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Development and validation of LC-MS-MS method for determination of ibuprofen in human plasma

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Ibuprofen is widely used to reduce fever, pain or inflammation. Moreover, one of the most aspects of ibuprofen usage is for closure of the patent ductus arteriosus (PDA) in preterm infant. To study pharmacokinetics in human, the method for drug determination is required to accurately and reliably appropriate strategy to predict the rate of PDA closure. From the previous review the researchers found that the high area under the curve of oral ibuprofen contribute to better rates of successful PDA closure. Liquid chromatography with tandem mass spectrometry (LC-MS-MS) is the one of the bioanalytical methods that has the highly sensitivity, accuracy, reliable, fast as well as simple. In this study, we conducted the LC-MS-MS method for ibuprofen bioavailability. Samples were stable at room temperature in autosampler for 24 h. The calibration curve was linear across the concentration range of 0.15-50 µg/ml. The coefficient of variation for intra-day and inter-day precision was 0.78-7.21% and accuracy was within 97.52-107.21 of the nominal values for QCL (0.45 µg/ml), QCM (9.0 µg/ml) and QCH (40.0 µg/ml). For ibuprofen concentration at the lower limit of quantification (LLOQ), intra-day and inter-day accuracy of the LLOQ was 98.11% and 99.81% while the intra-day and inter-day precision were 1.89% and 5.37%. Recovery was 84-94%. The pharmacokinetic study in 18 neonates which was divided into low and high dose group was analyzed. The median maximum concentration of ibuprofen for low and high regimen was 16.05 (14.21-19.32) and 24.10 (20.63-32.03) µg/ml, the median elimination rate constant (k_e) was 0.041 (0.026-0.047) and 0.071 (0.050-0.073) hr⁻¹, respectively. Therefore, LC-MS-MS method was a suitable technique to the analysis of unknown plasma samples for ibuprofen pharmacokinetic, bioavailability or bioequivalence studies.

Biography

Apichaya Puangpetch has completed her PhD from Khon Kaen University and Postdoctoral studies from Mahidol University. She is the Lecturer of Pharmacogenomics in Mahidol University. She has published more than 40 papers in reputed journals and has been studying the TPMT enzyme activity and NUDT polymorphisms.

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