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EVALUATING THE RISK: GROUP A *STREPTOCOCCUS* AS A CAUSATIVE AGENT OF STREPTOCOCCAL TOXIC SHOCK SYNDROME AND NECROTIZING FASCIITIS

Julia Krotofil[1], Michal Pruc[2, 3], Damian Swieczkowski[2, 4], Katarzyna Solowiej[1], Lukasz Szarpak[2, 5, 6]

[1]Research Unit, Polish Society of Disaster Medicine, Warsaw, Poland
[2]Department of Clinical Research and Development, LUXMED Group, Warsaw, Poland
[3]Department of Public Health, International European University, Kyiv, Ukraine
[4]Department of Toxicology, Faculty of Pharmacy, Medical University of Gdansk, Poland
[5]Henry JN Taub Department of Emergency Medicine, Baylor College of Medicine, Houston, TX, USA
[6]Research Unit, Maria Sklodowska-Curie Bialystok Oncology Centre, Bialystok, Poland

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Since 2022, several countries have shown a rise in the occurrence of severe invasive group A streptococcal disease (GAS), and this rise is a component of a broader escalation [1]. GAS bacteria are prevalent and may be transmitted by respiratory droplets or direct contact with infected individuals, carriers, or infected skin lesions. GAS is a bacterium that often leads to strep throat and skin infections. Severe GAS infection may progress to an invasive stage, indicating that the bacterium has spread to areas of the body where they are not typically present, such as the bloodstream, deep muscles, adipose tissue, or the lungs. However, it is crucial to be vigilant for indications of sepsis [2].

Streptococcal toxic shock syndrome (STSS) is an uncommon, severe and sometimes lethal illness linked to invasive or non-invasive GAS (especially *Streptococcus pyogenes*). STSS may manifest in conjunction with infection at any location, however, it most often arises in connection with an infection of a cutaneous lesion [3]. Characteristic features of toxicity include signs of poisoning and a fast-advancing clinical course, with a case fatality rate that may exceed 50% [4]. The first symptoms include fever and chills, muscular pains, as well as nausea and vomiting. Following this occurrence, STSS rapidly progresses, leading to hypotension, organ failure, tachycardia, and tachypnoea. STSS mostly affects individuals in the geriatric population and those with open wounds [4, 5].

According to the National Institute of Infectious Diseases (NIID), the data reveals that the incidence of STSS in Japan, as of March 25, 2024, exceeded the total number of cases reported in the preceding year. In 2023, there were a total of 409 STSS cases caused by GAS. For the first 11 weeks of 2024, there were 335 cases of STSS caused by GAS. Over the prior 6 years, the average number of notifications between weeks 1–11 was 77.5, with a range of 39 to 106. However, in 2024, there were 335 instances reported during weeks 1–11, which is the greatest number recorded thus far. The incidence of STSS

CORRESPONDING AUTHOR:
Michał Pruc, Department of Clinical Research and Development, LUXMED Group, 02–676 Warsaw, Poland
phone: +48 695483564, e-mail: m.pruc@ptmk.org
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cases attributed to GAS has shown a steady rise since July 2023, with further escalation seen in November, culminating in its zenith in January 2024, with a total of 165 reported cases. Notably, this surge in cases mostly affected those below the age of 50. Since November, there has been a rise in the number of notifications of instances involving individuals over the age of 50. The NIID further states that there was a rise in invasive GAS infections in the UK, France, Ireland, the Netherlands, and Sweden during the late 2022 and early 2023 period, but invasive GAS infections have stabilized in these nations by April 2023 [6].

