinine, early institution of mechanical ventilation is life saving.

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