WEEKLY EPIDEMIOLOGICAL REPORT

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Ministry of Health

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Scrub Typhus (Part I)

This is the first in a series of two articles on Scrub typhus

Background

Scrub typhus is an acute, febrile, infectious illness that is caused by Orientia(formerly Rickettsia) tsutsugamushi. It is also known as the tsutsugamushi disease. Scrub typhus was first described from Japan in 1899. Humans are accidental hosts in this zoonotic disease. The term scrub is used because of the type of vegetation (terrain between woods and clearings) that harbours the vector; however, the name is not entirely correct because certain endemic areas can also be sandy, semi-arid and mountain deserts.

Scrub typhus, a dreaded disease in pre-antibiotic era, is a militarily important disease that caused thousands of cases in the Far East during the Second World War. Soldiers were exposed to chigger bites in forest areas during military operations. It is estimated that 36,000 soldiers were either incapacitated or died during World War II. The overall mortality varied from 7% to 9%, second only to malaria among infectious diseases. Furthermore, severe epidemics of the disease occurred among troops in Myanmar (Burma) and Sri Lanka during World War II.

The disease continued to be of military significance during the Malayan Emergency. It was suspected to be the leading cause of pyrexia of unknown origin (PUOs) in forces of the United States (US) of America during the Viet Nam conflict, and caused two confirmed cases among the US troops during the Korean War.

Epidemiology of Scrub typhus

Scrub typhus is endemic to a part of the world known as the "tsutsugamushi triangle", which extends from northern Japan and far-eastern Russia in the north, to northern Australia in the south, and to Pakistan in the west. Scrub typhus is essentially an occupational disease among rural residents in the Asia-Pacific region. In oil-palm workers in Malaysia, the incidence of antibodies to scrub typhus declines with declining grass density between the rows of maturing oil-palm. This correlates with the decline of chigger populations in this habitat. An increase in the prevalence of scrub typhus has been reported from some Asian countries, which coincides with the widespread use of β-lactam antimicrobial drugs and urbanization in rural areas.

Scrub typhus is difficult to recognize and diagnose because the symptoms and signs of the illness are often non-specific. The non-specific presentation and lack of the characteristic eschar in 40% patients makes the misdiagnosis and underreporting of scrub typhus common. On the other hand, diagnostic facilities are not available in much of its native range. Therefore, the precise incidence of the disease is unknown.

An estimated one billion people are at risk for scrub typhus and an estimated one million cases occur annually. Mortality rates in untreated patients range from 0-30%.

The characteristic feature of an outbreak of scrub typhus are:

(i) the obvious association with certain types of terrain
(ii) the marked localization of many cases within certain small foci
(iii) the large percentage of susceptible people, who may be infected simultaneously following exposure over relatively short periods
(iv) the absence of a history of bites or attack by arthropods

South-East Asia Region

The vector of scrub typhus is present in most countries of the South-East Asia Region and it is endemic in certain geographical regions of India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka and Thailand.

Seasonality

The seasonal occurrence of scrub typhus varies with the climate in different countries. The period of epidemic is influenced by the activities of the infected mite. It occurs more frequently during the rainy season. However, outbreaks have been reported during the cooler season in southern India. Certain areas such as forest clearings, riverbanks and grassy regions provide optimal conditions for the infected

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mites to thrive

Agent

It is an obligate intracellular gram-negative bacterium that has a large number of serotypes.This pathogen does not have a vacuolar membrane; thus, it grows freely in the cytoplasm of infected cells. Because they are intracellular parasites, they can live only within the cells of other animals. Even though it is recognized as one of the tropical rickettsioses diseases, O. tsutsugamushi has a different cell wall structure and genetic composition than that of the rickettsiae. O. tsutsugamushi includes heterogeneous strains classified in five major serotypes: Boryon, Gilliam, Karp, Kato and Kawazaki.

Differentiation of serotypes is important for laboratory diagnosis. Orientia tsutsugamushi can be cultivated on L929 cells and stained using the Giemsa method.

Transmission

Scrub typhus is transmitted to humans and rodents by some species of trombiculid mites ("chiggers",Leptotrombidium deliense and others). The mite is very small (0.2 – 0.4mm) and can only be seen through a microscope or magnifying glass.
Humans acquire the disease from the bite of an infected chigger. The bite of the mite leaves a characteristic black eschar that is useful to the doctor for making the diagnosis.

The adult mites have a four-stage lifecycle: egg, larva, nymph and adult. The larva is the only stage (chigger) that can transmit the disease to humans and other vertebrates, since the other life stages (nymph and adult) do not feed on vertebrate animals. Both the nymph and the adult are free-living in the soil.

Chigger mites act as the primary reservoirs for O. tsutsugamushi. Once they are infected in nature by feeding on the body fluid of small mammals, including the rodents, they maintain the infection throughout their life stages and, as adults, pass the infection on to their eggs by transovarial transmission. Similarly, the infection passes from the egg to the larva or adult in a process called transtadial transmission.

