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Why the drug solutions may cause inflammation at the injection site

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The injections of drug solutions with a high and low concentration (less than 10%) of active drug substance can be followed by the development of local inflammation and complications: cellulitis, phlegmon and necrosis. There are cases of local inflammation after injection solutions of antibacterial, steroidal and non-steroidal anti-inflammatory drugs. We suggested that irritant action of the latter could be caused by high osmolality. The aim of this study is to investigate the local safety drug solutions with different osmolality *in vivo* using infrared thermography. It is found that Ketorolac tromethamine osmolality index was 2971 mmol/kg, metamizole sodium was 4520 mmol/kg and prednisolone was 4205 mmol/kg. Osmolality of sodium chloride 9 mg/ml (control solution) equaled 305 mmol/kg. High osmolality of 50% metamizole sodium solutions was caused primarily by high concentration of active drug substance metamizole sodium (500 mg/ml) in the solution, but high osmolality of ketorolac tromethamine and prednisolone was due to high total concentration of an adjuvants. Thirty minutes after injection local skin hyperthermia at the site of intramuscular injections of ketorolac tromethamine, metamizole sodium and prednisolone solutions were detected. Skin temperature at the site of injecting these solutions was 0.6-1.4°C higher compared with the initial values. Injections of the solutions diluted with sterile water for injections to osmolality index less than 900-1000 mmol/kg did not result in local skin hyperthermia. For safe injecting drug solutions measure their osmolality should be monitored. Infrared thermography can be useful in the local drug safety assessment *in vivo*.

Biography

Kasatkin Anton, PhD, assistant of department of General and Clinical Pharmacologi Izhevsk State Medical Academy. He has published more than 65 papers in journals and received 20 patents for invention. Urakov Aleksandr, MD, Prof. Head of Department of General and Clinical Pharmacologi Izhevsk State Medical Academy. He has published more than 250 papers in journals and received 100 patents for invention.

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