



衛生防護中心 Centre for Health Protection

Scientific Committee on Vector-borne Diseases

Epidemiology, Prevention and Control of Severe Fever with Thrombocytopenia Syndrome (SFTS)

Purpose

Severe Fever with Thrombocytopenia Syndrome (SFTS) is an emerging infectious disease caused by a bunyavirus (SFTS virus)¹. Transmission is predominantly via bites from ticks carrying the virus.

2. In view of the recent report of human-to-human infection of SFTS in Japan in March 2024, together with the fact that the incidence and geographic distribution of tick-borne diseases (TBDs) have been steadily increasing over the past few decades leading to substantial morbidity and occasionally mortality in affected individuals², this paper aims to review the global and local situation of SFTS, updated disease information, as well as strategies for the prevention and control.

Background

Causative Agent and Mode of Transmission

3. The pathogen, SFTS virus, belongs to the genus *Phlebovirus* in the family *Phenuiviridae* of the order *Bunyavirales*¹.

4. SFTS is primarily transmitted to humans through the bite of ticks that carry SFTS virus³. Four tick species are known vectors for SFTS virus, namely *Haemaphysalis longicornis*, *Amblyomma testudinarium*, *Rhipicephalus microplus*, and *Ixodes nipponensis*⁴.



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5. SFTS can also be transmitted through direct contact with the blood, bloody secretions, excretions, and contaminants of patients and deceased individuals. Pets such as cats and dogs, as well as domestic animals like sheep and cattle in endemic areas, are important hosts for ticks; close contact with these animals can increase the risk of infection^{5,6,7}.

6. While the ocular route had previously been suggested as a highly possible mode of SFTS virus transmission, the first human-to-human infection of SFTS in Japan confirmed that, although rare, the infection may occur via this route^{8,9}. A doctor with a surgical mask on but no gloves or goggles attended to a patient who was later diagnosed with SFTS and subsequently passed away. The same doctor performed post-mortem procedures without proper eye protection. Nine days after the patient's death, the doctor developed fever and headache and was diagnosed with SFTS. Genetic sequencing showed identical SFTS virus genes in both the doctor and the patient⁹.

Clinical Features

7. With an incubation period SFTS usually ranging from 6 to 14 days, the symptoms of SFTS include fever and gastrointestinal symptoms (nausea, vomiting, diarrhoea, and melena), and are sometimes accompanied by abdominal pain, muscle pain, neurological symptoms, lymph node swelling, and bleeding symptoms³. Patients may also present with thrombocytopenia, leukocytopenia and lymphadenopathy. Severe infections can cause haemorrhagic fever and multiple organ failure leading to death⁴.

8. The mortality rate of SFTS ranged from 10 to 30%^{1,3}, which is comparable to infection with other bunyaviruses, such as Crimean-Congo haemorrhagic fever virus and hantavirus¹⁰. People in the older age groups, in particular female, farmers, and patients with haemorrhagic/ neurologic manifestations are at risk of higher fatality¹¹.

Laboratory Confirmation

9. Laboratory tests help confirm the presence of SFTS virus and

differentiate SFTS from other febrile illnesses with similar presentations. Laboratory confirmation of SFTS by molecular means is available in the Public Health Laboratory Services Branch under the CHP. It is a sensitive and specific tool for detecting SFTS virus RNA in the serum during the first week of illness, with detection possible up to 3 weeks post-onset¹².

Treatment

10. Currently, there is no specific treatment for SFTS, and management of patients primarily focuses on symptomatic treatment to relieve discomfort. For patients with severe SFTS, hospitalisation with supportive management is often necessary^{3,13}. Ribavirin has been prescribed to patients with SFTS in some countries, but its therapeutic effectiveness remains unproven¹³. Recent in vitro, animal model, and clinical studies have shown that favipiravir may be an effective therapeutic option in selected groups of patients^{12,14,15,16}.