In this way, chigger mite populations can autonomously maintain their infectivity over long periods of time.

Early workers thought that rodents were the natural reservoir of infection, but it is now believed that mites are both the vector and the reservoir.

This mite is fastidious in matters of temperature, humidity and food and finds everything suitable in restricted areas. Scrub typhus is generally seen in people whose occupational or recreational activities bring them into contact with ecotypes favourable for vector chiggers.

Incubation period

The incubation period of scrub typhus is about 5 to 20 days (mean, 10-12 days) after the initial bite.

Clinical Features

The chigger bite is painless and may become noticed as a transient localized itch. Bites are often found on the groin, axillae, genetalia or neck. An eschar is often seen in humans at the site of the chigger bite. The illness begins rather suddenly with shaking chills, fever, severe headache, infection of the mucous membrane lining the eyes (the conjunctiva) and swelling of the lymph nodes. A spotted rash on the trunk may be present. Eschars are rare in patients in countries of South-East Asia and indigenous persons of typhus-endemic areas commonly have less severe illness, often without rash or eschar. Whether this is due to past exposure to the organism, or to other factors, is unknown. Symptoms may include muscle and gastrointestinal pains. More virulent strains of O. tsutsugamushi can cause haemorrhage and intravascular coagulation.

Acute scrub typhus appears to improve viral loads in patients with HIV. This interaction is currently unexplained. Clinical scrub typhus is not known to occur naturally in animals.

Source-Frequently Asked Questions-ScrubTyphus, av ailble from *http://www.searo.who.int/entity/emerging_diseases/CDS_faq_Scrub_Typhus.pdf*

Compiled by Dr. Madhava Gunasekera of the Epidemiology Unit

Table 3 : **Water Quality Surveillance**
Number of microbiological water samples - Oct /2013

District	MOH areas	No: Expected *	No: Received
Colombo	12	72	60
Gampaha	15	90	34
Kalutara	12	72	39
NHIS	2	12	NR
Kandy	23	138	2
Matale	12	72	NR
Nuwara Eliya	13	78	NR
Galle	19	114	36
Matara	17	102	10
Hambantota	12	72	NR
Jaffna	11	66	33
Kilinochchi	4	24	25
Manner	5	30	29
Vavuniya	4	24	26
Mullatvu	4	24	17
Batticaloa	14	84	0
Ampara	7	42	6
Trincomalee	11	66	27
Kurunegala	23	138	58
Puttalam	9	54	24
Anuradhapura	19	114	46
Polonnaruwa	7	42	0
Badulla	15	90	52
Moneragala	11	66	99
Rathnapura	18	108	6
Kegalle	11	66	43
Kalmunai	13	78	NR

* No of samples expected (6 / MOH area / Month)
NR = Return not received

to be continued.

Table 4: Selected notifiable diseases reported by Medical Officers of Health 09th Nov- 15th Nov(46th Week)

RDHS Division	Dengue Fever		Dysentery		Encephalitis		E Fever		F Poisoning		Leptospirosis		T Fever		V Hepatitis		H Rabies		Chickenpox		Meningitis		Leishmaniasis		WRCD %	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	139	8855	7	205	0	17	3	152	3	59	0	194	0	9	0	79	0	1	3	422	3	66	0	0	62	38
Gampaha	44	3324	2	198	1	22	1	51	0	39	7	408	0	21	3	180	0	0	5	167	0	92	0	5	80	20
Kalutara	24	1613	2	175	0	20	1	83	1	27	5	380	0	7	1	25	0	0	6	257	1	70	0	0	77	23
Kandy	16	1624	0	156	0	11	0	27	0	12	2	73	0	99	1	117	0	0	4	139	0	16	0	5	87	13
Matale	7	435	8	104	0	4	0	25	0	10	1	65	0	4	1	52	0	0	0	45	0	35	1	13	77	23
NuwaraEliya	4	236	4	157	0	2	1	17	0	217	0	30	1	62	0	24	0	0	3	133	0	12	0	0	85	15
Galle	14	793	3	120	0	19	0	7	0	89	5	208	0	64	1	16	0	2	2	305	1	47	0	2	79	21
Hambantota	4	306	3	61	0	3	0	15	0	38	1	164	1	64	1	90	0	0	0	98	1	52	5	318	75	25
Matara	7	435	3	85	0	13	1	29	0	29	1	149	2	88	1	143	0	2	0	247	0	81	2	93	100	0
Jaffna	7	657	7	404	0	10	3	315	1	114	0	9	1	346	0	17	0	1	3	144	1	57	0	0	92	8
Kilinochchi	1	61	2	42	0	0	0	15	0	5	0	9	0	16	0	0	0	2	0	2	0	7	0	11	50	50
Mannar	0	68	0	74	0	3	0	66	0	36	0	15	0	20	0	2	0	0	0	12	0	5	0	4	80	20
Vavuniya	0	72	1	60	0	13	1	14	0	20	1	51	0	3	0	4	0	2	0	22	0	34	1	13	75	25
Mullaitivu	1	118	0	24	0	2	0	10	0	43	0	38	0	7	1	2	0	2	0	8	0	6	0	15	60	40
Batticaloa	0	518	4	317	0	5	0	10	0	73	0	33	0	2	0	14	0	3	0	45	0	8	0	0	79	21
Ampara	2	195	3	182	0	1	0	5	0	12	1	38	0	1	1	10	0	0	1	89	0	18	0	3	57	43
Trincomalee	0	187	3	67	0	3	0	6	0	3	0	60	0	15	0	4	0	1	1	41	0	4	0	29	75	25
Kurunegala	21	2596	4	198	0	42	1	40	0	26	26	340	1	46	0	59	0	1	9	345	1	100	2	57	96	4
Puttalam	13	848	0	76	0	7	0	16	0	36	0	43	0	14	0	7	0	1	1	84	0	35	0	10	62	38
Anuradhapura	4	494	0	103	0	17	0	3	3	70	2	310	1	25	0	27	0	2	0	167	1	95	6	397	79	21
Polonnaruwa	9	441	1	84	0	2	0	14	2	67	5	167	0	3	2	34	0	2	6	133	0	20	0	160	86	14
Badulla	6	483	2	204	0	5	0	21	1	12	1	59	3	88	0	46	0	0	2	128	0	70	0	7	65	35
Monaragala	2	246	4	118	0	6	1	25	0	36	1	199	0	62	7	183	0	1	3	55	0	26	0	10	82	18
Ratnapura	9	1633	3	372	1	84	0	40	1	20	6	361	1	73	14	535	0	1	4	185	1	79	0	13	83	17
Kegalle	19	1092	1	127	0	17	0	30	0	11	13	255	0	74	5	228	0	0	5	322	2	107	0	2	82	18
Kalmune	1	495	5	153	0	2	0	3	0	122	1	11	0	2	0	5	0	0	2	95	0	11	0	1	54	46
SRI LANKA	354	27825	72	3866	2	330	1	1039	12	1226	79	3669	11	1215	39	1903	0	24	60	3690	12	1153	17	1168	79	21

