

ABSTRACT

Significant number of individuals who have HIV/AIDS are also chronic alcohol consumers (Pandrea et al., 2010). Alcohol intake has been found to disrupts ARV drug bioconversion and innate immunity of the gut (Bishehsari et al., 2017), but the exact effects of the combined use of alcohol and/or cART on small intestinal epithelium and Paneth cells remains unclear. Paneth cells are the main regulator of innate immunity of the gut (Salzman et al., 2010). This study evaluated the histomorphologic appearances of Paneth cells and crypt-villous morphology in small intestine of rats exposed to alcohol and/or combination anti-retroviral drug therapy (cART).

The study utilized an experimental study design of 32 adult male Sprague-Dawley rats which were divided into 4 groups and treated with normal saline, alcohol, cART or a combination of alcohol and cART. The animals were sacrificed after 90 days. Segments of small intestine were collected and studied to evaluate the morphometric changes of crypts and villi dimensions in the jejunum and ileum, determine the location of the Paneth cells along the axis of the intestinal crypts of the jejunum and ileum. Furthermore, to examine the histomorphological appearance of Paneth cells including their morphology and amounts of secretory granules, in the jejunum and ileum and examine the histomorphological appearance of stem cells in the crypts of the jejunum and ileum using H&E, special stains and immunohistochemistry. Histomorphometric measurements were done using ImageJ software. Analysis of data was done using STATA SE 15 statistical software.

Morphometry and morphological analysis showed significant ($p < 0.05$) reduction in villous height, villous width, crypt's depth, intestinal stem cells, increased villous stripping, increased crypt's width, increased muscular wall thickness, increased number of Paneth cells and staining intensity of Paneth cell granules in alcohol + cART treated group. The increase in number of villi was in all experimental groups and highest following treatment with cART alone or in combination with alcohol. The shortest villi, shallowest crypts and the least number of crypts were seen in ileum of animals that had cART alone. The alcohol alone group had the least number of villi but showed increased collagen content. Paneth cells were noted in the proliferation zone of intestines of animals that had combined treatment (alcohol +cART).

Concomitant use of alcohol and cART led to thickening of small intestinal wall, shortening and/or stripping the villi, reduction of crypt depth, appearance of Paneth cells in proliferation zone and a decrease in intestinal stem cells. The structural changes in the small intestine and

Paneth cells may adversely affect the regulation of gut innate immunity. These findings are clinically invaluable in the management of HIV patients considering the critical significance of innate immunity amongst HIV patients.