



A CASE SERIES OF SCRUB TYPHUS IN PEDIATRICS MASQUERADING AS SIRS

Pediatrics

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ABSTRACT

Rickettsial infections form one of the most covert emerging infections of recent times. Scrub typhus is a febrile infection caused by bacteria *Orientia tsutsugamushi* (family Rickettsiaceae) and transmitted by the bite of an infected larval trombiculid mite of *Leptotrombidium* (chiggers). We are reporting this case series to highlight the significance of thorough history taking and clinical examination, and to raise awareness of its complications like Systemic Inflammatory Response syndrome (SIRS), which could be the presenting feature as in our cases. Three children presented to our casualty between the months of October 2022 – January 2023 with pyrexia of unknown origin. All the three children tested positive for Scrub typhus IgM. Intravenous Doxycycline was given at a dose of 4mg/kg/day in twice-a-day dosing regimen. General condition and blood parameters improved in within 72 hours of starting Doxycycline. Scrub typhus needs to be considered in the differential diagnosis of acute febrile illness, including those presenting with pneumonitis, atypical pneumonia, ARDS, thrombocytopenia and altered sensorium. The diagnosis may be missed in the absence of rash or a typical eschar, or if the eschar is present in hidden areas of the body, such as the axilla or scrotum. However the diagnostic tests such as Weil-Felix and IgM ELISA are cheap and inexpensive. A high degree of suspicion along with a thorough clinical examination is needed to diagnose this disease. One must be aware of its complications and atypical presentations, as a timely diagnosis can reduce the morbidity and mortality associated with this disease.

KEYWORDS

INTRODUCTION:

Rickettsial infections form one of the most covert emerging infections of recent times. Scrub typhus is a febrile infection caused by bacteria *Orientia tsutsugamushi* and transmitted by the bite of an infected larval trombiculid mite of *Leptotrombidium* (chiggers). Annually, over one million new infections are detected worldwide, including India during the summer and autumn months. The diagnosis is challenging, since the clinical presentation closely mimics viral, bacterial and protozoal infections. We are reporting this case series to highlight the significance of thorough history taking and clinical examination, and to raise awareness of its complications like Systemic Inflammatory Response syndrome (SIRS), which could be the presenting feature as in our cases.

CLINICAL DETAILS:

Three children presented to our casualty between the months of October 2022 – January 2023 with pyrexia of unknown origin. All three children were referred to us in view of Systemic Inflammatory Response Syndrome.

The demographic features and clinical presentation of the 3 children are summarised in table 1.

Table 1

	CASE 1	CASE 2	CASE 3
Age of child	13 years	1 year	4 years
Weight	86.8 kgs	7.8	14
Height	161cm	69cm	98cm
Pre-existing comorbidities	Obesity	Nil	Nil
Fever	+	+	+
Duration of fever	7 days	6 days	6 days
Respiratory symptoms	+	+	+
Altered sensorium	+	+	-
Duration of hospital stay	10 days	8 days	7 days

On receiving in casualty, case 1 and 2 had profound hypoxemia and respiratory distress with shock. Case 3 was hypoxic but hemodynamically stable. Blood gas and Chest X-Ray of all three children (Figure 1, 2 and 3) showed classical features of severe Acute Respiratory Distress Syndrome.

The laboratory parameters of the three cases are summarised in table 2.

Table 2

	CASE 1	CASE 2	CASE 3
Hemoglobin (gm/dL)	10.2	7.7	10.9
Total count (cells/cumm)	4200	29900	13600

ANC (cells/cumm)	3612	23920	8976
Lymphocyte count (cells/cumm)	504	4485	3536
Platelet(cells/cumm)	60000	68000	122000
ESR (mm/hr)	14	3	24
CRP (mg/L)		78.38	74.46
PF Ratio	78	93	210
OI Ratio	28	18	NA

PF Ratio (Arterial PO₂/FiO₂ ratio): PO₂ X 100 / FiO₂

OI Ratio (Oxygenation Index) : FiO₂ x Mean Airway Pressure / PaO₂

MANAGEMENT AND OUTCOME:

All the three cases presented to us after one week of fever with shock, worsening respiratory distress and poor sensorium. In view of severe respiratory distress with poor GCS, two of the three children were intubated at admission. One child was connected to non invasive ventilation(HFNC). Shock was treated with fluid boluses and inotropic agents.

