Anti-inflammatory and side effects of cyclooxygenase inhibitors

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Abstract:
Nonsteroidal anti-inflammatory drugs (NSAIDs) are the most commonly used drugs in inflammatory diseases, since they are effective in management of pain, fever, redness, edema arising as a consequence of inflammatory mediator release. Studies have shown that both therapeutic and side effects of NSAIDs are dependent on cyclooxygenase (COX) inhibition. COX isoforms have been named constitutive (COX-1) and inducible (COX-2). COX-1 catalyzes formation of cytoprotective prostaglandins in thrombocytes, vascular endothelium, stomach mucosa, kidneys, pancreas, Langerhans islets, seminal vesicles, and brain. Induction of COX-2 by various growth factors, proinflammatory agents, endotoxins, mitogens, and tumor agents indicates that this isoform may have a role in induction of pathological processes, such as inflammation. It is well known that therapy with COX inhibitors is associated with a number of side effects including gastrointestinal erosions, and renal and hepatic insufficiency. Such critical adverse reactions are mostly dependent on COX-1 inhibition. As a result of research focused on reduction of the adverse effects of NSAIDs, selective COX-2 inhibitors, such as celecoxib and rofecoxib have been developed. However, many data demonstrate that mechanisms of action of these drugs are multidirectional and complex. These drugs or their derivatives, which belong to the same group, have distinct pharmacological effects, side effects and potencies which implies that there may be more than two, five or even tens of COX isoforms.

Key words: NSAIDs, COX enzymes, inflammation, COX-2 selective inhibitors, non-selective inhibitors