

## RELATIVE BRADYCARDIA IN SCRUB TYPHUS

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**Background:** Scrub typhus is a mite-borne infectious disease caused by *Orientia tsutsugamushi*. Arrhythmia is one of the reported cardiac complications and includes non-symptomatic electrocardiographic changes and serious arrhythmias such as ventricular tachycardia and Torsades de pointes. Relative bradycardia is an inappropriately low heart rate response to every 1-degree rise in body temperature that occurs in scrub typhus cases. To investigate the relationship between heart rate and temperature in patients with scrub typhus, we examined 493 febrile patients with documented scrub typhus.

**Method:** Body temperature and heart rate were recorded upon presentation, during treatment, and following symptom resolution. Fever was defined as temperature greater than 37.8°C. Febrile heart rate and temperature data were documented on initial patient evaluation, before application of antibiotic therapy. Baseline temperature and heart rate were assessed when patients first became and then remained afebrile following treatment. Although no uniform definition of relative bradycardia (RB) exists, we defined it a priori as an increase in the heart rate from a baseline of less than 10 beats/minute/°C increase in temperature. Patients exhibiting a pulse increase greater than 10 beats/minute/°C were classified as having non-relative bradycardia (NRB).

**Results:** The general relationship between heart rate and increased temperature was assessed in 493 patients with scrub typhus infection: 337 (68.4%) responded to fever with a heart rate increase <10 beats/minute/°C (RB) and 156 patients had a heart rate response ≥10 beats/minute/°C (NRB). Basal temperatures were not significantly different between the two groups. Maximal temperature was significantly higher in the RB than the NRB group. The RB group had a higher median resting heart rate than the NRB group (RB group vs. NRB group, 80.2 ± 11.5 vs. 77.2 ± 10.7 beats/minute; P=0.006). The RB group had a significantly lower heart rate than the NRB group at maximal temperature (RB group vs. NRB group, 84.6 ± 12.5 vs. 100.1 ± 17.3 beats/minute, P<0.001). ΔHeart rate/Δtemperature showed the opposite effect between the two groups during fever (RB group vs. NRB group, 1.17 ± 8.15 vs. 17.89 ± 8.65, P<0.001). Despite differences in the heart rate response between relative bradycardia and NRB patients, no significant differences were seen in clinical outcomes (acute kidney injury P=0.564, SIRS P=0.523, death P = 0.136) between the two groups.

**Conclusion:** Most patients with scrub typhus present with relative bradycardia. RB in scrub typhus should be included as a biomarker for differential diagnosis from other infectious diseases. In addition, relative bradycardia was not related to clinical outcomes.

### Biography

Chang-Seop Lee, currently working as an assistant professor at Chonbuk National University, Korea. His main research interests are parasitology, neglected tropical diseases, chest medicine and vector Borne diseases.

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