Trends in Pain Management Urinalysis: A Retroactive Study

E.A. Guice, M.S.§, J. Marsh, B.S., M. Pentis, B.S., E. Borgmeier, B.S., and H. Workman, B.A.

Western Slope Laboratory, LLC 1197 Rochester Rd Troy, MI 48083 §Address questions and reprints to author

Abstract

Pain Management is the fastest growing field in medicine because as we age, we develop chronic pain, cancer pain, and are prone to age-related injuries that can lead to acute pain. As such, physicians are tasked with the job of alleviating this aforementioned pain while managing the growing opiate abuse epidemic in the United States. To aid them in this mission, many opt to submit their patients to regular urinalysis as part of their treatment regimen. This testing is used to determine if the patients are in compliance with the drug regimen by the presence or absence of particular drugs. Though this field of testing is in its infancy, physicians are required to make decisions based on these results. To this end, we review the data from thirteen pain management practices who submitted tests to our laboratory. In this study, we examine the results from pain management patients over the course of 2008 and discuss trends and comment on the predictive nature of testing in this arena. For each drug examined, there was no significant dose-dependent range of expected concentration in the urine. Moreover, the standard deviations of the ranges were such that the dose concentrations for all the drugs overlapped. However, when each patient was examined separately, a definite range trend was observed for most drugs.

Introduction

Urine toxicology testing in the pain management arena has increased several-fold over the last few years. This is due in part to regulations that require physicians who prescribe analgesics to monitor their patients. A CDC study showed that pain reliever abuse has increased 111% between 2003 and 2005[a]. In addition to this misuse of pain relievers, it has been shown that the majority of persons who abuse prescription medications gain them from friends or family members who get them from a legal resource (i.e. one physician with a valid prescription)[b]. Moreover, the prevalence of abusing illicit drugs in the pain management population is approximately 11% [c].

Additionally, the increase is also due to physicians wanting to provide the best relief to their patients while still ensuring their safety. Physicians are responsible for the patients' health; as such they find it necessary to monitor the concentrations of the drugs being prescribed. Most opt to do so by performing urinalysis. Due to the inherent complexities of urinalysis, effective testing requires the physicians to work closely with a reliable laboratory [c]. Unfortunately, laboratory tests do not reveal time of drug usage, amount of drug usage, or frequency of drug usage. These points taken together manifest into a practice of medicine where drug testing is not only essential, but begs the question what good are the results.

Methods & Materials

Results from thirteen pain management practices who submitted patients for pain management urine drug testing in 2008 were examined. We collected patient information, drug and dosing information, and test results. Patient information and drug dosing information was obtained from the chain of custody (COC). COCs have information on donor name, collection date, drug doses, dose frequency, and last dose. Test results were obtained from our database. The test performed was a 32 analyte quantitative HPLC/MS/MS scan for several classes of drugs including amphetamines, cocaine, opioids, opiates, barbiturates, benzodiazepines, and cannabinoids. See Table 1 for Key Demographics

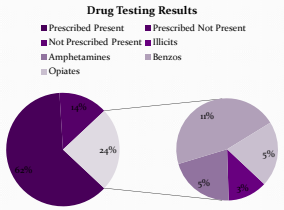
Gender	Prescriptions	Data Points
Males=242	Opiates= 1821	All >= 4
Females=246	Benzos= 357	Avg=4.76*
	Opioids=303	Max=12
Total= 488	TCA=217	Total=2324
	Barbs=12	* Most tested patients quarterly

Table 1: Demographics of the Study

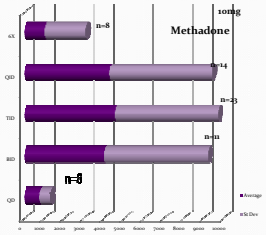
Results

The results from the pain management patients tested in 2008 (n=6545) were narrowed based on the study criteria. The criteria limited the group to patients that were tested at least four times at the Western Slope Laboratory facility under the pain management 32-drug panel (n=2324). A summary of results was determined for all the study patients evaluated. As demonstrated in Graph One, 62% of the patients tested positive for the drugs that were prescribed or its metabolite, as applicable. Further note that 14% of those tested were absent of all drugs in the panel. Here 24% tested positive for analytes not prescribed with only 3% being illicit compounds.

