

# Increased rate of skin and soft-tissue infections after chickenpox: Is it related to the COVID-19 pandemic?

Skin and soft-tissue infections (SSTIs) are the known secondary bacterial infections after chickenpox.<sup>[1]</sup> Group A  $\beta$ -hemolytic *Streptococcus* (GABHS) and *Staphylococcus aureus* are the major causative organisms in this regard.

This complication usually occurs in previously healthy children. However, some cases may have a history of nonsteroidal anti-inflammatory drugs (NSAIDs) consumption before or during the appearance of chickenpox manifestations.<sup>[2]</sup>

In the spring and summer of 2023, we noticed an increased incidence of SSTIs after chickenpox in Tehran as well as in different provinces of Iran. Totally, during 2 months, four patients with SSTIs were admitted to our hospital following chickenpox [Table 1], of whom 50% were male. The mean age of the patients was  $6.75 \pm 3.41$  (1–10) years. The interval between the onset of symptoms of chickenpox and the emergence of SSTI was  $8.25 \pm 2.48$  days. Totally, 50% of our cases had used NSAIDs. The manifestation of SSTI was cellulitis in all cases, which led to abscess formation in 75% of them. All cases with abscess formation underwent surgery and drainage. None of the cases had positive blood or discharge cultures. The mortality rate was zero.

Interestingly, an increased rate of streptococcal scarlet fever and streptococcal pharyngitis was noticed before and during the outbreak of postchickenpox SSTIs in Iran. This increase occurred following a period of reduced incidence of Group A *Streptococcus* (GAS) infections during the COVID-19 pandemic.

Several European countries have also reported the experience of an increased number of GAS infections during 2022.<sup>[3,4]</sup>

A literature review revealed a similar report of the increased rate of SSTIs after chickenpox in 2003 in Canada and a relationship between the increased rate of GABHS infections and postchicken pox SSTIs.<sup>[1]</sup>

Young children have experienced less exposure to GAS and are unlikely to possess antibodies against streptococcal proteins. Therefore, after varicella–zoster virus (VZV) infection as a predisposing factor for exposure to GAS, they are at increased risk of SSTIs.<sup>[1]</sup> The mean age of our patients was  $6.75 \pm 3.41$  years. The low incidence of GABHS in recent years and prevention measures, especially during COVID-19 pandemic, might be a reason for the older age of our cases.

The increased rate of GABHS infection cases after the end of the COVID-19 pandemic might be due to reduced compliance with prevention measures, social distancing, and restrictions, resulting in increased streptococcal exposure and infection.

In addition, coinfection of viruses such as influenza, respiratory syncytial virus, and VZV with GAS may increase the risk of invasive GAS (iGAS) infections. Increased circulation of respiratory viruses after reduction of COVID-19 infection may be an important reason for increased iGAS cases in the pediatric age group.<sup>[3,4]</sup> Skin lesions due to VZV infection are another risk factor for GAS infections.<sup>[4]</sup>

In total, 50% of our patients had used NSAIDs for several days before admission. NSAIDs can reduce leukocyte recruitment through granulocyte function impairment, leading to staphylococcal and streptococcal infections facilitation.<sup>[2]</sup> By relieving pain, reducing swelling, and suppressing fever, NSAIDs may also mask the signs of disease progression, and delay in diagnosis and treatment of SSTIs.<sup>[2]</sup>

Totally, 75% of our cases led to abscess formation. However, we could not isolate the causative organism of SSTIs despite drainage of the abscess, probably

**Table 1: The characteristics of the patients**

Case	Sex	Age (years)	Time interval between chickenpox and SSTI (days)	Site of infection	Blood and discharge culture	Complication
1	Male	8	8	Submandibular area	Negative	Abscess formation
2	Male	10	5	Inguinal and scrotum	Negative	Cellulitis
3	Female	1	8	Knee and proximal site of leg	Negative	Abscess formation
4	Female	8	12	Axilla and upper chest	Negative	Abscess formation

SSTI=Skin and soft-tissue infection

secondary to wide-spectrum antibiotic usage before surgery. Similarly, the blood cultures were all negative.

In conclusion, it seems that the overlap of GAS and VZV infections was the main reason for increased cases of SSTIs following chickenpox. Indeed, the COVID-19 pandemic caused a significant decrease in childhood infections. At the end of the pandemic, decreased compliance with prevention measures, resulted in increased viral infections, especially influenza. Influenza as a predisposing factor for bacterial superinfections was followed by an increase in cases of streptococcal infections. The overlap of chicken pox and streptococcal infection outbreaks caused a significant rise in postchickenpox SSTIs.

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### Conflicts of interest

There are no conflicts of interest.

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