The Effect of Melatonin on Plasma Markers of Inflammation and -on Expression of Nuclear Factor-Kappa Beta in Acetic Acid Induced Colitis in the Rat

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Abstract:

Background: Taking into consideration the presence of melatonin (MEL) in gastrointestinal (GI) tissue and its role in gastrointestinal tract (GIT) physiology, it is practical to speculate that melatonin could influence inflammation-related GI disorders, including ulcerative colitis (UC). Aim of the study: We hypothesized the preventive, short and long term effects of melatonin administration on acetic acid (AA) induced colitis in rats and its potential underlying mechanism. We evaluate the immunohistochemical expression of nuclear factor NF-kappa beta (NF-κβ). Also, we estimated the relation between AA-induced colitis and pentraxin-3 (PTX-3) serum level. Materials and methods: The animals were divided into 5 groups. Control group, AA induced-colitis group, Pre-treated group, Short-term treated group, and Long-term treated group. At the end of the experiment, blood samples were taken for measurement of PTX-3, lipid peroxide (LP) and total thiols (TT). Colon was taken for histopathological examination and immunohistochemical study for detection of NF-κβ expression. Results: MEL is effective in prevention and short-term treatment of AA-induced colitis as indicated by attenuating the colitis symptoms such as rectal bleeding, reduction of the body weight, the increase in the colonic weight and reduction of the severity of mucosal damage dramatically. Also, MEL administration decreased NF-κβ immunohistochemical expression, decreased serum level of LP and PTX-3 and increased serum level of TT. However, in long-term treatment MEL has negative effect on AA-induced colitis. Conclusion: MEL is effective in prevention and short-term treatment of colonic inflammatory process while long-term treatment exacerbate the colitis. Also, the outcome indicated that melatonin contributes in a variety of guard mechanisms against colonic inflammatory processes by inhibiting the NF-κβ and conserving the vital endogenous antioxidant reserve of TT, thus dipping the level of colonic damage, mainly in the early phase of colitis.

Keywords:

melatonin, ulcerative colitis, acetic acid, PTX-3, NF-κβ.

Published In:

Dig Dis Sci, 58, 3156–3164