**Patients’ perspectives of a pharmacist-provided clinical pharmacogenomics service**

**Supplementary Data 2: Example of a personalized pharmacogenomics report provided by the service**

**Patient’s prior medication intolerances:**

* Celecoxib – did not work in the past
* Citalopram – severe dizziness and disorientation
* Tramadol – did not provide any pain relief, even at higher doses

**Patient’s current medication list:**

* Acetaminophen (Tylenol): Take 2 tablet po TID; Patient taking PRN for nerve pain
* Bevacizumab (Avastin): injection into the left eye for branch vein occlusion secondary to TIA
* Calcium citrate+ Vitamin D3: Take 6 capsules (400mg calcium/500 IU vitamin D3) po daily
* Escitalopram (Lexapro): Take 5mg po daily

**PHARMACOGENOMICS SUMMARY REPORT**

|  |  |
| --- | --- |
| Name: \*\*\* | Date of Birth: \*\*\* |
| Report Date: \*\*\* | Date of OneOme® Pharmacogenetic Test: \*\*\* |

**TABLE 1. PHARMACOGENOMIC RESULTS WITH GUIDELINES AVAILABLE**

Genetic variants affecting drug response are highlighted in yellow. References used include Clinical Pharmacogenetics Implementation Consortium (CPIC) and Dutch Pharmacogenetics Working Group guidelines, and the FDA drug label.

|  |  |  |
| --- | --- | --- |
| **GENETIC RESULT** | **PHENOTYPE** | **EXAMPLE OF DRUGS AFFECTED** |
| CYP2C9 \*1/\*2 | Intermediate metabolizer (Activity score 1.5)  per CPIC guidelines | Cardiovascular: Warfarin  Neurology: Phenytoin, siponimod  Other: Flibanserin, lesinurad  Pain: Celecoxib, flurbiprofen, ibuprofen, meloxicam, piroxicam |
| CYP2C19 \*1/\*4 | Intermediate metabolizer | Cardiovascular: Clopidogrel  Gastrointestinal: Dexlansoprazole, lansoprazole, omeprazole, pantoprazole  Infectious Disease: Voriconazole  Neurology: Brivaracetam, clobazam  Psychiatry/Depression: Amitriptyline, citalopram, clomipramine, doxepin, escitalopram, imipramine, sertraline, trimipramine |
| *CYP2D6* \*3/\*4 | Poor metabolizer  Total activity score: 0 | Cardiovascular: Carvedilol, flecainide, metoprolol, propafenone  Gastrointestinal: Metoclopramide, ondansetron  Oncology: Tamoxifen  Other: Eliglustat, pitolisant, tamsulosin, tetrabenazine, tolterodine  Pain: Codeine, hydrocodone, tramadol  Psychiatry/Depression: Amitriptyline, aripiprazole, atomoxetine, brexpiprazole, clomipramine, desipramine, doxepin, fluvoxamine, haloperidol, iloperidone, imipramine, nortriptyline, paroxetine, perphenazine, pimozide, protriptyline, thioridazine, trimipramine, venlafaxine, vortioxetine, zuclopenthixol |
| CYP3A5 \*3/\*3 | Poor metabolizer  (CYP3A5 non expresser) | Tacrolimus |
| VKORC1 rs9923231 GA | Intermediate activity | Warfarin |
| CYP2B6 \*1/\*1 | Normal metabolizer | Efavirenz |
| CYP2C rs12777823 GG | Normal metabolizer | Warfarin |
| CYP4F2 \*1/\*1 | Normal activity | Warfarin |
| DPYD \*1/\*1 | Normal metabolizer | 5FU, capecitabine |
| Factor 2 | Normal thrombosis risk | Estrogen-containing oral contraceptive |
| Factor 5 | Normal thrombosis risk | Estrogen-containing oral contraceptive |
| HLA-A\*31:01 | Negative | Carbamazepine |
| HLA-B\*15:02 | Negative | Neurology: Carbamazepine, oxcarbazepine, phenytoin |
| HLA-B\*57:01 | Negative | Infectious Disease: Abacavir  Oncology: Pazopanib |
| HLA-B\*58:01 | Negative | Allopurinol |
| IFNL4 rs12979860 TT | Variant absent | Interferon |
| NUDT15 rs116855232 CC | Normal risk | Azathioprine, 6-mercaptopurine |
| TPMT \*1/\*1 | Normal metabolizer | Azathioprine, 6-mercaptopurine |
| SLCO1B1 \*1A/\*1 | Normal function | Simvastatin |
| UGT1A1 \*1/\*1 | Normal metabolizer | Infectious Disease: Atazanavir, dolutegravir  Oncology: Belinostat, irinotecan, nilotinib, pazopanib |

**TABLE 2. PHARMACOGENOMICS RESULTS WITH NO GUIDELINES CURRENTLY**

|  |  |
| --- | --- |
| **GENETIC RESULT** | **PHENOTYPE** |
| CYP1A2 \*1A/\*1F | Rapid metabolizer |
| CYP3A4 \*1/\*1 | Normal metabolizer |
| COMT rs4680 AA | Low activity |
| DRD2 rs1799978 AA | Normal receptor expression |
| GRIK4 rs1954787 TC | Normal receptor function |
| HTR2A rs7997012 GG | Intron 2 genotype GG |
| HTR2C rs3813929 CC | Normal influence |
| OPRM1 rs1799971 AG | Asn/Asp isoform |
| SLC6A4 L/S (Sa/Sa) | Reduced expression |

**TABLE 3. PHARMACOGENOMIC INFORMATION FOR YOUR PAST MEDICATION INTOLERANCE**

|  |  |
| --- | --- |
| **DRUG NAME** | **COMMENTS** |
| Celecoxib | You are a CYP2C9 intermediate metabolizer of celecoxib. CPIC guidelines recommend initiating therapy with usual starting dose. Pharmacogenomics likely does not explain the lack of efficacy you experienced with celecoxib. |
| Citalopram | You are a CYP2C19intermediate metabolizer of citalopram. CPIC guidelines recommend initiating citalopram at usual starting doses. Studies have shown that CYP2C19intermediate metabolizers may accumulate citalopram leading to an increased risk of side effects, including dizziness/disorientation. This may partially explain the side effects you experienced with citalopram. |
| Tramadol | You are a CYP2D6poor metabolizer of tramadol so less tramadol is converted to its active metabolite that provides analgesia. CPIC guidelines recommend avoiding tramadol due to the possibility of diminished analgesia. Pharmacogenomics may explain the lack of pain relief you experienced with tramadol. |

**TABLE 4. PHARMACOGENOMIC INFORMATION FOR YOUR CURRENT MEDICATIONS**

|  |  |  |
| --- | --- | --- |
| **DRUG NAME** | **COMMENTS** | |
| Escitalopram | You are a CYP2C19intermediate metabolizer of escitalopram. CPIC guidelines recommend using usual starting doses. To titrate slowly and monitor for side effects. | |
| Acetaminophen, bevacizumab, calcium citrate, vitamin D3 | | No pharmacogenomic guidelines available. |