Henoch-Schönlein Purpura: Pathogenesis and Clinical Management

Ye Li

Department of Pediatric Neurology, First Affiliated Hospital of Zhengzhou University, Zhengzhou450000,Henan,China

Abstract: Henoch-Schönlein Purpura (HSP), also known as immunoglobulin A (IgA) vasculitis, is the most common systemic vasculitis in childhood and adolescence, characterized by non-thrombocytopenic palpable purpura, arthralgia, abdominal pain, and potential renal involvement. Its pathogenesis is centered on abnormal IgA immune complex deposition and subsequent vascular inflammation, with interactions between genetic susceptibility, environmental triggers, and immune dysregulation. This paper systematically reviews the latest progress in HSP research, focusing on its pathogenesis, clinical manifestations, diagnosis, treatment, and prognosis. It clarifies the core pathological process of IgA1 glycosylation abnormalities and vascular endothelial damage, elaborates on the diversity of clinical presentations (including typical skin lesions and multi-system involvement), and summarizes evidence-based diagnostic criteria and differential diagnosis approaches.

Keywords: Henoch-Schönlein Purpura; IgA vasculitis; Pathogenesis; Clinical manifestations; Evidence-based treatment; Pediatric vasculitis

1. Introduction

Henoch-Schönlein Purpura (HSP) is a systemic small-vessel vasculitis primarily affecting children aged 3-15 years, with a peak incidence between 6 and 10 years old. It has a global distribution, with no significant geographical or ethnic differences, and a slight male predominance. Although HSP is often self-limiting, up to 40% of patients may develop renal involvement, which is the most important determinant of long-term prognosis. In severe cases, complications such as gastrointestinal bleeding, intussusception, and severe nephritis can occur, posing a threat to the patient's health. The etiology and pathogenesis of HSP remain incompletely understood, but accumulating evidence indicates that it is an immune-mediated disease triggered by environmental factors in genetically susceptible individuals. Common triggers include infections (such as streptococcal pharyngitis, viral infections), allergic reactions to food or drugs, and environmental stimuli. The core pathological feature is the deposition of abnormal IgA1-containing immune complexes in the walls of small blood vessels, leading to vascular inflammation and increased permeability, which manifests as purpura, edema, and organ dysfunction.

In clinical practice, the diagnosis of HSP mainly relies on clinical manifestations, but it needs to be differentiated from other vasculitis, thrombocytopenic purpura, and rheumatic diseases. Treatment strategies vary according to the severity of the disease and the involvement of target organs, but there is still a lack of unified standardized treatment guidelines for severe or refractory cases.

2.Typical Cutaneous Manifestations

Cutaneous purpura is the most characteristic and initial symptom of HSP, occurring in more than 90% of patients. The lesions typically present as symmetric, non-thrombocytopenic, palpable purpura, which are most commonly distributed on the lower extremities (especially the calves and ankles) and buttocks. They can also involve the upper extremities and, rarely, the trunk and face. The evolution of the skin lesions follows a specific pattern: initially, they appear as erythematous macules or papules, which quickly develop into purpura (purple-red hemorrhagic spots) due to extravasation of blood. The lesions vary in size from a few millimeters to several centimeters, may merge into patches, and are usually non-blanching when pressed. In severe cases, the purpura may develop into vesicles, bullae, or even ulcerations, accompanied by local edema and tenderness. The skin lesions typically last for 1-2 weeks, and new lesions may recur within weeks to months, especially in cases with repeated exposure to triggers or incomplete control of inflammation.

3. Diagnosis and Differential Diagnosis

3.1 Diagnostic Criteria

The diagnosis of HSP is mainly based on clinical manifestations, combined with laboratory examinations to exclude other diseases. Currently, the most widely used diagnostic criteria are the 2006 EULAR/PRINTO/PRES criteria for childhood vasculitis, which define HSP as the presence of palpable purpura (mandatory criterion) plus at least one of the following four criteria:

1.Arthralgia or arthritis: Acute pain and swelling of large joints (knees, ankles, hips, elbows) without permanent deformity.

2.Gastrointestinal symptoms: Colicky abdominal pain, or vomiting, or hematochezia, or positive fecal occult blood test.

3.Renal involvement: Hematuria (microscopic or macroscopic) and/or proteinuria.

4.Histopathological findings: Leukocytoclastic vasculitis with IgA deposition in small vessels.

Laboratory examinations play an auxiliary role in diagnosis and disease evaluation. Routine blood tests usually show normal or slightly increased white blood cell count, normal platelet count (distinguishing from thrombocytopenic purpura), and increased erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) indicating systemic inflammation. Urine routine is crucial for detecting renal involvement, and 24-hour urine protein 定量 can assess the severity of proteinuria. Serum IgA levels are elevated in 50%-70% of patients, which is a characteristic laboratory finding but not specific. Other examinations such as coagulation function, liver and kidney function, and autoantibody tests (ANA, ANCA) are mainly used to exclude other diseases[1].

3.2 Differential Diagnosis

Due to the diversity of clinical manifestations, HSP needs to be differentiated from multiple diseases, especially those with similar skin lesions or multi-system involvement.

Thrombocytopenic purpura (such as immune thrombocytopenic purpura, ITP) is the most important differential diagnosis. Unlike HSP, ITP is characterized by decreased platelet count, and the purpura is non-palpable, asymmetric, and widely distributed (including the trunk and face). Laboratory examination shows significant thrombocytopenia, which is the key differentiating point.

