

Use of a Chagas Urine Nanoparticle Test (Chunap) to Correlate with Parasitemia Levels in T. cruzi/HIV Co-Infected Patients

Authors : Yagahira E. Castro-Sesquen, Robert H. Gilman, Carolina Mejia, Daniel E. Clark, Jeong Choi, Melissa J. Reimer-Mcatee, Rocio Castro, Jorge Flores, Edward Valencia-Ayala, Faustino Torrico, Ricardo Castillo-Neyra, Lance Liotta, Caryn Bern, Alessandra Luchini

Abstract : Early diagnosis of reactivation of Chagas disease in HIV patients could be lifesaving; however, in Latin American the diagnosis is performed by detection of parasitemia by microscopy which lacks sensitivity. To evaluate if levels of T. cruzi antigens in urine determined by Chunap (Chagas urine nanoparticle test) are correlated with parasitemia levels in T. cruzi/HIV co-infected patients. T. cruzi antigens in urine of HIV patients (N=55: 31 T. cruzi infected and 24 T. cruzi serology negative) were concentrated using hydrogel particles and quantified by Western Blot and a calibration curve. The percentage of Chagas positive patients determined by Chunap compared to blood microscopy, qPCR, and ELISA was 100% (6/6), 95% (18/19) and 74% (23/31), respectively. Chunap specificity was 91.7%. Linear regression analysis demonstrated a direct relationship between parasitemia levels (determined by qPCR) and urine T. cruzi antigen concentrations ($p < 0.001$). A cut-off of > 105 pg was chosen to determine patients with reactivation of Chagas disease (6/6). Urine antigen concentration was significantly higher among patients with CD4+ lymphocyte counts below 200/mL ($p = 0.045$). Chunap shows potential for early detection of reactivation and with appropriate adaptation can be used for monitoring Chagas disease status in T. cruzi/HIV co-infected patients.

Keywords : antigenuria, Chagas disease, Chunap, nanoparticles, parasitemia, poly N-isopropylacrylamide (NIPAm)/trypan blue particles (polyNIPAm/TB), reactivation of Chagas disease.

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