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Nail-fold capillaroscopy changes in patients with digital gangrene without connective tissue diseases or Raynaud's phenomenon compared to the normal population

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This cross-sectional study examines the main causes and nail-fold capillaroscopy (NFC) alterations in patients with digital gangrene without underlying connective tissue diseases or Raynaud's phenomenon (RP), compared to a control group. Patients referred for NFC from 2011-2023 were included, excluding those with RP, connective tissue diseases, compression traumatic causes, and positive antinuclear antibodies. Out of the 31 patients and 31 age- and sex-matched healthy individuals, the causes of digital gangrene were identified in 18 patients (58%). Oral contraceptive pills (OCPs) emerged as the most common cause, followed by Buerger's disease, hyperhomocysteinemia, COVID-19, ulcerative colitis, cryoglobulinemia, cold agglutinin disease, frostbite, antiphospholipid syndrome, and renal failure with arteriovenous fistula thrombosis. Capillaroscopy changes were significantly higher in patients compared to controls ($P < 0.001$), with non-specific changes being more prevalent in patients (64.5%) than controls (6.5%). Microhemorrhages were the most common abnormality, followed by dilated and thrombosed capillaries. The study concludes that causes of digital gangrene in patients without connective tissue disease or RP vary widely, with OCP users accounting for a significant portion; however, a considerable number of cases remain unexplained. Capillaroscopy findings in these patients often reveal non-specific abnormalities, significantly differing from the control population. Further studies involving larger sample sizes would be valuable in providing additional insights into this condition.

Keywords: digital gangrene; nail-fold capillaroscopy; microvascular changes; connective tissue diseases; Raynaud's phenomenon

Introduction

Digital gangrene, characterized by tissue necrosis in the fingers or toes [1], often results from compromised blood flow due to various etiologies, including diabetes mellitus (DM), thromboembolic events, vasculitis, and infections. It can be an indicator of a complex multisystem disease, such as rheumatologic and autoimmune disorders [2, 3]. In addition, the prevalence and outcomes of digital gangrene vary among different rheumatologic diseases [2]. Digital ulcerations and ischemia can be the manifestations among patients diagnosed with systemic sclerosis (SSc) [4], Besides, other conditions and disorders such as cryo-globulinaemic vasculitis [5], antineutrophil

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recommendations for future research that could shed light on various pathological and microvascular changes in patients with digital gangrene. Conducting large-scale, multicenter studies with control groups can address the existing gaps in knowledge by ensuring a sufficient sample size.

Conclusion

While the etiology was unknown in a considerable proportion of patients, OCP use emerged as the most common potential cause of digital gangrene in those without a CTD or RP. We also found various less frequent etiologies such as COVID-19 infection, cryoglobulinemia, cold agglutinin disease, frostbite, ulcerative colitis, anti-phospholipid syndrome and renal failure with AV fistula thrombosis and each of Buerger's syndrome and hyperhomocysteinemia. A history of previous digital gangrene was notably more common in patients than in controls, suggesting that this factor may serve as a potential risk indicator for developing digital gangrene. Additionally, abnormal capillaroscopy finding mostly non-specific pattern including microhemorrhages, dilated capillaries less than 30 µm, and thrombosed capillaries were also notably more common in patients than in controls. Although these results provide novel insights into the capillaroscopy aspects of digital gangrene, further investigations are needed to address the existing gaps and enhance the quality of care for these patients.

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Conflict of Interest

The authors declare no conflict of interest.

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