

Norovirus and *C. Jejuni*: Triggering a Guillain-Barré Syndrome Outbreak in Pune?

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Sir,

The recent cluster of Guillain-Barré Syndrome (GBS) cases in Pune has raised significant public health concerns, particularly due to its potential link with infectious agents like Norovirus and *Campylobacter jejuni*. In India, Norovirus is a leading cause of acute gastroenteritis across all age groups, and *C. jejuni* is frequently implicated in foodborne illnesses.¹⁻³ This potential link between GBS and these prevalent enteric pathogens warrants immediate attention, not only due to the acute neurological complications of GBS but also because of its potential to strain healthcare resources and impact long-term patient outcomes.⁴ Addressing this burgeoning public health challenge requires a swift and comprehensive response to mitigate further spread and protect vulnerable populations.

Guillain-Barré syndrome is an acute, immune-mediated polyneuropathy characterized by rapidly progressive limb weakness and diminished reflexes.⁴ The hallmark of GBS is the body's immune system mistakenly attacking the peripheral nervous system, leading to demyelination and axonal damage.⁵ This autoimmune response is often triggered by a preceding infection, with *Campylobacter jejuni* and Norovirus being among the most commonly implicated pathogens.⁶ The clinical presentation of GBS typically involves ascending weakness, starting in the legs and

progressing upwards, along with paresthesias (tingling sensations). In severe cases, it can lead to life-threatening respiratory muscle paralysis.⁴ Diagnosis often relies on clinical findings, nerve conduction studies, and cerebrospinal fluid analysis.⁷ While most patients recover with appropriate medical care, including supportive measures and immunomodulatory therapies, some may experience long-term neurological deficits, such as persistent weakness or fatigue.⁸

Both Norovirus and *C. jejuni* are significant contributors to gastroenteritis globally, and their prevalence in India is well-documented.^{9,10} Norovirus, a highly contagious RNA virus, spreads primarily through the fecal-oral route, often via contaminated food and water, and person-to-person contact.¹¹ *Campylobacter jejuni*, a Gram-negative bacterium, is commonly associated with the consumption of undercooked poultry and contaminated water sources. These pathogens possess virulence factors that enable them to colonize the gastrointestinal tract and evade host immune responses, contributing to their pathogenicity.⁹ These infections may trigger an autoimmune response through molecular mimicry, where pathogen structures resemble nerve components, leading to immune-mediated nerve damage.¹² For instance, lipooligosaccharides in *C. jejuni* have been shown to mimic gangliosides in peripheral nerves.¹³

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The incidence of GBS varies globally, with estimates ranging from 0.6 to 4 cases per 100,000 population per year.¹⁴ In India, studies have reported an incidence of approximately 1.3 cases per 100,000 population.¹⁵ While GBS can affect individuals of any age, it is more common in adults and older individuals.⁴ Recognizing the potential for serious complications and the need for prompt medical intervention, understanding the epidemiological trends and risk factors associated with GBS is crucial for effective public health management.

Despite the growing concern, specific details regarding the recent GBS outbreak in Pune, such as the exact number of cases, demographics, and confirmatory laboratory findings, remain limited. However, reports suggest a notable increase in GBS cases presenting to hospitals in Pune within a short timeframe, raising concerns of a potential outbreak. Preliminary investigations indicate a possible link to Norovirus and *C. jejuni* infections, although the extent of this association remains to be fully established. It is crucial to acknowledge the limitations of the currently available information. Without comprehensive epidemiological data, it is challenging to draw definitive conclusions about the outbreak's magnitude and potential risk factors. Furthermore, the lack of widespread laboratory testing for Norovirus and *C. jejuni* in all suspected GBS cases hinders the ability to establish a conclusive link between these pathogens and the observed surge in neurological illness.

While the temporal association between reported gastroenteritis cases and the subsequent rise in GBS cases suggests a possible link to Norovirus and *C. jejuni*, alternative explanations must also be considered. Other infectious agents known to trigger GBS, such as cytomegalovirus, Epstein-Barr virus, and Zika virus, should be investigated.⁶ Additionally, the possibility of other environmental factors or triggers contributing to the outbreak cannot be ruled out.

Given the potential for further cases, immediate epidemiological investigations and public health interventions are imperative to prevent escalation of the GBS outbreak in Pune. These should include:

Enhanced surveillance: Active case finding and systematic data collection, including detailed clinical information, demographics, and potential exposures.

Laboratory confirmation: Widespread testing for Norovirus, *C. jejuni*, and other potential pathogens in GBS cases.

Environmental investigation: Assessing potential sources of contamination, such as food and water sources.

Serological studies: Conducting serological surveys to determine the extent of exposure and assess population immunity.

Genomic sequencing: Analysing the genetic makeup of circulating strains to identify variants and trace their origins.

Public awareness campaigns utilizing diverse channels (e.g., targeted health education programs, social media engagement, and collaboration with community leaders) should be launched to educate the community about GBS, its symptoms, and preventive measures, such as safe food handling and water hygiene.

The recent GBS outbreak in Pune highlights the urgent need for strengthened surveillance and preventive strategies against enteric infections. We urge public health authorities to take immediate action to investigate the outbreak thoroughly, identify sources of infection, and implement targeted control measures to contain its spread. This should include enhanced surveillance efforts, laboratory confirmation of pathogens, and environmental investigations. In the long term, strengthening surveillance systems for GBS and related pathogens is crucial for early detection and timely intervention. Furthermore, continued investment in research is essential to elucidate the complex interplay between these infections and GBS, paving the way for more effective preventive and therapeutic strategies. A collaborative and proactive approach involving healthcare professionals, public health agencies, and the community is paramount in safeguarding public health and mitigating the impact of future outbreaks.

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