Theophylline Pharmacokinetics Dataset

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Indomethacin Pharmacokinetics Dataset Introduction and Description

Source: This data set is from a pharmacokinetic study of oral dosing of the anti-asthma medication, theophylline, in 12 subjects over 25 hours, published By Dr. Robert A. Upton, PhD around 1980. The original publication, if any, is unclear and not cited. These data were used in a package named `nlme`, and reported in Boeckmann, A.J., et al. The original publication on theophylline, if any, is unclear and not cited by the package developers. Dr. Upton was director of the Drug Studies Unit at the University of California, San Francisco, and did publish several papers on theophylline pharmacokinetics around 1980-1984, and these data could have been from one of these studies.

Boeckmann, A. J., Sheiner, L. B. and Beal, S. L. (1994), NONMEM Users Guide: Part V, NONMEM Project Group, University of California, San Francisco.

Davidian, M. and Giltinan, D. M. (1995) Nonlinear Models for Repeated Measurement Data, Chapman & Hall (section 5.5, p. 145 and section 6.6, p. 176)

Pinheiro, J. C. and Bates, D. M. (2000) Mixed-effects Models in S and S-PLUS, Springer (Appendix A.29)

This dataset is in the datasets package in base R. It can be used for examples of line plots over time, grouped by subject, and non-linear modeling, including general additive models (GAMs).

Abstract This data set contains data on 12 healthy volunteer subjects who participated in a pharmacokinetic study of oral Theophylline. Theophylline is an methylxanthine anti-asthma medication, which acts as a bronchodilator, with secondary effects to strengthen diaphragm contraction, reduce pulmonary artery pressures, and reduce mast cell release. It can be administered by the intravenous, oral, or rectal suppository routes. Unfortunately, the plasma level in blood varies considerably between patients, because of differences in drug clearance, which is affected by body mass, age, smoking, liver and heart function, and viral infections. To complicate this drug further, it has important interactions with a number of other common medicines which can increase or decrease the drug level. Each subject in this study received a single oral dose of 300 mg of theophylline, which has been converted to a milligrams per kilogram dose. Blood samples were taken at frequent intervals over the next 25 hours after dosing, and the quantity of theophylline in the plasma at each time point was measured in micrograms per milliliter of plasma.

Study Design Cohort Pharmacokinetic study over 25 hours.

Subjects & Variables

12 participants were administered oral theophylline, and plasma levels were measured at multiple time points over 25 hours.

Variables

- Subject
- Wt (kg)
- Dose (mg/kg)
- Time (hours)
- Concentration (mcg/mL)

Citation(s) Kwan, Breault, Umbenhauer, McMahon and Duggan (1976) Kinetics of Indomethacin absorption, elimination, and enterohepatic circulation in man. Pharmacokinetics and Biopharmaceutics. 1976 Jun;4(3):255-80. doi: 10.1007/BF01063617.