Effect of Rotavirus Toxin NSP4 on the Intestinal Microvasculature of Infant Rats – An Electron Microscopic Study

S. Ambikaipakan[1] and J. Suganthy[2]
[1]Department of Anatomy, Faculty of Medicine, University of Jaffna, Jaffna.
[2]Department of Anatomy, Christian Medical College, Vellore. India.

Diarrhoea due to rotavirus infection is one of the common causes of morbidity and mortality in young children. The intestinal microvascular endothelial cells are the common targets in many diarrhoeal diseases. The action of rotavirus toxin non structural glycoprotein 4 (NSP4) on endothelial cells has not been evaluated yet. The aim of this study is to identify the changes in intestinal microvasculature of infant rats developed diarrhoea when infected with rotavirus toxin NSP4 using electron microscopy. Twenty one, five-day-old Wistar rats were injected intraperitoneally with 150 μg of NSP4, SA11 Δ86 and fifteen were given sterile saline as control. Rats were observed for diarrhoea at different time points. Two rats were sacrificed at different time-points of post infection. Tissue samples were taken from proximal and distal small intestine, caecum and colon and processed for electron microscopy. Blood vessels of mucosa and sub-mucosa in each site were studied. Morphological changes of endothelium such as ruffling of luminal membrane, vacuolation of cytoplasm, swelling of endothelial cell, mitochondria and rough endoplasmic reticulum, rarefaction and disruption of cytoplasm were noted and photographs were taken in the electron-microscope. Diarrhoea began after 2 hours post infection and persisted till 24 hours. Sixty three percent of rats had diarrhoea at 24 hours post infection. Endothelial cell changes were more prominent in the arterioles of colon, capillaries of caecum and venules of proximal small intestine. The morphological changes of endothelium in the present study would further help in the understanding the pathogenesis of rotavirus infection.

Keywords: Rotavirus toxin NSP4, Electron microscopy, Endothelium, Infant rat