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Effect of ion channel blockers on pharmacological action of paracetamol using albino mice

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Introduction: Paracetamol is one of the most widely used drugs as antipyretic and analgesic for mild to moderate pain. Currently, paracetamol is the first-line of choice for pain management and antipyresis. Ion channels are involved in many cellular processes; drugs acting on ion channels have long been used for the treatment of many diseases.

Objective: To evaluate the effect of voltage gated ion channel blockers on analgesic activity of Paracetamol.

Material & Methods: The central antinociceptive activity was determined by hot plate test and formalin test (Phase I), using male albino mice. Anti-inflammatory activity was determined by formalin test (Phase II). Seven groups of mice were used. Group 1: control group (1% T80); group 2: treated with (200mg/kg) paracetamol; group 3: treated with different ion channel blockers; group 4: received combined treatment of ion channel blockers and paracetamol; group 5: received standard drugs as Aspirin (200mg/kg) for formalin test or tramadol (5mg/kg) for hot plate test. Intraperitoneal injection was adopted.

Results: Pain produced by noxious stimuli (heat and formalin) was significantly reduced by acute administration of paracetamol. Inflammation pain produced by formalin injection was significantly decreased by acute administration of paracetamol. Nifedipine has significant decrease in nociceptive pain (hot plate and formalin test, phase I) and inflammatory pain (formalin test, phase II). Verapamil did not produce analgesic or anti-inflammatory effects. Phenytoin produced significant decrease in nociceptive pain using hot plate test and decrease inflammatory pain in formalin test (Phase II), while phase I is not sensitive for phenytoin. 4-aminopyridine produces significant decrease in nociceptive and inflammatory pain. Combined treatment of nifedipine and paracetamol has antinociceptive and anti-inflammatory effects but less than the additive effect. Verapamil administration with paracetamol produces antinociceptive and anti-inflammatory activity. This effect is due to paracetamol only. Administration of combined treatment of phenytoin and paracetamol has antinociceptive action and anti-inflammatory effect but less than the additive effect which may reach the ceiling.The combined treatment of 4-aminopyridine and paracetamol showed antinociceptive action, 4-aminopyridine potentiates the effect of paracetamol; while the anti-inflammatory action was less than the additive effect.

Conclusion: Paracetamol has central analgesic and anti-inflammatory effect. Nifedipine, phenytoin and 4-aminopyridine, each alone, produce analgesic and anti-inflammatory action. Verapamil, in the dose used, by its self has neither analgesic nor anti-inflammatory effect. Paracetamol analgesic action is not affected by nifedipine or phenytoin; it may be concluded that the combined treatment may reach the ceiling effect of analgesic action, while analgesic effect of paracetamol is potentiated by 4 aminopyridine. Combined treatment of nifedipine, phenytoin or 4-aminopyridine with paracetamol produce anti-inflammatory effect, which less than the additive effect. Ceiling effect of anti-inflammatory activity may be produced by combined administration of paracetamol and nifedipine, phenytoin or 4-aminopyridine. Hot plate model is more sensitive to the effect of analgesic agent that relieve neuropathic pain compared to formalin test (phase I).

Biography

Suhera M Aburawi has completed her PhD at Cairo University (1999), and MPhill at London Hospital Medical College (1984). She has published more than 23 papers in reputed journals, and contributed to more than 24 conference papers. She was invited, by several journals, to review submitted manuscripts. She also contributed the chapter on Libya in several editions of D'Vanzo, C.E. and Geissler, E.M. (eds.), Cultural Health Assessment, Mosby Inc.

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