Histopathological rearrangements of the colonic wall following dopaminergic nigrostriatal neurodegeneration

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Parkinson’s disease (PD) is a degenerative neurological disorder, which is often associated with gastrointestinal disturbances (e.g., constipation and defecatory dysfunctions), whose mechanisms are still unknown [1]. Recently, an inflammatory pathogenesis has been proposed to explain these colonic disorders, but low literature are available. This study aims to analyze whether the central dopaminergic denervation, induced by intranigral injection of 6-hydroxydopamine (6-OHDA), can alter the morphological arrangement of colon in rats. Animals were euthanized 4 and 8 weeks after 6-OHDA injection. Histological, histochemical and immunohistochemical analysis were carried out on formalin-fixed, paraffin-embedded colonic samples in order to evaluate: histology, inflammatory cells (eosinophils and mast cells) and collagen fibers in the whole wall; glial fibrillary acidic protein (GFAP), immunoperoxidase, alpha-smooth muscle actin (alpha-SMA) and vimentin immunofluorescence by confocal microscopy. Malondialdehyde (MDA, colorimetric assay), TNF and IL-1β (ELISA assay) levels were also examined. 6-OHDA-induced nigrostriatal denervation was associated with the following histopathological changes observed in the colonic wall: eosinophil and mast cell infiltration, collagen deposition, activation of myenteric glial cells (GFAP+), increased vimentin immunostaining associated with alpha-SMA decrease in the tunica muscularis, enhanced colonic tissue levels of MDA, TNF and IL-1β. On the basis of the present results it is possible to conclude that the induction of central nigrostriatal dopaminergic denervation is followed by inflammation and fibrotic rearrangement of the colonic wall.

References


Keywords

Parkinson’s disease; experimental dopaminergic nigrostriatal neurodegeneration; colonic rearrangement.