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(54) Title: IRRIGATION SOLUTION AND METHOD FOR INHIBITION OF PAIN, INFLAMMATION AND SPASM

(57) Abstract

A method and solution for perioperatively inhibiting a variety of pain and inflammation and spasm processes at a wound. The solution includes multiple pain and inflammation inhibitory agents and spasm inhibitory agents at dilute concentration in a physiologic base, such as saline or lactated Ringer's solution. Depending on the application, the pain and inflammation agents included in the solution may include: (1) serotonin receptor antagonists; (2) serotonin receptor agonists; (3) histamine receptor antagonists; (4) bradykinin receptor antagonists; (5) kallikrein inhibitors; (6) tachykinin receptor antagonists, including neurokinin$_1$ and neurokinin$_2$ receptor subtype antagonists; (7) calcitonin gene-related peptide (CGRP) receptor antagonists; (8) interleukin receptor antagonists; (9) inhibitors of enzymes active in the synthetic pathway for arachadonic acid metabolites, including (a) phospholipase inhibitors, including PLA_2 isoform and PLC_γ isoform inhibitors, (b) cyclooxygenase inhibitors, and (c) lipooxygenase inhibitors; (10) prostanoid receptor antagonists including eicosanoid EP-1 and EP-2 receptor subtype antagonists and thromboxane receptor subtype antagonists; (11) leukotriene receptor antagonists including leukotriene B_4 and D_4 receptor subtype antagonists; (12) opioid receptor agonists, including mu-opiate, delta-opiate, and kappa-opiate receptor sybtype agonists; (13) purinoceptor agonists and antagonists including P_{2X} receptor antagonists and P_{2Y} receptor agonists; (14) adenosine triphosphate (ATP)-sensitive potassium channel openers; and (15) calcium channel antagonists. Suitable anti-inflammatory/anti-pain agents which also act as anti-spasm agents include serotonin receptor antagonists, tachykinin receptor antagonists, ATP-sensitive potassium channel openers and calcium channel antagonists. Other agents which may be utilized in the solution specifically for their anti-spasm properties including endothelin receptor antagonists and the nitric oxyde donors (enzyme activators). The solution is used to continuously irrigate a wound during an operative/interventional procedure for preemptive inhibition of pain and inflammation, as well as vascular and smooth muscle spasm, while avoiding undesirable side effects associated with oral, intramuscular or intravenous application of larger doses of the agents. The solution is useful for arthroscopic, intravascular and urologic procedures, as well as for application to burns, and intra- and postoperative application to surgical wounds.