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A Key Predictor for Scrub Typhus is Thrombocytopenia: A Prospective Observational Study in Andhra Pradesh, South India

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ABSTRACT

Back ground: Scrub typhus is a mite born and serious health problem in public of Asia and Australia, mortality can be decreased through early diagnosis or detection and improve patient quality of life. Thrombocytopenia is also included along with other parameters for accurate and early diagnosis. An early diagnosis and institution of specific treatment will reduce morbidity and mortality from scrub typhus infectious disease.

Materials and Methods: Hospital based prospective observational study was carried out for1 year in scrub typhus positive patients in the department of General medicine. Data of 120 patients were collected, evaluated and categorized using prospective analysis. This study, we discussed mainly the importance of differential diagnostic clues, clinical manifestations of this disease vary from minimal disease to severe fatal illness with multi-organ dysfunction.

Results: out of 120 patients, 31- 45 age group patients have shown more prevalence. A total of 120 cases, female patients 70 (58.34%)and male patients 50 (41.66%). The detail investigative options for thrombocytopenia patients in absence of pathogenic eschar for early diagnosis of diseases other than scrub typhus.

Conclusion: Clinical clues like thrombocytopenia, eschar useful for early recognition of scrub typhus and designed flow chart mentioned in this study is useful for the treatment pattern to early recovery of patient. Delayed diagnosis may lead to possible complications and increases the cost burden to the patient. The main task of health care sector is affordable health care, which includes better patient compliance to decrease the cost burden on patients.

Keywords: Thrombocytopenia, Scrub typhus, Eschar

INTRODUCTION

Scrub typhus is previously called rickessia caused by a mite i.e orientiatsutsugamushi and vector borne disease (leptotrombidium species). The severity of disease depends on the strain of organism involved & host. Scrub typhus is an acute febrile illness which generally causes nonspecific symptoms and signs. Scrub typhus fever is the most common symptom, and in endemic regions, it is one of the causes of fever of unknown origin[1].Scrub typhus is one of the differential diagnoses for fever with thrombocytopenia. Scrub typhus can manifest with either nonspecific febrile illness/with symptoms/organ dysfunction[2]. Diagnosis of scrub typhus is challenging because its symptoms mimic with other disease. Thrombocytopenia (decreased platelet count) is the most common presenting complaint in the emergency & outpatient clinics in developing countries, Clinical symptoms of scrub typhus mimicking other prevalent diseases such as dengue, malaria, leptospirosis, ITP (immunothrombocytopenia), bone marrow diseases, chemotherapy, viral infections. Some of these diseases can cause severe thrombocytopenia, which can be life-threatening. The presence of thrombocytopenia in acute febrile illness should alert the clinician to identify the aetiology and prompt treatment of the patient[3]. In recent years, scrub typhus rapidly emerged to become a major cause of thrombocytopenia, so including monitoring of platelet count for early diagnosis is mandatory. Scrub typhus is one of the differential diagnoses for fever with thrombocytopenia or hemorrhagic fever[4]. Scrub typhus has a variety of clinical manifestations, ranging from subclinical disease to multiorgan failure and death[5].An early diagnosis and institution of specific treatment will reduce

morbidity and mortality from this infectious disease. High mortality is caused by factors such as the organism's varying levels of antibiotic resistance, late presentation, and delay in diagnosis and treatment[6]. All details were recorded in designing proforma which includes demographic details, past history for present illness, comorbidities, any previous treatment history and also vitals, investigations required for diagnosis the patient. Peripheral smear plays an important role to confirm the scrub typhus because the manual count by a pathologist is different from bioanalyzer count of platelets.

METERIALS AND METHODS

A hospital-based Prospective observational study was conducted in the Department of General Medicine at Government teaching general hospital, Rajahmundry, India. We collected 120 patient's data without interrupting the patient treatment and without involvement of the patients. We were using the specially designed format for collecting the different parameters like comorbidities, patient, demographic, past and personal history and medications prescribed for the patient. The required data were collected from the case files of the patient and patient counselling in ward rounds. Special monitoring was needed for thrombocytopenia progress for every diagnostic test.

Study Site: Government Teaching General Hospital, Rajahmundry, Andhra Pradesh, India.

Study Duration: Six months (Jan 2023 to Dec 2023)

Inclusion Criteria:

1. Patients of both genders.
2. Patients of any age.
3. Patient with past and personal history, comorbid conditions.

Exclusion Criteria:

1. Patients who left without medical advice.
2. Pregnant and lactating women.
3. Patient with chronic history like ITP, Anemia, Cancer-related issues etc.

Data Analysis: Data were analyzed with MS Excel and descriptive statistics were used for analyzing the result of the study.

