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= Abstract =

A Clinical Study of Tsutsugamushi Fever in Children during  
1997 - 2000 in the Western Kyungnam Province

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**Propose :** Tsutsugamushi fever is a acute febrile disease, which is caused by *O. tsutsugamushi*. Recently, this disease is increasingly reported in children. This study was undertaken to investigate clinical features of tsutsugamushi fever in children.

**Methods :** This study involved 17 children with tsutsugamushi fever who were admitted to Masan Samsung hospital between September 1997 and December 2000. We investigated the age, sex ratio, clinical manifestations, laboratory findings, response of therapy and prognosis.

**Results :** The age of patients was  $6.9 \pm 3.6$  years, ranging from 6 months to 12 years and male predilection(58.8%) was noted and all cases of patients occurred in October or November. The most common symptoms were fever in all cases and headache in 8(47.1%). The most common signs were skin rash in all cases, eschar in 14(82.4%) and lymphadenopathy 8(47.1%). Locations of the eschars were back and inguinal area in each 3 cases, neck and chest in each 2, popliteal area in 2, scalp and thigh in each 1. Laboratory findings included anemia in 1 case, leukopenia and thrombocytopenia in each 5, hematuria and proteinuria in each 1, ESR elevation in 2 and positive CRP in 12, AST elevation in 9 and ALT elevation in 7. Serologic diagnosis was made by passive hemagglutination assay(PHA) in 8 cases(47%) on admission, 4 cases in initial negative group were performed follow-up test at 2nd or 3rd weeks of illness and then all cases of 4 were converted to positive reaction. Clinical improvement was noticed in all cases after treatment to chloramphenicol or doxycycline. Mean duration for defervescence after treatment was  $1.4 \pm 0.8$  days. Complications were interstitial pneumonia in 1 case and aseptic meningitis in 3, but all cases of patients were recovered without sequelae or recurrence.

**Conclusions :** Tsutsugamushi fever in children was similar to adult in the clinical features except male predilection. Early diagnosis and empirical treatment based on clinical manifestations such as fever, skin rash, eschar, lymphadenopathy is important and serologic diagnosis need to perform follow-up test at 2nd or 3rd weeks of illness.

**Key Words :** Tsutsugamushi fever, Children

가 (tsutsugamushi fever) *Orientia tsutsugamushi* (chigger) 1997 9 2000 12

, 가 (eschar) 17

1) 1951 UN 가 1

2) 1986 3

3, 4) 1987

5) 가 ,

40 60 9 12 , 가

*O.tsutsugamushi* (sheep red blood cell) (passive hemagglutination assay : PHA) Genedia tsutsugamushi PHA 2 kit( , ) *O.tsutsugamushi* 가가 1 : 80 , 가 1 : 5,120 가 Hantann virus

6 9) 가 1980 1993 3 가 80

11) 1994 12) 10 1995 13) 17

가 1997 9 2000 12 exact test Mann-Whytney test Fisher's

가 17

1 . , 17 6 12 가  $6.9 \pm 3.6$  가 7 (41.2%) 10 (58.8%), (Fig. 1). 10 7 , 11 10

(Fig. 2),  
 10 11  
 10 가 4  
 1  
 14  
 2.  
 2 8( 5.2± 1.7)  
 가 , , , , , ,  
 가 , , , , ,  
 (Table 1). 가 14  
 가 3 가  
 , 가 , , , ,

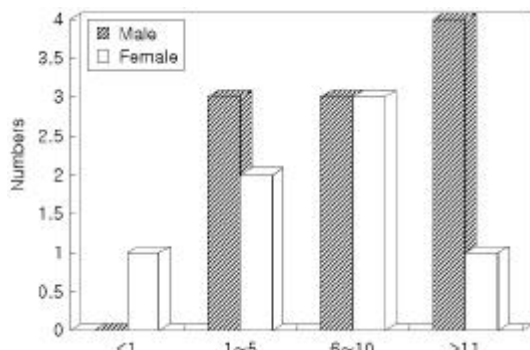


Fig. 1. Age and sex distribution of patients with tsutsugamushi fever.