Source: Weekly Returns of Communicable Diseases (WRCD).

*T=Timeliness refers to returns received on or before 15th November , 2013 Total number of reporting units 337. Number of reporting units data provided for the current week:265 C** -Completeness

A = Cases reported during the current week. B = Cumulative cases for the year.H Rabies*= Human Rabies, E Fever*=Enteric Fever, F Poison* =Food Poisoning, T Fever*=Typhus Fever, V Hepatitis*=Viral Hepatitis

Table 1: Vaccine-Preventable Diseases & AFP

09th Nov– 15th Nov 2013 (46th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2013	Number of cases during same week in 2012	Total number of cases to date in 2013	Total number of cases to date in 2012	Difference between the number of cases to date in 2013 & 2012
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	00	00	00	01	00	00	01	02	91	70	+30%
Diphtheria	00	00	00	00	00	00	00	00	00	00	-	03	-	-
Mumps	05	02	02	02	04	01	02	01	04	22	34	1376	4074	-66.2%
Measles	13	01	08	01	03	03	05	04	22	60	01	3631	60	+5951.7%
Rubella	00	00	00	00	00	00	00	00	00	00	-	27	-	-
CRS**	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Tetanus	00	00	00	00	00	00	00	00	00	00	00	22	12	+83.3%
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Japanese Encephalitis	00	00	00	00	00	00	00	00	00	00	-	68	-	-
Whooping Cough	00	00	00	00	00	00	00	00	00	00	01	82	93	-11.9%
Tuberculosis	160	03	35	03	06	01	23	21	26	264	107	7352	7818	-6.0%

Key to Table 1 & 2

Provinces: W: Western, C: Central, S: Southern, N: North, E: East, NC: North Central, NW: North Western, U: Uva, Sab: Sabaragamuwa.

RDHS Divisions: CB: Colombo, GM: Gampaha, KL: Kalutara, KD: Kandy, ML: Matale, NE: Nuwara Eliya, GL: Galle, HB: Hambantota, MT: Matara, JF: Jaffna, KN: Killinochchi, MN: Mannar, VA: Vavuniya, MU: Mullaitivu, BT: Batticaloa, AM: Ampara, TR: Trincomalee, KM: Kalmunai, KR: Kurunegala, PU: Puttalam, AP: Anuradhapura, PO: Polonnaruwa, BD: Badulla, MO: Moneragala, RP: Ratnapura, KG: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS** =Congenital Rubella Syndrome

AFP and all clinically confirmed Vaccine Preventable Diseases except Tuberculosis and Mumps should be investigated by the MOH

Influenza Surveillance in Sentinel Hospitals - ILI & SARI (Oct /2013)								
Month	**Human**					**Animal**		
	No Received	Infl A untyped	Infl B	A(H1N1)pdm09	A(H3N2)	Pooled samples	Serum Samples	Positives
October	309	4	25	6	21	309	705	0

Source: Medical Research Institute & Veterinary Research Institute

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ON STATE SERVICE

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