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Challenges in Surveillance for Streptococcal Toxic Shock Syndrome (STSS): Active Bacterial Core Surveillance (ABCs)

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ABSTRACT

Streptococcal toxic shock syndrome (STSS) is a rare but severe condition caused by invasive infections with group A Streptococcus (GAS). The Active Bacterial Core Surveillance (ABCs) system plays a crucial role in monitoring the epidemiology of STSS, but challenges remain in accurately capturing cases and identifying risk factors(1,2). This review outlines the obstacles in STSS surveillance, including diagnostic difficulties, underreporting, and variations in clinical presentations. It also discusses strategies to address these challenges, such as enhanced data collection, education initiatives, and technological advancements.

Introduction

Streptococcal toxic shock syndrome (STSS) is a life-threatening illness caused by invasive group A Streptococcus (GAS) infections, characterized by rapid progression to septic shock and multi-organ failure. Surveillance systems like the Active Bacterial Core Surveillance (ABCs) have been critical in tracking STSS cases, monitoring trends, and guiding public health interventions. However, STSS poses unique challenges for surveillance due to its clinical complexity, rarity, and variability in diagnostic criteria. This review aims to explore the challenges associated with STSS surveillance and propose potential solutions.

1. Challenges in STSS Surveillance

✓ **Diagnostic Complexity**

✓ **Non-specific Symptoms**: Early symptoms of STSS, such as fever, muscle pain, and confusion, overlap with other conditions, leading to delays in diagnosis.

✓ **Criteria for Diagnosis**: The reliance on strict clinical and laboratory criteria, such as hypotension and multi-organ failure, may exclude milder or atypical cases (3,4).

- **Underreporting and Case Ascertainment**

✓ **Rare Condition**: As a rare disease, STSS is often underrecognized by healthcare providers.

✓ **Reporting Systems**: Variability in reporting practices across regions can result in incomplete data.

✓ **Access to Care**: In resource-limited settings, limited access to diagnostic tools may lead to missed cases.

- **Laboratory Limitations**

✓ **Culturing GAS**: Identifying GAS in sterile sites is critical for diagnosis, but culture-negative cases may go undetected.

✓ **Advanced Diagnostics**: Molecular testing for GAS, such as polymerase chain reaction (PCR), is not universally available, further complicating surveillance efforts.

- **Data Gaps in Risk Factor Identification**

✓ **Demographic and Clinical Data**: Incomplete data on patient demographics, comorbidities, and exposures hinder the identification of risk factors.

✓ **Community-Associated Cases**: Differentiating between healthcare-associated and community-acquired cases is often challenging.

- **Heterogeneity in Case Definitions**

✓ Differences in case definitions across regions and institutions can lead to inconsistencies in reported data, affecting the ability to compare trends.

- **Delayed Reporting**

✓ Reporting delays can impact the timeliness of public health responses and obscure real-time trends in STSS incidence.

2. Strategies to Address Surveillance Challenges

- **Standardizing Diagnostic and Reporting Criteria**

✓ Developing uniform case definitions for STSS that account for a spectrum of clinical presentations can improve case identification and comparability.

- **Enhancing Laboratory Capabilities**

✓ Expanding access to molecular diagnostic tools, such as PCR, can improve the detection of GAS in suspected cases.

✓ Incorporating whole-genome sequencing into surveillance systems can provide insights into the genetic factors associated with virulent GAS strains.

- **Improving Data Collection and Integration**

✓ Implementing electronic health records (EHR) for automated case detection and data sharing can enhance the accuracy and efficiency of surveillance.

✓ Linking ABCs data with other public health databases can fill gaps in demographic and clinical information.

- **Educational Initiatives**

✓ Training healthcare providers to recognize and report STSS can reduce underreporting and improve case detection(5).

✓ Public health campaigns can raise awareness of GAS infections and their complications.

- **Strengthening Community-Based Surveillance**

✓ Engaging community healthcare workers and expanding surveillance networks to rural and

underserved areas can capture cases that might otherwise be missed.

- **Leveraging Technology for Real-Time Monitoring**

  ✓ Utilizing syndromic surveillance systems and mobile health technologies can facilitate early detection and response to STSS outbreaks.

3. Future Directions

Advancements in genomic technolog3.ies and data integration offer opportunities to improve the surveillance and understanding of STSS. Future research should focus on developing rapid diagnostic tools, identifying genetic markers of virulence, and evaluating the impact of GAS vaccines on STSS incidence.

Conclusion

Surveillance for STSS through systems like ABCs is essential for understanding and mitigating the burden of this severe condition. Addressing challenges such as diagnostic complexity, underreporting, and data gaps requires a multifaceted approach involving standardization, education, and technological innovation. Strengthening surveillance efforts will ultimately improve public health responses and patient outcomes.

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