

Leishmaniasis and Trace Element Alterations: a Systematic Review

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Abstract

Leishmaniasis is a worldwide prevalent parasitic infection caused by different species of the genus *Leishmania*. Clinically, the disease divided into three main forms, including visceral leishmaniasis (VL), cutaneous leishmaniasis (CL), and mucocutaneous leishmaniasis (MCL). There is no vaccine for human leishmaniasis and their treatment is challenging. Trace elements (TEs) alteration, including the selenium (Se), zinc (Zn), copper (Cu), iron (Fe), and magnesium (Mg) have been detected in patients with CL and VL as well as canine leishmaniasis. Because TEs play a pivotal role in the immune system, and host immune responses have crucial roles in defense against leishmaniasis, this systematic review aimed to summarize data regarding TEs alteration in human and animal leishmaniasis as well as the role of these elements as an adjuvant for treatment of leishmaniasis. In a setting of systematic review, we found 29 eligible articles (any date until October 1, 2020) regarding TEs in human CL ($N = 12$), human VL ($N = 4$), canine leishmaniasis ($N = 3$), and treatment of leishmaniasis based on TEs ($N = 11$), which one study examined the TEs level both in CL and VL patients. Our analysis demonstrated a significantly decreased level of Fe, Zn, and Se among human CL and canine leishmaniasis, and Zn and Fe in patients with VL. In contrast, an increased level of Cu in CL patients and Cu and Mg in VL patients and canine leishmaniasis was observed. Treatment of CL based zinc supplementation revealed enhancement of wound healing and diminished scar formation in human and experimentally infected animals. The results of this systematic review indicate that the TEs have important roles in leishmaniasis, which could be assessed as a prognosis factor in this disease. It is suggested that TEs could be prescribed as an adjuvant for the treatment of CL and VL patients.