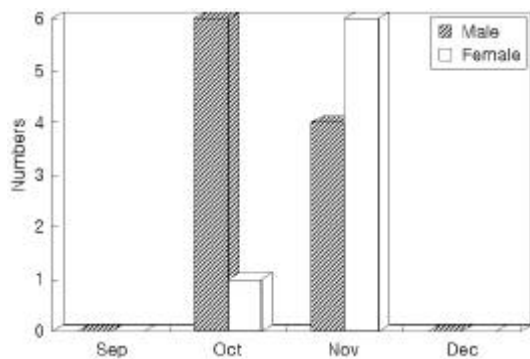


Fig. 2. Seasonal distribution of patients according to the onset of disease.

(Table 2).

3.  
 1  
 가 5  
 가 1  
 ESR 2  
 CRP 12  
 aspartate aminotransferase(AST) alanine  
 aminotransferase(ALT) 9 7

Table 1. Clinical Findings of Patients with Tsutsugamushi Fever

Symptoms	No. of cases(%)
Fever	17(100.0)
Headache	8( 47.1)
Cough	7( 41.2)
Pruritis	6( 35.2)
Rhinorrhea	4( 23.5)
Abdominal pain	3( 17.6)
Vomiting	3( 17.6)
Diarrhea	3( 17.6)
Signs	No. of cases(%)
Skin rash	17(100.0)
Eschar	14( 82.4)
Lymphadenopathy	8( 47.1)
Conjunctival injection	3( 17.6)
Pharyngeal injection	2( 11.8)
Skin desquamation	2( 11.8)
Hepatomegaly	1( 5.9)
Foot edema	1( 5.9)

Table 2. Location of the Eschars

Locations	No. of cases(%)
Back	3( 21.4)
Inguinal	3( 21.4)
Neck	2( 14.3)
Chest	2( 14.3)
Popliteal	2( 14.3)
Scalp	1( 7.1)
Thigh	1( 7.1)
Total	14(100.0)

Table 3. Laboratory Findings of Patients with Tsutsugamushi Fever

Items	Results	No. of cases(%)
Hematologic findings		
Hemoglobin(g/dL)	< 10	1( 5.9)
WBC(mm <sup>3</sup> )	<5,000	5(29.4)
	> 10,000	2(11.8)
Platlet( $\mu$ L)	< 150,000	5(29.4)
Renal functions		
RBC(>/HPF <sup>*</sup> )		1( 5.9)
Protein(> + 1)		1( 5.9)
Acute phase reactants		
ESR(>20 mm/hr)		2(11.8)
CRP(>5 mg/L)		12(70.6)
Liver functions		
AST(>55 IU/L)		9(52.9)
ALT(>45 IU/L)		7(41.2)
Cerebrospinal fluid findings		
WBC(>5/mm <sup>3</sup> )		3(17.6)
Protein(>45 mg/dL)		3(17.6)

\*high power field

가 . , 가  
14 3  
가 가  
가 (Table 3).  
7 1 .  
PHA  
8 (47%)  
7 (38.5%) 7 (75%)  
,  
9 2 3  
4  
(Table 4). , Hantann virus  
Leptospira  
.  
4 .  
17 8 9 chlor-  
amphenicol(25 mg/kg) 8  
, 8 8 doxycycline(5 mg/kg/

Table 4. Change of PHA<sup>\*</sup> Titers According to Duration of Fever and Time of Test in 17 Patients

Duration of fever (days)	PHA titers (Admission/after 2 3 wks)
2	N <sup>†</sup> /1 : 320
3	1 : 80
3	N
4	N/1 : 320
4	N
4	N
5	N
5	1 : 640
5	N/1 : 320
5	1 : 160
6	1 : 320
6	N
6	1 : 5,120
7	1 : 640
7	1 : 2,560
8	1 : 2,560
8	N/1 : 2,560

