

Session: P038 More on parasitic disease epidemiology and management

Category: 7c. Antiparasitic drugs & treatment

23 April 2017, 12:30 - 13:30
P0814

Efficacy of gold nanoparticle-loaded with nitazoxanide on parasitological and histopathological parameters in murine cryptosporidiosis

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Background: *Cryptosporidium parvum* is a protozoan parasite that infects the gastrointestinal epithelial cells causing several parasitological and pathological changes. This work aimed to evaluate the effectiveness of Nitazoxanide alone or loaded with gold nanoparticles in treatment of cryptosporidiosis.

Material/methods: This study included five groups of mice: group I, infected control; group II, infected and treated with Nitazoxanide; group III, infected and treated with Gold Nanoparticle; group IV, infected treated with Nitazoxanide loaded with gold nanoparticles and groups V non-infected control. Mice were subjected to stool examination for oocyst counts prior to and after 2 weeks post infection and were later sacrificed for intestinal dissection and routine histo-pathological examination, beside measurement of fecal IgA in stool samples and different cytokines in serum samples

Results: Infected control group showed the highest numbers of oocysts shed compared to the other groups. The highest reduction of oocysts shed was observed in group of mice treated with Nitazoxanide loaded with gold nanoparticles 93.7 %. Low-grade dysplastic changes were seen in group of mice with combined treatment. The highest significant reduction of fecal IgA was observed in combined therapy. Mice with combined treatment showed a high significant ($P < 0.001$) increase in serum levels of both IFN- γ and IL-10 and moderate significant ($P < 0.01$) reduction in serum level of IL-5 when compared to group infected non-treated mice, while no significant difference between all treated groups and group infected non-treated mice in serum level of IL-2.

Conclusions: This study was concluded that the combination of Nitazoxanide loaded with gold nanoparticles was effective in the treatment of *Cryptosporidium* infection.