



Testing patients for pain medications: Is oral fluid a better choice than urine?

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Introduction

Urine is commonly collected by medical professionals for the analysis of prescribed pain medications. However, oral fluid (OF) is becoming the matrix of choice for this purpose as it has several advantages:

- Rapid and easy to collect
- Difficult to adulterate
- Reflects free drug circulating in blood
- Better correlation with blood concentration than urine results, and
- Indicative of recent drug exposure and contains parent drug.

Interpretation of urine results is more difficult as urine contains drug metabolites, has a longer window of detection of drugs, and the data provide limited information about the actual dose or dosing protocol. The analysis of oxycodone in whole blood and OF specimens collected simultaneously was performed to determine potential therapeutic ranges in OF.

Objective

To compare the concentrations of oxycodone in simultaneously collected OF and whole blood specimens.

The correlation between these concentrations may be used to propose therapeutic ranges for OF and improve the interpretation of OF drug concentrations.

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Methods

Paired blood and OF specimens were retrospectively studied in an attempt to establish a range for oxycodone concentrations in OF reflective of therapeutic intake

- Twenty-three OF: blood pairs
- OF (1mL) collected with the Quantisal™ device
- Blood specimens collected simultaneously in gray-top tubes
- Analysis by solid phase extraction followed by LC-MS/MS

Results

Blood concentrations were converted to plasma levels

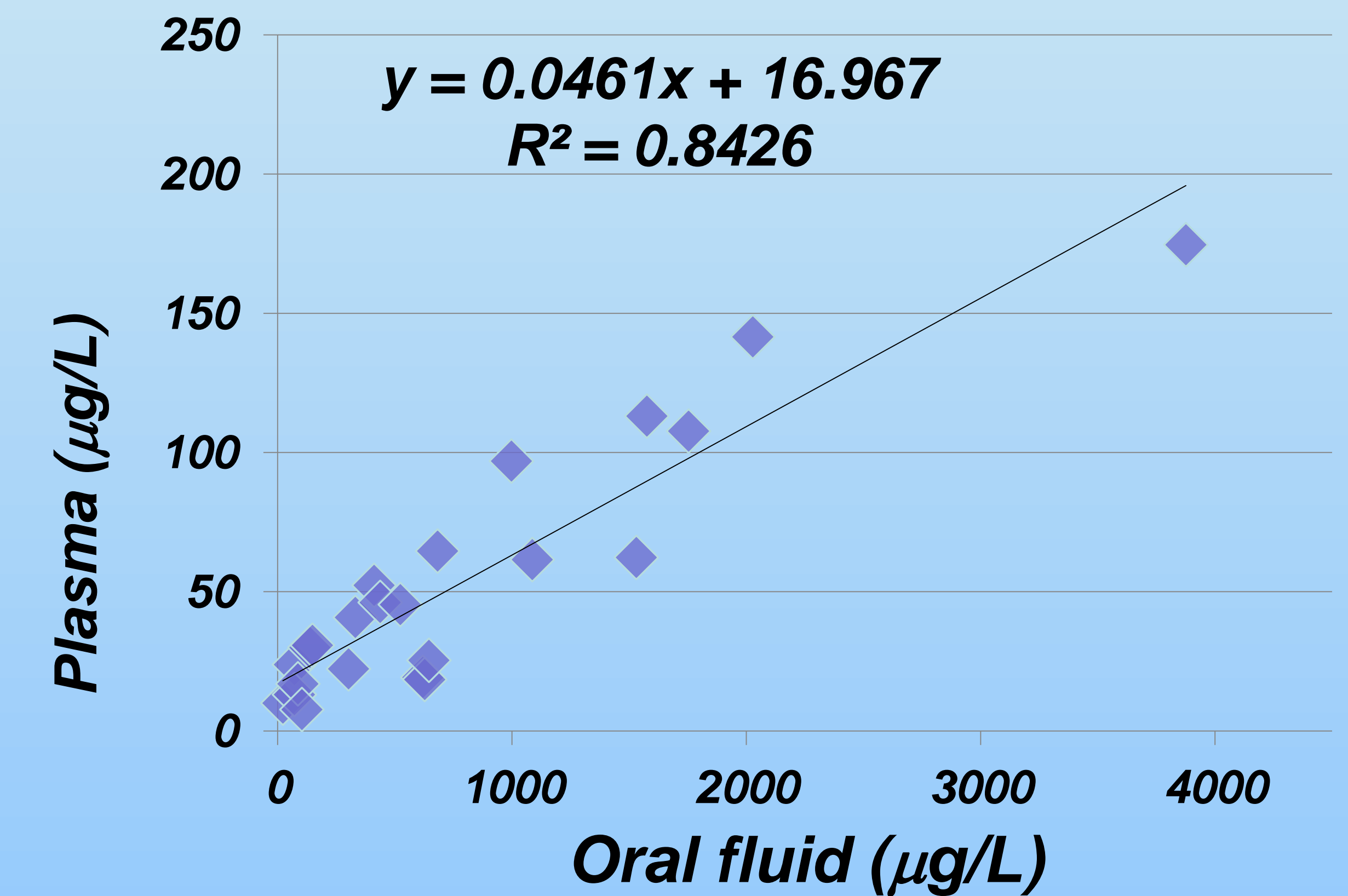
Whole blood : plasma ratio (WB : P) for oxycodone = 1.3

- **Median OF concentration: 524µg/L**
- **Median blood concentration: 53µg/L**
- **Median plasma concentration: 41µg/L**

Projected OF : P ratio = 12

Discussion

- Fatal post-mortem blood levels of oxycodone average 1200µg/L (100 - 8000µg/L)
- Regardless of formulation, oxycodone plasma concentrations generally do not exceed 100µg/L
- Based on therapeutic plasma concentrations, the corresponding OF concentration range would be 120 – 1200µg/L
- Five of 23 OF specimens had concentrations greater than 1200µg/L, indicating 22% of the samples may be considered outside the OF therapeutic range
- The corresponding plasma concentrations were 62 - 175µg/L for these five specimens



Summary

- Relationship between plasma and OF concentrations for oxycodone was remarkably consistent
- Oxycodone is generally given in a sustained release formulation, so it is possible that equilibration between blood and saliva has time to occur, improving correlation
- Since oxycodone is an opioid with potential for the development of tolerance in chronic users, therapeutic ranges may be extended
- Comparing OF to blood concentrations allowed the projection of OF:P ratios for oxycodone, and the development of a potential therapeutic range in OF
- OF oxycodone concentrations are more closely related to blood levels than urine
- Similar controlled studies should include other pain medications to provide a foundational base for the interpretation of OF results

Reference

Moore C, Kelley-Baker T, Lacey J. Interpretation of oxycodone concentrations in oral fluid. *J Opioid Management* 2012; 8(3):161-6.

ASPMN, Baltimore, 2012