



A STUDY OF CARDIAC MANIFESTATIONS IN SCRUB TYPHUS FEVER

General Medicine

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ABSTRACT

This work was about spotted fever, a rickettsiosis infection caused by *Orientia Tsutsugamushi*. The purpose of the study was to compare the outcomes of typhus patients with and without myocarditis and to examine the spectrum of cardiac manifestations in typhus infection in Eastern Medical School and Hospital, Ragolu, Srikakulam, Andra Pradesh and the study was carried out at 81 patients performed. Simple descriptive statistical analyzers are used as materials and methods. Cardiovascular manifestations were assessed using cardiac biomarkers, electrocardiogram and echocardiogram. The development of myocarditis increased the need for ventilation, increased the duration of the intensive care unit and hospitalization. Myocarditis was not associated with worse mortality in our cohort

KEYWORDS

Scrub typhus, myocarditis, acute febrile illness, cardiac biomarkers

INTRODUCTION

Scrub typhoid is an infection caused by *Orientia Tsutsugamushi*, which is caused by a *Rickettsia*. Typhus is still poorly understood, particularly in Asia, where rickettsial disease can cause up to 28% of non-malarial fevers. This disease can present itself in many ways, from mild symptoms to organ failure and death. Scrub typhoid begins with fever, headache, lymphadenopathy, rash, and scabs. The complications of bush typhoid usually show up in the second week of illness.

This disease has many well-known difficulties, including jaundice, renal failure, pneumonitis, ARDS, septic shock, myocardium, and meningoencephalitis. It is believed that around one million cases of bush typhus occur annually in Southeast Asia alone. In terms of mortality rates, this means that between 50,000 and 80,000 people die every year. It is not clear that bush fever can cause myocardial disease and death. Myocarditis can be caused by spreading endothelial infection of small vessels or by secondary immune-mediated mononuclear inflammation.

Objectives of the study

1. To Find out the different ways scrub typhus affects the heart.
2. To figure out how often Myocarditis happens
3. To see how patients with scrub typhus with and without Myocarditis fared.

MATERIALS&METHODS

Source of Data:

The study was done on 81 people who were hospitalized at Great Eastern Medical School and Hospital in Ragolu, Srikakulam, Andhra Pradesh, and whose scrub IgM ELISA results were positive.

Study period: August 2020 to November 2021

Study Design: Cohort study that looks ahead

Inclusion criteria:

- 1) Age of 16+
- 2) Acute febrile illness (AFI) that meets the criteria for a scrub typhus diagnosis
- 3) After the first clinical evaluation, there was no obvious source of infection.

Criteria For Diagnosis:

Negative for other serologies such as Dengue, Malaria, and more., but positive for Scrub IgM ELISA or the presence of eschar on the body.

Exclusion criteria:

1. Possible Diagnosis Other Than Scrub Typhus
2. Patients with autoimmune diseases
3. Seropositive for both Scrub and Dengue

Statistic evaluation

Fisher's exact test and the student t-test were used to comparing the results of categorical and continuous variables. All continuous data were shown as the mean plus the standard deviation unless the data did not follow a normal distribution. A p-value of 0.05 was considered statistically significant in all analyses.

RESULTS

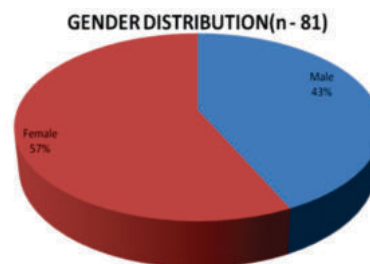


Figure 1: Out of 81 patients, 57%, 46 are female, and 43%, that is, 35 patients, are males.

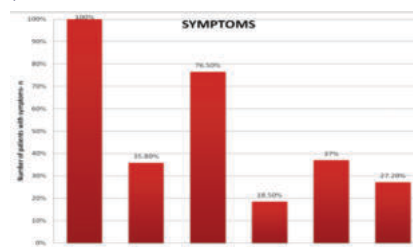


Figure 2: Out of 81 patients, all have a fever, 76.50% have Dyspnea, 37% have myalgia, 35.80% have a cough, 27.20% have altered mental status, and 27.20% have vomiting.

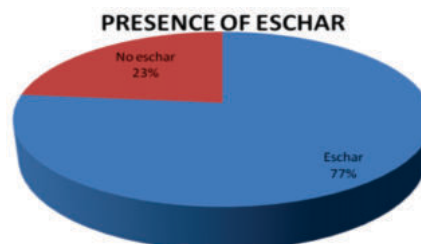


Figure 3: Out of 81 patients, 62 had eschar (77%), and 19 had no eschar (23%).

PERCENTAGE OF DIFFERENT ORGAN INVOLVEMENT IN SCRUB TYPHUS (n=81)

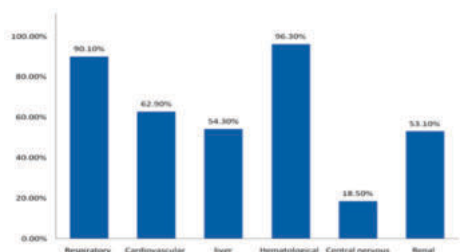


Figure 4: 96% of patients have hematological abnormalities, 90% have respiratory system involvement, 62% have Cardiac involvement, 54% have liver involvement, 53% have renal participation, and 18% have central nervous system involvement.