STSS in Japan is also reportedly associated with another serious complication called necrotizing fasciitis (NF). In Western Europe, NF is roughly 1 case per 100,000 people, but in the US, it is 0.4. This illness usually affects adults and increases with age, reaching 12 per 100,000 in those 80 and older. NF infection is an infrequent but very severe type of bacterial infection. A very severe and often fatal kind of NF infection is caused by the bacterium *Streptococcus pyogenes*, also known as "flesh-eating bacteria" [7]. Necrotizing soft tissue infection occurs when there is a break in the skin, including wounds, surgical incisions, or even small scrapes, which allows infectious bacteria to enter the deeper layers of tissue called fascia [8]. The bacteria initiate proliferation and secrete toxins that induce tissue necrosis and disrupt blood circulation in the region. In cases of necrotizing fasciitis, the bacteria produce chemical compounds that inhibit the body's immune response to the pathogen. As the tissue undergoes necrosis, the bacterium infiltrates the bloodstream and proliferates quickly throughout the whole organism [7, 8].

As of March 2024, the incidence of STSS cases caused by GAS in Japan has significantly increased compared to previous years. It is imperative for healthcare providers to be alert in promptly identifying and treating STSS to enhance patient outcomes. Public health initiatives aimed at preventing STSS and necrotizing fasciitis include encouraging effective hygiene practices, such as appropriate wound management and hand cleanliness, as well as raising awareness among the general population about the indicators and symptoms of these infections. Timely identification and immediate action may greatly enhance the likelihood of recuperation and minimize the possibility of adverse outcomes — both STTS and necrotizing fasciitis are severe and possibly lethal conditions that need prompt medical intervention. The rising prevalence of these illnesses is a matter of concern, and endeavours should be undertaken to enhance awareness and adopt solutions to mitigate the dissemination of this lethal illness.

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REFERENCES

1. Abo YN, Oliver J, McMinn A, et al. Increase in invasive Group A streptococcal disease among Australian children coinciding with northern hemisphere surges. Lancet Reg Health West Pac. 2023; 41: 100873, doi: 10.1016/j.lanwpc.2023.100873, indexed in Pubmed: 38223399.
2. Walker MJ, Barnett TC, McArthur JD, et al. Disease manifestations and pathogenic mechanisms of Group A Streptococcus. Clin Microbiol Rev. 2014; 27(2): 264–301, doi: 10.1128/CMR.00101-13, indexed in Pubmed: 24696436.
3. Steer AC, Lamagni T, Curtis N, et al. Invasive group a streptococcal disease: epidemiology, pathogenesis and management. Drugs. 2012; 72(9): 1213–1227, doi: 10.2165/11634180-000000000-00000, indexed in Pubmed: 22686614.
4. Amerson SJ, Hoffman M, Abouzahr F, et al. Sequential extracorporeal therapy of pathogen removal followed by cell-directed extracorporeal therapy in streptococcal toxic shock syndrome refractory to venoarterial extracorporeal membrane oxygenation: a case report. Crit Care Explor. 2024; 6(3): e1058, doi: 10.1097/CCE.0000000000001058, indexed in Pubmed: 38415021.
5. Streptococcal Toxic Shock Syndrome (STSS) (Streptococcus pyogenes) 2010 Case Definition. https://ndc.services.cdc.gov/case-definitions/streptococcal-toxic-shock-syndrome-2010/ (22.07.2024).
6. National Institute of Infectious Diseases (NIID), Risk Assessment for Streptococcal Toxic Shock Syndrome (STSS) in Japan, March 29,

2024. https://www.niid.go.jp/niid/images/cepr/RA/STSS/240329_STSS_2023-2024_Eng.pdf (22.07.2024).

7. Paz Maya S, Dualde Beltrán D, Lemercier P, et al. Necrotizing fasciitis: an urgent diagnosis. Skeletal Radiol. 2014; 43(5): 577–589, doi: 10.1007/s00256-013-1813-2, indexed in Pubmed: 24469151.
8. Wong CH, Khin LW, Heng KS, et al. The LRINEC (laboratory risk indicator for necrotizing fasciitis) score: a tool for distinguishing necrotizing fasciitis from other soft tissue infections. Crit Care Med. 2004; 32(7): 1535–1541, doi: 10.1097/01.ccm.0000129486.35458.7d, indexed in Pubmed: 15241098.