RESULTS

Table – 1 Demographic and clinical data of patients (*N*= 120)

Characteristic	***N* (%)**
Age (years)	
15 – 30	**13 (10.8)**
31 – 45	**84 (70)**
45 – 60	**21 (17.5)**
>60	**2 (1.7)**
Sex	
Male	**50 (41.66)**
Female	**70 (58.34)**
Duration of symptoms (days)	
<5	**24 (20)**
5 – 10	**89 (74.16)**
>10	**7 (5.84)**
Residence	
Rural	**92 (76.2)**
Urban	**28 (23.34)**
Symptoms	
Fever	**120 (100)**
Body pains	**84 (70)**
Rash	**15 (12.5)**
Nausea/vomiting	**27 (22.5)**

Cough	**63 (52.5)**
Headache	**69 (57.5)**
Others	**22 (18.33)**
Signs	
Platelet count <30000/Cumm	**107 (89.16)**
Hypotension/shock	**44 (36.66)**
Hepatitis	**35 (29.16)**
Eschar	**87 (72.5)**
Co-morbidities	
DM	**17(14.16)**
Hypertension	**22 (18.33)**
Hypothyroidism	**4 (3.33)**
DM + HTN	**5 (4.16)**

The main strength of this study is that we included confirmed cases of scrub typhus who had scrub typhus ELISA positive and Eschar present + platelet count <30000/cummmajority of them are housewives and students constituted the two major occupational subgroups.

DISCUSSION

When a patient with an AFI had a positive scrub typhus serology, the presence of eschar or the absence of any other fever-causing factors strengthened the diagnosis of scrub typhus.Most common fevers are associated with chills also adiagnosis of scrub typhus is difficult in India because of its varied clinical presentation, absence of eschar in many patients, and lack of specific tests available (ELISA/serological tests).Patients who appeared to have mixedinfections had significantly higher median plateletcounts and significantly lower median serum bilirubinand creatinine concentrations than did individuals with leptospirosis alone. Scrub typhus should be included in the list of differentials while evaluating a patient of acute undifferentiated febrile illnesses from a rural background in a tropical country like India[7]. The clinical manifestations of this disease vary from minimal disease to severe fatal illness with multi-organ dysfunction. Using clinical features and initial laboratory values, this study may assist in the early diagnosis of scrub typhus, allowing for the prompt administration of a specific antibiotic (Doxycycline)can prevent the occurrence or reduce the severity of ARDS[2]. Ourpatients too presented with similar clinical manifestations andthese have been reported in another study from the Indian subcontinent[8].The possibility of scrub typhus infection should be considered in leptospirosis patients who respond poorly to treatment or who have a typical disease manifestations [9].

Clinical clues for Differential Diagnosis:
Diagnosis of scrub typhus is difficult in India because of its varied clinical presentation, absence of eschar in many patients, in developing countries with limited resources such as India, we suggest that the diagnosis of scrub typhus should be based largely on a high index of suspicion and careful clinical, laboratory and epidemiological evaluation[10].

The symptoms may be mild and the clinical course self-limited, with spontaneous recovery after a few days in some cases.

In middle income countries like India, most of the people are economically poor, so we have to advise the minimum laboratory tests to avoid economic burden to the patients. In view of these laboratory tests need to be advised based on clinical features. Intermittent fever, rash, body aches, exhaustion, headache, myalgia, and widespread lymphadenopathy are frequently present in the clinical presentation of scrub typhus. Scrub typhus or murine typhus may present with skin eschar regional lymphadenopathy and a maculopapular rash.

The clinical manifestations of this disease vary from minimal disease to severe fatal illness with multi-organ dysfunction. Our patients too presented with similar clinical manifestations and these have been reported in another study from the Indian subcontinent[11]. There have been reports of sporadic outbreaks of scrub typhus mainly in the eastern and southern Indian states with serological evidence of widespread prevalence of spotted fevers and scrub typhus[12, 13] particularly during the monsoon and post monsoon months,[14,13,15,16]. The study relied on IgM positivity through ELISA while indirect immunofluorescence assay is considered the gold standard test for scrub typhus diagnosis.

Prophylactic treatment:
It is crucial to determine the prevalence and epidemiology of the causative pathogens to develop protocols for empiric antibiotics[17]. Azithromycin has been proved extra powerful than doxycycline in the doxycycline-prone and doxycycline-resistant lines inflicting scrub typhus.

Treatment with oral antibiotics can be undertaken in mild cases, however injectable treatment is recommended for seriously ill patients. Resistance to tetracycline has been mentioned in few areas[18]. No powerful vaccine has been evolved for scrub typhus[19, 20, 21].

Complications in early diagnosis:
Complications in scrub typhus broaden after the primary week of illness. Delay in diagnosis, complications, or mortality are possible outcomes of atypical clinical characteristics and the absence of eschars[19].

The main worry is that when the distinctive eschars are missing, misdiagnosis happens[22]. In scrub typhus, gastrointestinal tract involvement might also additionally cause haemorrhage and sufferers can increase superficial mucosal haemorrhage, more than one erosion, and ulcers with none predilection sites. The endoscopic capabilities are associated with cutaneous lesions and severity of the disease [23].