Global Situation

11. The SFTS pathogen was first identified in Mainland China in 2010¹⁷, but retrospective studies traced earlier cases back to 1996 in Jiangsu of Mainland China and to 2005 in the Nagasaki Prefecture of Japan^{8,17,18}. The disease was subsequently found to be endemic in several Asian countries including South Korea, Japan, Vietnam and Myanmar⁸. Thereafter, SFTS has become prevalent in the Asia-Pacific region, with cases reported annually in South Korea, Japan, Vietnam, Myanmar, Pakistan, Thailand, and the United Arab Emirates (UAE)^{8,19}. Some SFTS-like cases have also been reported in the US and Australia¹⁹.

12. In Mainland China, national data has shown increasing prevalence of SFTS in the last decade. In 2011, 571 confirmed cases from 13 Provinces, including 59 fatal cases were reported, the number gradually increased year by year and reached 18 902 cases in total, including 966 deaths (case fatality ratio (CFR): 5.11%) across more than 19 provinces by the end of 2021^{17,20,21}. These cases were mainly found in the mountainous and hilly areas of Henan, Hubei, Shandong, Anhui, Liaoning, Jiangsu and Zhejiang provinces^{5,22}. The number of SFTS cases continued to increase and the geographical distribution spread from central area to the northeast and from the west to the south²¹. SFTS cases were reported all year round but majority occurred from April to October, with

the incidence peaking from May to June²¹. The risk of infection and mortality increased with age, with most cases occurred in age group 50-74 years (69%) and fatality in age group over 60 years (80%)²¹. High-risk populations for SFTS include those who live and work in the hills, mountains and forests, as well as tourists engaging in outdoor activities in these regions, as they are more likely to get tick bites. Farmers in endemic areas and older females are also more susceptible to the infection, accounting for more than 80% of the total caseload^{5,11}.

13. In South Korea, the first SFTS case was reported in 2013. Over the past decade, the number of patients with SFTS increased from 36 cases in 2013 to 272 in 2017, thereafter the trend has remained stable in recent years with around 200 to 250 cases per year^{23,24}. Between 2013 and 2022, a total of 1 697 cases and 317 deaths were reported, with a CFR of 18.7%. The older age group and those with underlying diseases were found to have higher risk of death. Most of the SFTS patients had been involved in farming (49.7%) and other outdoor activities such as hiking, walking and camping (45.1%). Geographically, most of the infections were found in the Yeongdeok-gun, Gyeongsangbuk-do, Yangyang-gun, Gangwon-do and Inje-gun, Gangwon-do regions²⁵.

14. In Japan, SFTS was first detected and reported in 2013, though the first case could be traced back to 2005¹⁸. Recent statistics showed that an increasing trend of SFTS cases has been observed, ranging from 40 to 132 per year²⁶. As of April 2024, 963 cases, including 106 deaths, have been reported since 2013, with CFR of 11.0%. The male-to-female ratio was 1:1, and the median age at the time of notification was 75 years. Geographically, majority of the cases were found in the western part of Japan, including Miyazaki, Hiroshima, and Yamaguchi prefectures²⁶.

Local Situation

15. In Hong Kong, TBDs including spotted fever and relapsing fever are statutorily notifiable under the Prevention and Control of Disease Ordinance (Cap. 599). In the past 10 years (2014-2023), the CHP recorded 205 cases of spotted fever, ranging from 13 to 34 cases per year, and five deaths. Among

them, 193 cases were locally acquired, three were imported and the importation status of nine others remained undetermined. For relapsing fever, the last case was reported in 1950. Although SFTS per se is not a notifiable disease in Hong Kong, viral haemorrhagic fever (which can be a presentation of SFTS) was made notifiable on 14 July 2008. So far, there has been no confirmed case of SFTS recorded in Hong Kong.

