Bedside real-time detection technology can quickly obtain multi-index results, facilitating doctors to make quick decisions. By observing whether the indicators decrease or continue to increase, it is also possible to indirectly determine whether the treatment is effective and decide whether the intervention plan needs to be adjusted (Vairaperumal et al., 2025).

6.3 Utilize biomarkers to improve monitoring and guide treatment

Biomarkers can reflect the disease changes of patients with severe dengue fever and provide references for disease surveillance, fluid replacement plan formulation and treatment decision-making. Elevated endothelial injury, inflammation or metabolism-related indicators often suggest an increased risk of circulatory system complications and the need for intensive intervention (Ghosh et al., 2024). Dynamically adjusting the treatment strategy based on indicators is helpful for reasonably controlling the infusion volume and reducing the risk of infusion-related organ injury (Vairaperumal et al., 2025).

The combined evaluation of multiple biomarkers can be used to determine whether there is coagulation dysfunction or vascular injury and guide the initiation timing of supportive treatment. Its standardized detection and interpretation in clinical practice can help improve the accuracy of decision-making and the prognosis of patients (Ghosh et al., 2024; Katz et al., 2025).

7 The Immune Treatment and Intervention Study of the Storm

7.1 Potential directions of anti-inflammatory and immunomodulatory therapy

Severe dengue fever often presents as an immune storm type, characterized by disordered immune regulation and excessive release of pro-inflammatory factors. Enhanced or inhibited interferon signals related to antibodies will promote the further expansion of the inflammatory chain reaction. Anti-inflammatory treatment mainly works by intervening in key inflammatory pathways to reduce the excessive activation of immune cells. Studies have shown that IL-1 receptor antagonists and JAK inhibitors can reduce the level of inflammation, and immune checkpoint related regulation can help restore immune balance and alleviate vascular damage (Chermahini et al., 2025; Yoo et al., 2025).

Early use of corticosteroids combined with intravenous immunoglobulin can enhance anti-inflammatory effects and improve organ function. However, there are individual differences in therapeutic effects. The effect is more obvious in patients with compensatory shock, while it is relatively poor in the decompensated stage. The choice of treatment duration and applicable population has a significant impact on the treatment outcome (Mahashabde and Kumar, 2024; Shetty et al., 2025). The relevant basis and practice of immunomodulatory therapy in other infectious disease fields can also provide a reference for optimizing the treatment plan for dengue fever.

7.2 Drug strategies for protecting vascular endothelium and reducing leakage

Damage to vascular endothelium and increased permeability are the key basis for plasma leakage and shock formation. Therefore, endothelial protection and leakage control have become the focus of research. Existing studies have shown that some kinase inhibitors can alleviate vascular leakage related to viral infection and improve survival rate, and some receptor agonists can enhance vascular barrier stability. Their protective effects have been preliminarily confirmed in animal models (Modak et al., 2023; Mishra et al., 2025).

Anti-vegf antibodies can help reduce vascular leakage in terms of lowering vascular permeability. Drugs that inhibit mast cell activity can also reduce the risk of shock to a certain extent (Lim et al., 2024). Meanwhile, some natural compounds demonstrated antiviral and endothelial-protective activities in experiments and could inhibit viral protein-mediated vascular leakage (De Sousa et al., 2022). It can be seen that both synthetic drugs and natural ingredients are expected to play a role in maintaining the function of the vascular barrier.

7.3 A comprehensive strategy combining supportive treatment with targeted intervention

The pathological process of severe dengue fever is rather complex, and a comprehensive treatment strategy is often adopted in clinical practice. Standardized supportive treatment remains the basic measure, mainly including fluid management, circulatory monitoring and organ function support (Hasani et al., 2025), supplemented by intervention methods for immune disorders and endothelial injury. Relevant studies suggest that some drugs have certain effects in inhibiting viral replication and reducing inflammation (Abbasi, 2025).