Misconceptions (false assumptions):
The eschar resembles the skin burn of a cigarette but in a hospital based study[11], noted fever (100%), chills (39%), cough (24%), headache (21%), diarrhoea (18%), eschar (60%), adenopathy (33%) and rash (21%) in sufferers of scrub typhus. Respiratory complications may associate in late diagnosis of scrub typhus. Insect bites, especially spider bites, and posttraumatic scabs are differentials for a scrub-typhus eschar[24]. A low platelet count (<140,000/cm) and low white blood cell count (<5,000/cm) are also strongly related to dengue infections [25].

CONCLUSION

In this study conclude that the identification of scrub typhus in the early days of fever is useful to treat patient effectively, however the diagnosis of scrub typhus in the late days of fever leads to false assumptions. The high prevalence noted indicates that scrub typhus is more common among people who reside near trees, gardens, and farming fields. Early identification and optimization of empirical antibiotics in patients can be improved by primary health care physicians or first consultant physicians.

Clinical clues like thrombocytopenia, eschar useful for early recognition of scrub typhus and designed a flow chart mentioned in this study is useful for the treatment pattern to early recovery of patients. The cost of laboratory investigations and medical treatment can be increased by late diagnosis of patients, which may lead to potential complications.

The primary objective of the health care sector is to provide affordable health care, which requires improved patient compliance to decrease the burden on patients.

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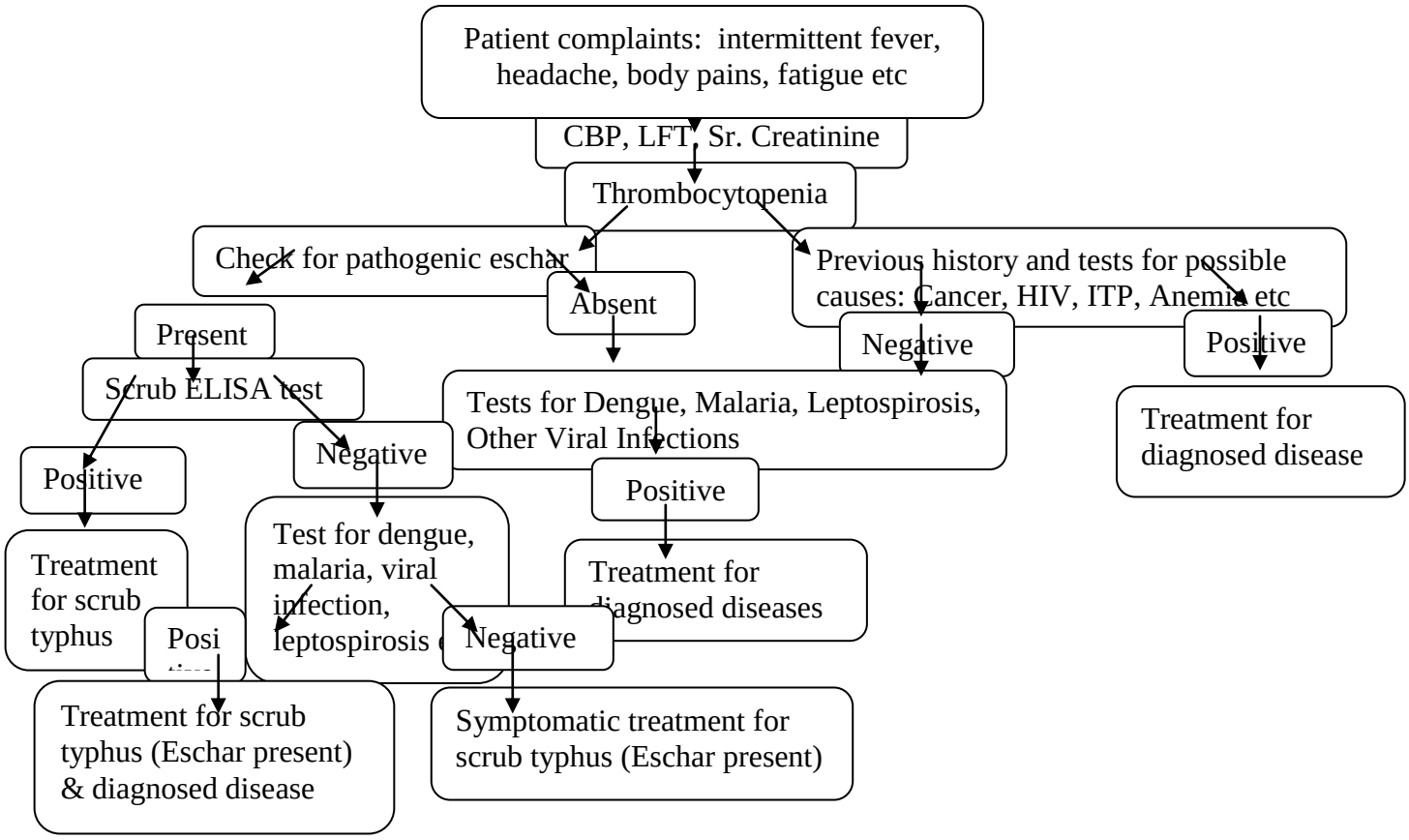

Fatigue: Flow chart to diagnosis of different fevers.