PERICARDIAL EFFUSION

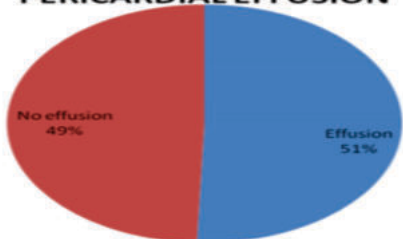


Figure 5: Out of 81 patients, 41 have pericardial effusion (51%), and 40 subjects do not have pericardial effusion (49%).

CARDIOVASCULAR MANIFESTATIONS IN SCRUB TYPHUS (n=81)

Characteristic	Number	mean	SD	95 % CI
a. Cardiac biomarkers				
CKMB	81	6.69	9.4	4.88-9.07
Troponin T	81	83.1	212.2	36.21- 130.04
b. Echocardiography findings				
LVEF	81	57.59	14.16	54.46-60.72
Cardiac output	63	4.37	1.38	4.02-4.71

Figure 6: Cardiovascular Manifestation in Scrub Typhus

OUTCOME VARIABLES IN PATIENTS WITH SCRUB TYPHUS (n=81)

Primary outcomes	
Variable	Frequency (%)
Myocarditis	17 (21)
Myocardial dysfunction	25 (30.9)
Myocardial injury	50 (61.7)

Figure 7: Outcome Variables in Patients with Scrub typhus

ELECTROCARDIOGRAPHIC FINDINGS IN SCRUB TYPHUS

Sinus Tachycardia	38(46.9)
ST-T changes	10 (12.3)
T wave inversion	8 (9.9)
QRS morphology changes	11 (13.6)
Supraventricular tachycardia	1 (1.2)
Atrial fibrillation	3 (3.7)
Wide QRS tachycardia	1 (1.2)
Sinus bradyarrhythmia	5 (6.2)

Figure 8: Electrocardiographic Finding in Scrub Typhus

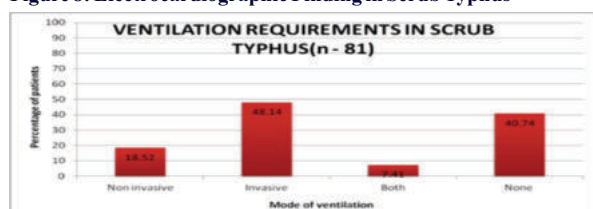


Figure 9: 48% of patients required an invasive ventilation

mode, 40% did not require any ventilation method, 18% required a non-invasive way of ventilation, and 7% needed both invasive and non-invasive modes.

COMPARISON OF OUTCOMES IN PATIENTS WITH SCRUB TYPHUS WITH AND WITHOUT MYOCARDITIS

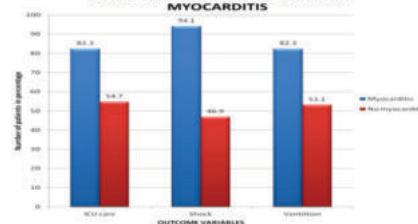


Figure 10: In ICU, out of 82% of patients, 54% developed Myocarditis; out of 94% of patients in shock, 46% developed Myocarditis. Out of 82% of patients on ventilators, 53% developed Myocarditis.

COMPARISON OF SYMPTOMATOLOGY WITH AND WITHOUT MYOCARDITIS

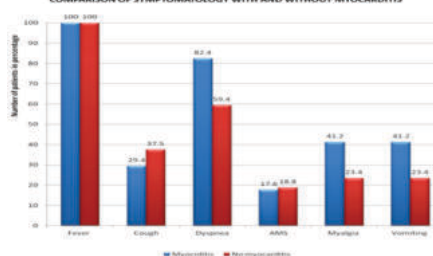


Figure 11: All patients with fever had Myocarditis. Out of all patients with cough, 29% had Myocarditis, 82% of patients with Dyspnea had Myocarditis, 17% of patients with altered mental status had Myocarditis, 41% of patients with myalgia had Myocarditis and 41% of patients with vomiting had Myocarditis.

DISCUSSION

Typhoid is one of the most common causes of sudden fever with problems in more than one organ. But the extent and impact of heart symptoms in bush fever is unknown. The effect on the heart was measured using cardiac biomarkers, an electrocardiogram and an echocardiogram. The mean (SD) levels of CKMB and troponin T were 6.69-9.4 ng/mL and 83.1-212.2 pg/mL, respectively. Because troponin T is a more sensitive marker of myocyte damage in patients with clinically suspected myocarditis, it has been used to screen patients for myocarditis. Myocarditis was assumed only when both myocardial damage and global myocardial dysfunction were present. For this reason, an overestimated rate of myocardial injury did not affect the prevalence of myocarditis in our group. All had an echocardiogram and the mean left ventricular ejection fraction was $57.59 \pm 14.16\%$. The average output of the heart was 4.37 ± 1.38 liters. Most of these patients had sinus tachycardia, found in 38 (46.9%). Pericardial effusion was found in 41 (51%) of our patients. Twelve patients had regional wall motion problems and 7 of them had myocarditis. The mean number of days in the ICU was 4.2-4.4 and the mean number in the hospital 9.2-4.7. 63.8% of patients required invasive ventilation and 17.2% non-invasive ventilation. The all-cause mortality rate for our group was 9.9%.

CONCLUSION

Myocarditis was found in 21% of the GEMS hospital scrub typhoid patients who were in our group. Myocardial damage was observed in 61.7% of participants and myocardial dysfunction in 30.9%. 51% of cases had mild to moderate pericardial effusion, meaning the heart was affected. The ECG changes were not very marked and sinus tachycardia was the most common finding in this group. Myocarditis made it more critical to use ventilation and increased time spent in the ICU and hospital. In our group, myocarditis was not associated with a higher mortality rate.

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