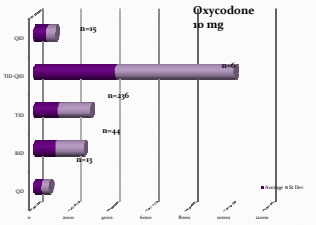
Each major drug was examined and their average concentrations and standard deviations were determined for each dosage level. The metabolites average concentrations and standard deviations are also present where applicable. Handout One has results for each class and dosage level. Each dose had such large concentration ranges that frequency could not be determined. Moreover, the standard deviations for all values were such that specific doses could not be determined from the test results (Graphs 2-6).



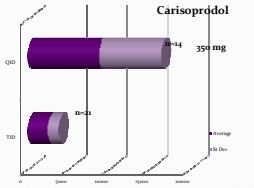
Graph 1: Summary of Testing Results



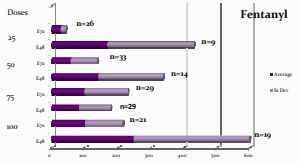
Graph 2: Methadone



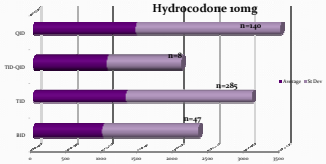
Graph 3: Oxycodone



Graph 4: Carisoprodol's Metabolite Meprobamate



Graph 5: Fentanyl



Graph 6: Hydrocodone

Please note only the most popular dose was used for the drugs above. Unless stated The metabolite graphs are not shown. Other doses available. Other drugs available: Propoxyphene, Codeine, Oxymorphone, Meperidine, and Morphine

Acknowledgements

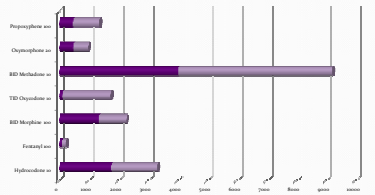
The authors want to acknowledge Jill Bensie, Ph.D., Russell Mehlenbacher, and Robert Chomic, M.S. who aided in the preparation and testing of the samples. Moreover, they would like to thank Thomas McCormick for his continued support of research projects at Western Slope Laboratory. They also want to thank the staff at Western Slope Laboratory for their help in preparing this document. Finally, they want to thank our families and friends for their love and support.

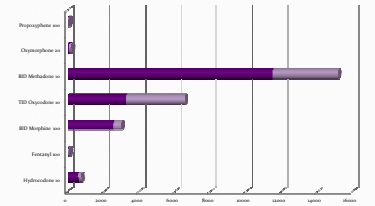
Results, Cont.

When examining patients individually, it was demonstrated that the standard deviations from the average concentrations decreased markedly in all cases. Moreover, three drugs showed significant decrease in the scatter. See Table 2 and Graph 7.

Drug	Dose	Frequency	% Decrease in St Dev	P-value
Fentanyl	100 µg	E72	51.49%	0.3249
Hydrocodone	10 mg		48.86%	0.0733
Oxymorphone	20 mg		38.82%	0.2132
Propoxyphene	N-100		87.08%	0.4976
Oxycodone	10 mg	TID	27.10%	0.0039
Morphine	100 mg	BID	49.97%	0.0058
Methadone	10 mg	BID	96.98%	0.0404

Table 2: Comparison of Individual Patients to Drug Subgroup





Graph 7: Comparison of Concentrations Ranges of Group to Individual

Summary & Conclusions

It has been shown that physicians/laboratories cannot with certainty predict the expected concentration for individuals when data from others on the same medication is present. However, the data suggests that when taken individually, patients will develop a range of concentration with a low standard deviation that is independent of collection time and date as long as the drugs and doses stay constant. This allows physicians to reliably determine compliance over time.

References

a) Center For Disease Control and Prevention CDC Online Newsroom cdc.gov June 17, 2010
b) AACC Annual Meeting 2010
Course 33211-10 DL Pain Management: Clinical Perspectives and the Role of the Clinical Laboratory John Markman, MD, FAAN and Tai Kwong, PhD
c) Cone and Caplan 2009 *Postgraduate Medicine* July 121(4):91-102