Other vasculitis diseases, such as Kawasaki disease, polyarteritis nodosa, and granulomatosis with polyangiitis (GPA), also need to be differentiated. Kawasaki disease mainly affects children under 5 years old, with clinical manifestations such as persistent high fever, conjunctival hyperemia, strawberry tongue, and extremity changes, without typical IgA deposition. Polyarteritis nodosa involves medium-sized vessels, with more severe systemic symptoms and often no IgA deposition. GPA is characterized by upper and lower respiratory tract involvement and glomerulonephritis, with positive ANCA, which is different from HSP.

Rheumatic diseases such as juvenile idiopathic arthritis (JIA) may present with joint symptoms and skin rashes, but JIA is mainly characterized by chronic arthritis, and the skin rash is usually non-hemorrhagic, which can be distinguished by laboratory tests such as autoantibodies and joint imaging.

Gastrointestinal diseases such as acute appendicitis, intussusception, and peptic ulcer may have similar abdominal symptoms to HSP. Acute appendicitis is characterized by right lower abdominal pain and tenderness, with elevated white blood cell count and neutrophils. Intussusception in young children often presents with paroxysmal crying, abdominal mass, and red currant jelly-like stools, which can be confirmed by abdominal ultrasound. Peptic ulcer usually has a history of irregular abdominal pain, and gastroscopy can confirm the diagnosis[2].

4. Treatment and Management

4.1 General Treatment and Symptomatic Management

General treatment is the foundation of HSP management, applicable to all patients, regardless of disease severity. Rest is essential during the acute phase to reduce activity and avoid trauma, which can prevent the exacerbation of skin purpura and vascular damage. Patients should avoid exposure to identified triggers, such as allergens (food, drugs) and infectious foci (such as tonsillitis, sinusitis), which is crucial for preventing disease recurrence.Dietary management should be individualized. For patients with gastrointestinal involvement, a mild, easy-to-digest diet (such as porridge, noodles, steamed food) is recommended, avoiding spicy, irritating, cold, and hard foods to reduce gastrointestinal irritation. For patients with suspected food allergies, potential allergenic foods should be temporarily avoided, and gradually reintroduced after symptoms are controlled to identify specific allergens.

4.2 Immunomodulatory Therapy and Targeted Intervention for Severe Cases

Immunomodulatory therapy is mainly used for patients with severe systemic involvement (such as severe gastrointestinal symptoms, nephritis, nephrotic syndrome) or refractory cases that do not respond to general treatment. Glucocorticoids are the first-line immunomodulatory drugs for severe HSP. They have strong anti-inflammatory and immunosuppressive effects, which can quickly relieve severe abdominal pain, joint pain, and severe skin lesions. For patients with severe gastrointestinal involvement (such as severe abdominal pain, gastrointestinal bleeding) or severe arthritis, oral or intravenous glucocorticoids (such as prednisone, methylprednisolone) can be used. The dosage and course of treatment should be adjusted according to the severity of the disease and the response to treatment, and gradually tapered to avoid sudden withdrawal. However, the use of glucocorticoids for the prevention of renal involvement is controversial, and current evidence does not support routine use of glucocorticoids in patients without severe organ involvement[3].

4.3 Management of Multi-System Involvement

The management of multi-system involvement should be individualized according to the involved organs and severity. For renal involvement, the treatment strategy is determined based on the clinical manifestations and pathological findings. Patients with mild asymptomatic hematuria and mild proteinuria can be managed with general treatment and close follow-up, with regular urine routine and renal function monitoring. Patients with acute 肾炎 syndrome or nephrotic syndrome require combined treatment with glucocorticoids and immunosuppressants, and angiotensin-converting enzyme inhibitors (ACEI) or angiotensin receptor blockers (ARB) can be used to reduce proteinuria and protect renal function. Patients with rapidly progressive glomerulonephritis may need intensive treatment such as pulse glucocorticoids, cyclophosphamide, and plasma exchange.For gastrointestinal involvement, in addition to symptomatic treatment and glucocorticoids for severe cases, close monitoring of vital signs and abdominal symptoms is required. If intussusception is suspected, emergency abdominal ultrasound should be performed, and surgical reduction or resection is necessary for those who fail conservative treatment. Gastrointestinal bleeding should be managed with hemostatic drugs, fluid replacement, and blood transfusion if necessary[4].

5.Conclusion

Henoch-Schönlein Purpura is a common immune-mediated systemic small-vessel vasculitis in children and adolescents, with complex pathogenesis involving immune dysregulation, abnormal IgA metabolism, genetic susceptibility, and environmental triggers. Its clinical manifestations are diverse, characterized by typical skin purpura, and often accompanied by multi-system involvement such as gastrointestinal tract, kidneys, and joints. Among them, renal involvement is the key factor affecting long-term prognosis.

References:

[1]Reiter J C H ,Andersen A C . Henoch-Schönlein Purpura (IgA Vasculitis) Chronic Lesions: How Fluorescence Imaging of Bacteria Illuminated the Way Toward Healing[J].Dermato,2024,4(4):198-204.

[2]Chen B ,Yang M ,Zeng Y , et al. The Latest Treatment Strategies for Henoch-Schönlein Purpura Nephritis: Application of Immunosuppressants[J].International Journal of Biology and Life Sciences,2024,8(1):14-18.

[3]Torelli L ,Crafa P ,Ghiselli A , et al. Gastrointestinal involvement in Henoch-Schönlein purpura.[J].Journal of pediatric gastroenterology and nutrition,2024,

[4]Kaya A ,Yörük G ,Canpolat M , et al. Henoch-Schönlein Purpura in a Patient with AIDS: A Case Report and Literature Review.[J]. Infectious diseases & clinical microbiology,2024,6(3):243-247.