

## Spotted fever group rickettsiosis in Korea

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**Background:** Spotted fever group rickettsiosis(SFGR) is a tick-borne disease(TBD) with fever, myalgia, rash and eschar. Frequency and clinical features of SFGR were reported in TBD patients among tick-bitten patients who visited our hospital in 2018. **METHOD:** Pan-rickettsia 50S RT-PCR, Pan-rickettsia Sca1 and OmpA N-PCR, Ehrlichia and Anaplasma GroEL or Anka genes N-PCR were performed. N-PCR was performed with O.tsutsugamushi 56kDa gene and severe fever thrombocytopenia syndrome virus M or S gene. Tick identification and PCR against using ticks were performed. Antibody titers were measured using IFA using antigens from SFGR, A.phagocytophilum, O. tsutsugamushi, and SFTS virus. SFGR was diagnosed on PCR or IFA antibody IgM or IgG increased more than 4 times at the recovery phase compared to the acute phase.

**Results:** In 2018, a total of 110 patients were suspected TBD, including 41 tick bite patients. Nine patients were confirmed with scrub typhus, 1 with SFTS, 8 with anaplasmosis, 9 with SFGR alone, and 4 were confirmed co-infection with SFG and anaplasmosis. PanR Q-PCR was performed on all 13 positive patients. When cutoff was set as less than Ct value 39, 3 patients were positive. One patient was positive for Sca1 N-PCR, and Rickettsia(R.) raoultii was identified using sequence analysis(Table.1). There were 2 patients brought ticks, were Amblyomma(A.) testudinarium and Haemaphysalis(H.) longicornis, respectively. In PCR using ticks, R.tamurae was detected in A.testudinarium, and R.monacensis in H.longicornis. Five patients were hospitalized, Three had fever and only 1 had rash, and there was no patient with typical eschar. Six patients complained sore throat, myalgia and nausea and the rest of the patients were asymptomatic. Some patients showed leukopenia, thrombocytopenia, and elevated aspartate aminotransferase, alanine aminotransferase, C-Reactive Protein on Laboratory findings.

**Conclusion:** SFGR recover with mild clinical course, but in some patients, insomnia, dysesthesia, decreased blood pressure occurred. Most of our patients did not show positive PCR. Symptoms and laboratory results that require hospitalization are exists, SFGR should not be overlooked.

Supplementary Table 1. Clinical manifestations and diagnosis methods and LAB

No	Age/ Sex	OPD or HD	Sign and Symptoms					diagnosis methods					LAB	
			fever	rash	eschar	Diarrhea	Others	PanR Q-PCR	Sca1 N-PCR	SFG IFA IgG	SFG IFA IgM	Ara IFA IgG	Ara IFA IgM	WBC/HGB/PLT AST/ALT/CRP
1	64/M	OPD	+	+	-	-	-	UD	UD	<1:16	<1:16	<1:16	<1:16	6400 / 14.8 / 201K 24.4 / 24.8 / NA
2	22/F	OPD	-	-	-	+	LAP, Sweating, Arm tingling	UD	UD	1:256	1:512	NA	NA	3930 / 13.2 / 342K 20.3 / 8.0 / 0.03
3	58/M	OPD	-	-	-	-	Tiredness dizziness	UD	UD	1:64	<1:16	<1:16	<1:16	4630 / 14.9 / 238K 22.2 / 24.9 / 0.06
4	43/F	OPD	-	-	-	-	Headache	UD	UD	1:64	1:256	<1:16	<1:16	3770 / 13.8 / 185K 13.4 / 10.3 / 0.05
5	43/M	OPD	-	-	-	-	-	UD	UD	1:256	1:64	NA	NA	12100 / 15.9 / 259K NA / NA / NA
6	47/M	OPD	-	-	-	-	Rhinorrhea, Sore throat	UD	UD	1:32	<1:16	<1:16	<1:16	7890 / 15.7 / 222K NA / NA / NA
7	48/M	HD	-	-	-	-	Sore throat dysesthesia	UD	UD	<1:16	<1:16	NA	NA	8100 / 16.0 / 20K 27.9 / 29.6 / 0.19
8	55/F	OPD	-	-	-	-	-	GroEL+, Ank +	Sca1 +	<1:16	1:256	<1:16	<1:16	4590 / 13.8 / 198K 17.9 / 17.1 / 0.08
9	56/F	HD	+	-	-	-	Insomnia	UD	UD	1:256	<1:16	<1:16	<1:16	4930 / 11.9 / 139K 201 / 212 / 9.76
10	40/M	HD	+	+	-	+	Sweating Nausea	UD	UD	1:128	<1:16	NA	NA	8050 / 14.0 / 183K 74.4 / 60.2 / 32.4
11	57/M	OPD	-	-	-	-	-	UD	UD	<1:16	<1:16	NA	NA	6880 / 16.7 / 240K 31.1 / 33.8 / NA
12	51/F	HD	+	-	-	-	Myalgia Nausea	UD	UD	<1:16	<1:16	<1:16	<1:16	8320 / 11.4 / 123K 144.3 / 382.1 / 4.77
13	74/F	HD	-	-	-	+	Vomiting Dizziness	UD	UD	1:128	<1:16	NA	NA	4000 / 9.3 / 99K 45.4 / 27.6 / 22.5

OPD : Out Patient Department, HD : Hospital Day, LAP : Lymphadenopathy, LAB : Laboratory findings, WBC : White Blood Cells, HGB : Hemoglobin, PLT : platelets, AST : Aspartate aminotransferase, ALT : Alanine aminotransferase, CRP : C-Reactive Protein, NA : Non Assessment, UD : Undetermined