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Effect of Sodium Arsenite Exposure on Pharmacodynamic of Meloxicam in Male Wistar Rats

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Abstract : Arsenic is a naturally occurring metalloid with potent toxic effects. It is ubiquitous in the environment and released from both natural and anthropogenic sources. It has the potential to cause various health hazards in exposed populations. Arsenic exposure through drinking water is considered as one of the most serious global environmental threats including Southeast Asia. The aim of present study was to evaluate the modulatory role of subacute exposure to sodium (meta) arsenite on the antinociceptive, anti-inflammatory and antipyretic responses mediated by meloxicam in rats. Rats were exposed to arsenic as sodium arsenite through drinking water for 28 days. A single dose of meloxicam (2 mg/kg b. wt.) was administered by oral gavage on the 29th day. The exact time of meloxicam administration depended on the type of test. Rats were divided randomly into 5 groups (n=6). Group I served as normal control and received arsenic free drinking water, while rats in group II were maintained similar to Group I but received meloxicam on 29th day. Groups III, IV and V were pre-exposed to arsenic through drinking water at 0.5, 5.0 and 50 ppm, respectively, for 28 days and was administered meloxicam next day and; pain and inflammation carried out by using formalin-induced nociception and carrageenan-induced inflammatory model(s), respectively by using standard protocol. For assessment of antipyretic effects, one more additional group (Group VI) was taken and given LPS @ 1.8 mg/kg b. wt. for induction of pyrexia (LPS control). Higher dose of arsenic inhibited the meloxicam mediated antinociceptive, anti-inflammatory and antipyretic responses. Further, meloxicam inhibited the arsenic induced level of tumor necrosis factor-α, inetrleukin-1β, interleukin -6 and COX2 mediated prostaglandin E2 in hind paw muscle. These results suggest a functional antagonism of meloxicam by arsenic. This may relate to arsenic mediated local release of tumor necrosis factor-α, inetrleukin-1β, interleukin -6 releases COX2 mediated prostaglandin E2. Based on the experimental study, it is concluded that sub-acute exposure to arsenic through drinking water aggravate pyrexia, inflammation and pain at environment relevant concentration and decrease the therapeutic efficacy of meloxicam at higher level of arsenite exposure. Thus, the observation made has clinical relevance in situations where animals are exposed to arsenite epidemic geographical locations.

Keywords : arsenic, analgesic activity, meloxicam, Wistar rats
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