Eschar was identified only in 1 out of the 3 children. Subsequently all the children were worked up for Covid and tropical infection scrub, dengue, typhoid and malaria. Cultures were sterile. Treatment was started with empirical IV antibiotic therapy and IV Doxycycline. All the three children tested positive for Scrub typhus IgM. Intravenous Doxycycline was given at a dose of 4mg/kg/day in twice-a-day dosing regimen. General condition and blood parameters improved in within 72 hours of starting Doxycycline. Echo done was non-contributory. Children required intensive care monitoring and mechanical ventilatory support for an average of 4 days, following which they were gradually weaned off from the ventilator.



Figure 1 : X-RAY OF CASE 1

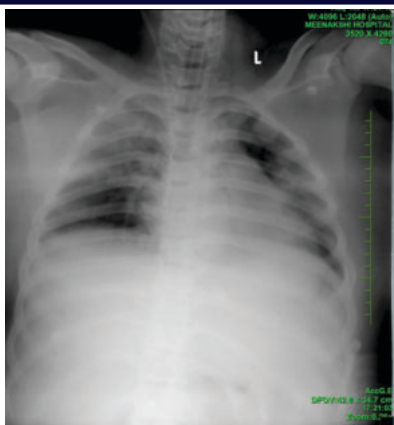


Figure 2: X-ray Of Case 2

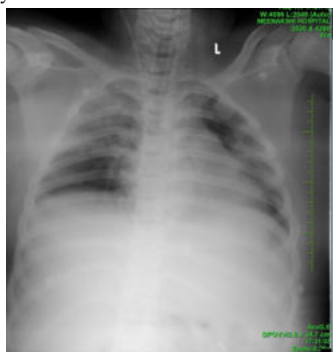


Figure 3 : X-ray Of Case 3

DISCUSSION:

Scrub typhus is an acute Rickettsial infection caused by the bacterium *Orientia Tsutsugamushi*¹. Rickettsial infections have been on the rise in recent times as an important re-emerging infection and Scrub Typhus is the most common infection in both pediatric and adult populations². Estimated annual incidence in India is approximately one million case per year. Though Scrub typhus with MODS and ARDS has been well studied in adult populations, further data is required in the pediatric population.

Classical presentation is high grade fever with myalgia. Scrub typhus needs to be considered in the differential diagnosis of acute febrile illness, including those presenting with pneumonitis, atypical pneumonia, ARDS, thrombocytopenia and altered sensorium³.

The target cells of *O. tsutsugamushi* are endothelial cells and macrophages. It disseminates into multiple organs through endothelial cells and located predominantly in the macrophages of liver and spleen. Disseminated vasculitis with perivasculitis is the hallmark of Scrub typhus and involvement of brain and lungs are the most important factors in fatal outcome⁴. Complications in Scrub typhus usually develop after first week of illness and is directly related to blood levels of *O. tsutsugamushi*. The most common organ dysfunction was hepatitis followed by MODS, ARDS, circulatory collapse, meningoencephalitis and AKI.

The pathognomonic feature of Rickettsial infection is eschar – a crusty, necrotic lesion with or without surrounding halo. Common areas of appearance of eschar are axilla, inguinal and perineal area, scrotum, buttocks, behind auricle and thighs. However, this is rarely identified in pediatric population, making the diagnosis further difficult. Studies suggest eschar is present in only about 11% of cases⁷.

The initial clinical symptoms of scrub typhus are non-specific like other viral illnesses or malaria. There is a good chance of misdiagnosis due to lack of awareness of the disease and non-availability of the specific serological test. The diagnosis may be missed in the absence of rash or a typical eschar, or if the eschar is present in hidden areas of the body. However the diagnostic tests such as Weil-Felix and IgM ELISA are cheap and inexpensive.^{6,7}

mg twice daily for 7 days orally or intravenously⁸. While the response to treatment is often dramatic, failure of defervescence within 48 h should raise the suspicion of an alternative diagnosis. Treatment should be initiated while awaiting lab confirmation as delay in treatment might prove to be fatal⁹. The main management goals should anchor around treating the underlying cause, maintaining adequate oxygenation as well as avoiding secondary lung injury and extra pulmonary complications¹⁰. Strict monitoring and ICU care should be provided to sick patients as our cases to prevent multiple organ failure and mortality.

CONCLUSION:

Scrub typhus is an underdiagnosed cause of acute undifferentiated febrile illness with ARDS. A high degree of suspicion along with a thorough clinical examination is needed to diagnose this disease. One must be aware of its complications and atypical presentations, as a timely diagnosis can reduce the morbidity and mortality associated with this disease.

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