Pediatric Granuloma Annulare: A Rare Association with Lyme Disease

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Introduction

Granuloma annulare is a benign, self-limiting granulomatous skin condition that typically presents with annular plaques and flesh-colored to erythematous papules.[1,2] While the exact etiology remains unclear, various triggers have been implicated, including infections, trauma, and medications.[1,3] Among infectious agents, *Borrelia burgdorferi*, the spirochete responsible for Lyme disease, has been associated with the development of granuloma annulare in rare cases.[4,5,6] This association suggests that granuloma annulare may represent a delayed immunologic response to infection, even after appropriate antimicrobial treatment.[4] We present a case of a 9-year-old male who developed polymorphic granuloma annulare several months following appropriately treated Lyme disease, highlighting the importance of recognizing this rare post-infectious sequela.

Case Presentation

A 9-year-old male presented to the office with a progressive rash involving the knees and elbows. The patient's parents reported a history of Lyme disease diagnosed in the summer of 2025, which was appropriately treated with antibiotics. In fall 2025, the patient began developing flesh-colored nodules along the knees. By winter 2025, the lesions had progressed to involve both knees and elbows, prompting the office visit.

Physical examination revealed a polymorphic presentation with violaceous lesions at sites where the rash had originally appeared, as well as active erythematous papules on the knees and ankles (Figure 1). The distribution pattern and morphology of the active lesions were reminiscent of Gianotti-Crosti syndrome. The violaceous quality of the older lesions raised clinical concern for urticarial vasculitis.

Given the atypical and polymorphic presentation, a punch biopsy was performed on an active lesion on the elbow to establish a definitive diagnosis. Histopathological examination revealed palisading granulomas with central collagen degeneration and mucin deposition, findings consistent with granuloma annulare (Figure 2).[7] There was no evidence of vasculitis or other inflammatory dermatoses.

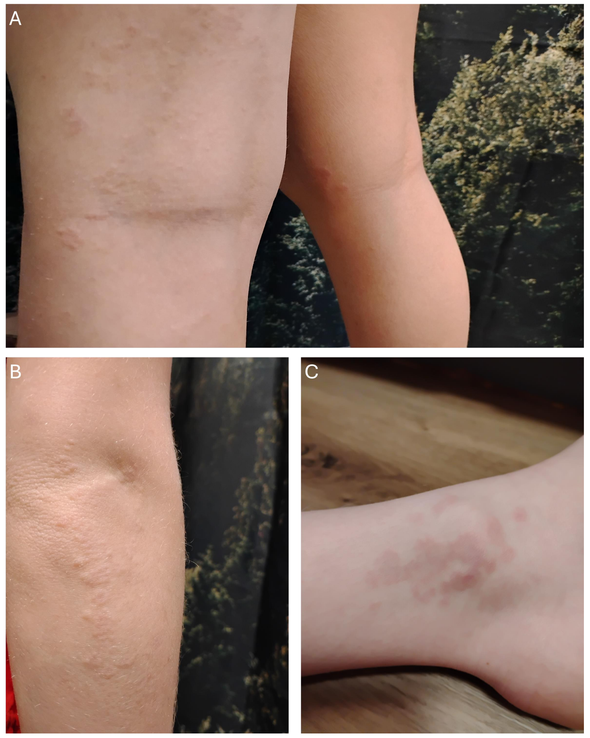

Figure 1: Representative Cutaneous Lesions of Disseminated Pediatric Granuloma Annulare Following Borreliosis. A (Top): Non-annular, grouped flesh-colored to pink papules with underlying hyperpigmented macules in the popliteal fossa. **B** (Bottom Left): Linear arrangement of firm, smooth, wheal-like papules on the extensor surface of the elbow. **C** (Bottom Right): Ill-defined, dusky violaceous patches on the medial ankle.

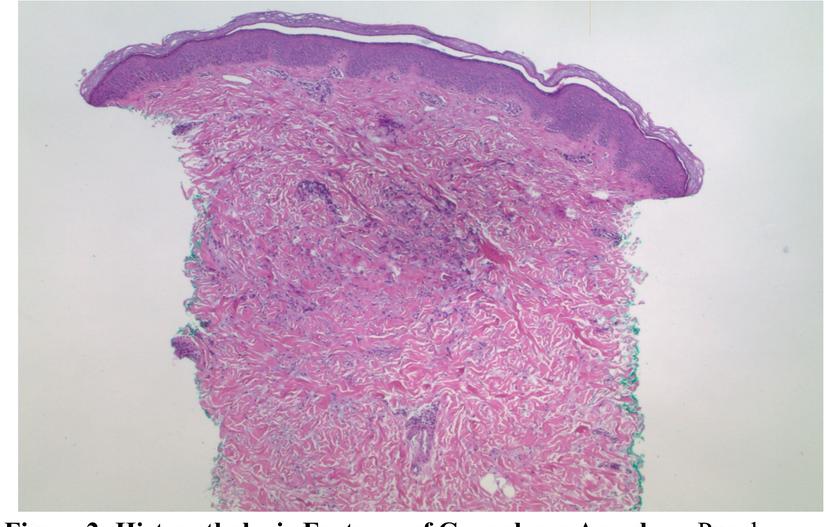

Figure 2: Histopathologic Features of Granuloma Annulare. Punch biopsy of an active elbow lesion demonstrating a prominent histiocytic component arranged around foci of collagenolysis, consistent with granuloma annulare (H&E stain).

Discussion

- This case illustrates the rare but documented association between Lyme disease and subsequent development of granuloma annulare[4,5]
- The temporal relationship suggests granuloma annulare may represent a delayed immunologic response to *Borrelia burgdorferi*, even after successful antibiotic treatment
- **Proposed mechanisms include:**[3,8]
  - Molecular mimicry: immune responses against spirochetal antigens cross-react with host tissue components
  - Persistent antigenic stimulation from residual spirochetal fragments
  - Altered immune regulation following infection
- **Diagnostic challenges in this case:**
  - Polymorphic presentation created significant uncertainty
  - Violaceous older lesions raised concern for urticarial vasculitis
  - Distribution of active erythematous papules mimicked Gianotti-Crosti syndrome
- Histopathological examination was essential for establishing the diagnosis
  - Palisading granulomas with collagen degeneration and mucin deposition confirmed granuloma annulare
  - Excluded urticarial vasculitis and other inflammatory dermatoses
- **Management considerations:**
  - Granuloma annulare is typically self-limiting and may resolve spontaneously over months to years
  - Treatment options include topical or intralesional corticosteroids
  - Observation alone is often appropriate

Conclusion

This case highlights granuloma annulare as a potential post-infectious sequela of appropriately treated Lyme disease in pediatric patients. The polymorphic presentation, mimicking both Gianotti-Crosti syndrome and urticarial vasculitis, emphasizes the diagnostic challenges that may arise. Biopsy remains critical for definitive diagnosis when clinical findings are atypical. Pediatricians and dermatologists should be aware of this rare association to ensure accurate diagnosis and avoid unnecessary interventions.

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