Validation of a Commercial Assay and Decision Support Tool for Routine Paclitaxel Therapeutic Drug Monitoring (TDM)

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BACKGROUND
The value of therapeutic drug monitoring (TDM) for paclitaxel (PTX) was recently demonstrated in the largest TDM trial ever conducted in oncology. The trial demonstrated significant reduction in neuropathy when using TDM. Dose adjustment for PTX was based on time above a threshold concentration (Tc>0.05). Tc>0.05 must be calculated with a pharmacokinetic model and complex nonlinear mixed-effects software. The use of the software and chromatographic methods to measure PTX requires specialized expertise. User-friendly methods to quantitate PTX and calculate Tc>0.05 could simplify the introduction of TDM into routine clinical practice.

METHODS
The immunoassay (MyPaclitaxel) was used to quantitate PTX in samples from the clinical trial; the results were used to calculate Tc>0.05 using a stand-alone computer program with a simple, friendly graphical user interface for nonlinear mixed-effects pharmacokinetic calculations (MyCare Drug Exposure Calculator). The resulting dose recommendations from the calculated Tc>0.05 were compared with those using liquid chromatography-ultraviolet detection and NONMEM to examine the efficacy of the simpler tools for TDM.

RESULTS
There was a good agreement between the immunoassay and liquid chromatography-ultraviolet detection: Passing-Bablok regression slope was 1.045 and intercept was -6.00, R was 0.9757, and mean bias was -1.77 ng/mL (-2.07 nmol/L). Dosing recommendations were identical for 70% of the cycles and within 10% for 89% of the samples. All Tc>0.05 values were at the same or adjacent medical decision points.

CONCLUSIONS
MyPaclitaxel assay and MyCare Drug Exposure Calculator are convenient, user-friendly tools that may be suitable for routine TDM of PTX in clinical care.
type: journal paper/review (English)
date of publishing: 12-2017
journal title: Ther Drug Monit (39/6)
ISSN electronic: 1536-3694
pages: 617-624