\*passive hemagglutination assay, <sup>†</sup> negative

Table 5. Duration of Fever before Admission and after Treatment in 17 Patients

Before admission (days)	No. of cases(%) (n=17)	After treatment (days)
		CM <sup>*</sup> /DC <sup>†</sup>
2	1( 5.9)	/4
3	2(11.8)	/1, 2
4	3(17.6)	1/1, 1
5	4(23.5)	1, 1, 1, 3/
6	3(17.6)	1/1, 1
7	2(11.8)	2/1
8	2(11.8)	1, 1/
5.2 $\pm$ 1.7		1.3 $\pm$ 0.6/ 1.5 $\pm$ 1.0

\*chloramphenicol, <sup>†</sup> doxycycline

day) 2  
4 .  
chloramphenicol : 1.3  $\pm$  0.6 , doxycycline :  
1.5  $\pm$  1.0 (Table 5).

4 : 4

가

217

1 ,

1.5 2

3

17

6, 9)

13, 18)

가

가

가 *O. tsutsugamushi*( *Rick-*  
*ettsia tsutsugamushi* )가

가

가

scrub typhus

. *O. tsutsugamushi*

17

10 (58.8%)가

,

1

6

가

<sup>14)</sup>

가

*O. tsutsugamushi* 0.5 1.2  $\mu$ m

가

Giemsa

1 3

, , ,

가 가 <sup>5, 15)</sup>

50%

5 8

8가

Krap, Kato, Gilliam 3가

<sup>16)</sup> . *O. tsutsugamushi*

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<sup>9, 17)</sup>

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(ova)

<sup>19)</sup>

, , , ,

<sup>15)</sup>

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가

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<sup>20, 21)</sup>

10

, , , ,

가 가 50%

가

<sup>1)</sup>

1951 UN

<sup>9, 13, 17)</sup>

<sup>2)</sup> 1986 Weil-Felix

, , ,

(indirect fluorescent anti-

, ,

body assay : IFA)

.

가 가

17

<sup>6, 9)</sup>

9 12

가 14 (82.4%)

, , ,

10 가

가 3 가

, 가 ,

<sup>6, 13)</sup>

, ,

.

11 가

<sup>9, 17)</sup>

가

,

,

가

17

10 (58.8%)

11

, ,

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1 :

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ESR

, CRP  
transaminase , ,  
21, 22)  
1 ,  
가 5 ,  
가 1 .  
ESR 2 CRP 12 가  
, AST ALT  
9 7 가 .  
가 Wei-  
Felix , IFA, PHA,  
(enzyme-linked immunosorbent assay),  
(indirect immunoperoxidase test :  
IIP) , Wei-Felix  
가 IFA,  
PHA, IIP 18, 23)  
IFA 1  
33 43%, 99% 2 3  
95% , 99%  
18, 24) PHA IFA  
23)  
3 가  
가 가  
가  
5) . PHA  
가 38.5% 1 75% 17  
가 , 가  
2 3 4  
가  
2 3  
PHA 1  
가 chloramphenicol tet- 가  
racycline, doxycycline, minocycline , , 가 ,  
1, 25) tetracycline 가  
가  
2 3  
8 .

. 가 14  
가 3 가  
, 가 , , ,  
:  
가 1  
5  
17 가 1  
가 , ESR 2  
CRP 12 ,  
AST ALT 9 7  
(PHA)  
8 (47%)  
7 (38.5%) 7 (75%)  
가 17  
, , , , 9 2 3 4  
. 가 8  
1 9 chloramphenicol(25 mg/kg)  
3 8 , 8 8  
가 , doxycycline(5 mg/kg/day) 2  
4 .  
*O.tsutsugamushi* chloramphenicol :  
1.3 ± 0.6 , doxycycline : 1.5 ± 1.0  
(PHA) Genedia tsutsugamushi PHA 2 kit(  
, ) *O.tsutsugamushi* 가  
가 1 : 80 ,  
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Hantann virus  
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1 가  
, , 가  
: 17 6  
12 6.9 ± 3.6  
가 10 (58.8%), 가 7 (41.2%)  
10 7 , 11 10  
10 11 ,  
14  
2 8( 5.2 ± 1.7)  
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