Feasibility of pharmacogenomic testing in an ambulatory care clinic

Rheanna M. Kies, Pharm.D. Candidate 2021; Jessica A. Cellar, Pharm.D. Candidate 2021;
Jason W. Guy, Pharm.D.; Julie H. Oestreich, Ph.D., Pharm.D.
College of Pharmacy, The University of Findlay, Findlay, OH 45840

University of Findlay

Introduction and Objective

- Most drugs that are available are dosed as a “one size fits all” model but this may not work the same for everyone.The value of pharmacogenomic testing lies in its ability to identify safe and effective medication regimens that are tailored to a specific individual.

- The objective of this study is to introduce healthcare workers within an ambulatory care clinic to the role of pharmacogenomic testing and to identify the frequency of clinically relevant gene-drug pairs in that patient population.

Hypothesis

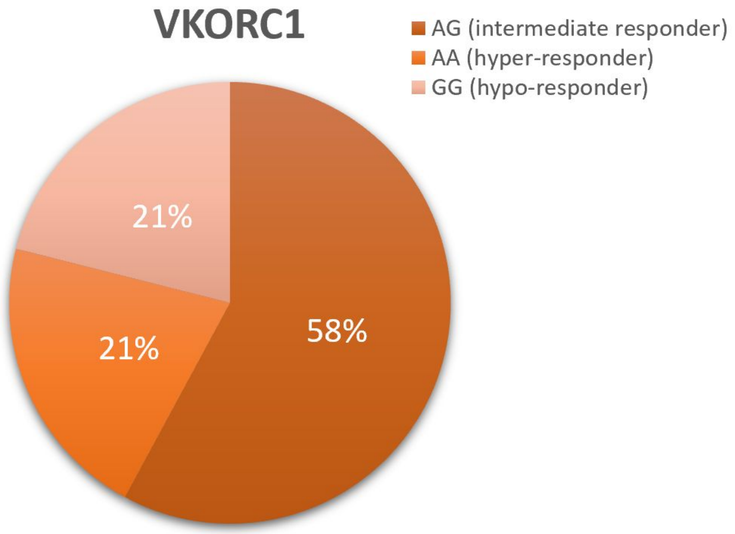
- Incorporating pharmacogenetic testing into the ambulatory care clinic will occur within the standard workflow model used at the clinic.

Methods

- **Study design**: a prospective study that used a convenience sampling methodology to recruit patients.
- This study was approved by the University IRB.
- At the clinic, we invited patients taking two or more prescription medications to participate in pharmacogenomic testing. Counseling and signed documentation for participation was obtained. Fifty DNA samples were collected by buccal swab and de-identified.
- DNA from each sample was isolated and purified in the lab using a commercial kit (QIAgen). We then performed genotyping for specific alleles including VKORC1, CYP2C9*2 and CYP2C9*3. Real time PCR was conducted using ThermoFisher Taqman genotyping assays.
- Data was analyzed using descriptive statistics.

Results

- Relationships with providers were developed and we were incorporated into the clinic workflow with minimal disruption.
- For VKORC1, eleven samples were heterozygotic for AG (intermediate responders), four were homozygotic for AA (hyper-responders), and four were homozygotic for GG (hypo-responders).
- Additional genotyping results for CYP2C9*2 and CYP2C9*3 are pending.



Discussion

- Within the clinic, we were able to perform both counseling and DNA sample collection without significantly interrupting the normal day-to-day functions. Aftering being in the clinic for a few weeks, we developed professional relationships with the staff which enabled us to work more efficiently in recruiting potential participants.
- The results for VKORC1 show that while 58% of participants should response as expected to medications affected by this enzyme, such as warfarin, the other 42% may not. This means that 42% of patients could benefit from knowing their pharmacogenomic profile. Utilizing this information, their medication regimen could have been better optimized from the beginning to avoid under or over dosing.

Conclusion

- With the support of early adopter physicians, we successfully incorporated the consent process and sample collection into the workflow of the clinic. Based on these results, implementation of sample collection in the clinic is feasible.
- Preliminary genotyping results show that incorporating pharmacogenomic testing into an ambulatory care setting could be beneficial for more than 40% of patients.

Future Steps

- Review each subjects medications in context with their genetic results to identify areas of clinical relevance.
- Complete additional genotyping of additional alleles such as CYP2D6 to draw a more accurate conclusion of the frequency of clinically relevant gene-drug pairs.

Funding

- This work was supported by a University of Findlay Enhanced Teaching and Scholarship (ETS) Grant titled ‘*Development of Experiential and Cross-Departmental Pharmacogenomic Learning Laboratory*’ (co-PIs: Guy and Oestreich)