16. According to the Pest Control Advisory Section of the Food and Environmental Hygiene Department, there have been no recorded instances of the classical vectors of SFTS being found in the local environment, except on one occasion when a sample sent from the Prince of Wales Hospital had *R. microplus* identified in 2011, but it was found on a patient's scalp and not associated with any vector-borne disease. However, some potential vectors such as *Haemaphysalis* sp. (e.g. *H. hystricis* and *H. sinensis*), *Rhipicephalus* sp. (e.g. *R. sanguineus* and *R. pumilio*) and some *Ixodes* sp. are present in Hong Kong.

Prevention and Control Measures

17. Prevention and control of SFTS mainly rely on undertaking measures to avoid tick bites as far as possible. From the public health perspective, emphasis could be put on the following aspects:

- a. Disease surveillance and epidemiological investigation;
- b. Vector surveillance and control;
- c. Infection control measures in hospitals;
- d. Risk communication;
- e. Health education and publicity including preventive measures for travellers.

18. At the individual level, preventive measures should be taken when visiting rural areas to avoid tick bites as vectors transmitting SFTS are mainly found in rural vegetated areas.

- a. Pre-visit preparation:

- Wear loose, light-coloured, long-sleeved tops and trousers;
 - Wear shoes that cover the entire foot, avoid wearing sandals or open shoes;
 - Tuck trousers into socks or boots to prevent arthropods from reaching the skin;
 - Use DEET-containing insect repellent on exposed parts of the body and clothing;
 - Pregnant women and children of 6 months or older can use DEET-containing insect repellent;
 - Avoid using fragrant cosmetics or skin care products;
 - If both insect repellents and sunscreen are used, apply insect repellents after sunscreen.
- b. During the visit:
- Stay on footpath and avoid walking through vegetation. Do not brush along the vegetation at the sides of footpath;
 - Avoid resting on vegetation, or at humid and dark places;
 - Do not hang clothing on trees or vegetation;
 - Do not feed wild or stray animals;
 - Re-apply insect repellents according to instructions.
- c. After the visit:
- Inspect body parts and clothing. Clear any attached arthropods carefully;
 - Take a soapy shower and wash the clothes;
 - Inspect and clean the bodies of accompanying pets.
- d. If an attached tick is found on the body:
- Gently remove it by grasping its head with tweezers or fine-tipped forceps close to the skin, then disinfect the bite area and wash hands with soap and water;
 - Do not crush or twist the tick during removal.

19. In view of potential human-to-human transmission in the nosocomial setting, healthcare workers and carers who might need to handle blood or bloody secretions of patients with suspected SFTS are recommended to put on appropriate personal protective equipment (PPE) with eye protection.

Risk Assessment and Way Forward

20. An earlier risk assessment by WPRO/ Beijing CDC in 2012 indicated that *H. longicornis*, one of the known vectors of SFTS, was a widely distributed tick species and that the disease was likely to spread in China¹¹. Although the classical vectors for SFTS have not been found in the environment in Hong Kong, *H. longicornis* is native to East Asia and has established populations in the Australasian/ Western Pacific Regions and the US, resulting in a high possibility of increasing epidemic of SFTS in the future²⁷.

21. In Hong Kong, regular surveys on ticks are not routinely conducted, and they are only performed when TBDs have been reported; the coverage is also limited and mainly localised along hiking trails in the New Territories such as Tsuen Wan, Sai Kung, Tai Po, North, Lantau Island, etc., with *Haemaphysalis sp.* being the most commonly found species. As such, the extent of occurrence of relevant vectors in Hong Kong remains largely uncertain.

22. As Hong Kong is a metropolitan city with abundant international travels, imported cases of TBDs are expected and have been recorded. Together with frequent travel of local people to Mainland China, Japan and South Korea, the wide distribution of *H. longicornis* in East Asia, and the presence of potential vectors in the locality, including *Haemaphysalis* and *Rhipicephalis species*, the risk of contracting SFTS remains a possibility. It is important that members of the public and healthcare professionals should take reference of health advice mentioned for personal protection. Preventive measures are also important to avoid tick exposure when travelling abroad, especially for older people, people with underlying diseases and those frequently engaged in outdoor activities²⁵.

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