COMPARISON BETWEEN A POINT-OF-CARE AND A LABORATORY-BASED CYP2C19*2 GENOTYPING ASSAY FOR PHARMACIST-LED PERSONALISATION OF ANTIPLATELET THERAPY

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INTRODUCTION

The novel point-of-care (POC) Spartan™ RX CYP2C19 genotyping assay rapidly identifies presence of the CYP2C19 loss-of-function ‘*2’ variant allele and can be applied to personalise antiplatelet therapy at the start of treatment. This POC assay has not been previously compared to laboratory-based CYP2C19*2 genotyping using reverse dot-blot (RDB) hybridisation.

METHOD

- After obtaining written informed consent, patients undergoing PCI with stent deployment for acute coronary syndrome or stable angina and who were candidates for dual antiplatelet therapy, were recruited by non-probability sampling from the catheterisation laboratory at Mater Dei Hospital (MDH). Exclusion criteria were patients age < 18 years and > 75 years, body weight < 60 kg, history of stroke or transient ischaemic attack, active bleeding, coagulation or platelet disorders, and/or chronic liver disease.
- A buccal swab and EDTA-whole blood sample were obtained for CYP2C19*2 genotyping with the POC Spartan™ RX CYP2C19 assay (Spartan Bioscience) and with the laboratory-based GenID® RDB hybridisation 2070/1X assay (Autoimmun Diagnostika AID GmbH) respectively.
- Each patient was genotyped as a non-carrier of CYP2C19*2 (*1/*1), a carrier of one *2 allele (*1/*2), or a carrier of two *2 alleles (*2/*2).
- Genotypes requiring alternative antiplatelet therapy to clopidogrel (*1/*2, *2/*2) were verbally communicated to the cardiologist and treatment decision was taken by the cardiologist. All processes were led by a clinical pharmacist researcher.
- Comparison between genotype results obtained with the two assays was carried out using percentage agreement and Cohen’s kappa (κ) statistic.

AIMS

To apply the Spartan™ RX assay for pharmacist-led CYP2C19*2 genotyping to personalise antiplatelet therapy in patients undergoing percutaneous coronary intervention (PCI) and compare it to a laboratory-based CYP2C19*2 RDB genotyping assay which uses a robust and accurate RDB hybridisation technique.

RESULTS

- The patient cohort consisted of 34 patients. Twenty-five patients were male and 9 were female, mean age was 66 years (range 49-75 years) and all patients were Caucasian.
- With the POC Spartan™ RX assay, 21 patients were genotyped as non-carriers of the CYP2C19 *2 allele, 12 patients as carriers of one *2 allele and 1 patient as a carrier of two *2 alleles.
- With the GenID® assay, the same 21 patients were genotyped as non-carriers of the CYP2C19 *2 allele, however 13 patients were genotyped as carriers of one *2 allele and no patients were identified as carriers of two *2 alleles.
- Agreement in genotype results was 97% (κ=0.939).

CONCLUSION

The POC Spartan™ RX assay is accurate and reliable (97% agreement in genotype results). The single mismatched result does not impact personalisation of antiplatelet therapy as an alternative to clopidogrel is recommended for both carriers of one and two CYP2C19 LoF *2 alleles (13 patients in the cohort studied). The POC assay provides much faster results, requires minimal training to perform the test and is non-invasive, however the tests are more expensive.

References


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<table>
<thead>
<tr>
<th>Spartan™ RX assay</th>
<th>GenID® RDB assay</th>
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<tbody>
<tr>
<td>Type of test system</td>
<td>Point-of-care</td>
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<tr>
<td>Polymerase chain reaction-based</td>
<td>Yes</td>
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<tr>
<td>Sample type for genomic DNA</td>
<td>Buccal swab</td>
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<tr>
<td>Approximate time for-result (hours)</td>
<td>1</td>
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<tr>
<td>User-friendliness of test procedure</td>
<td>Simple procedure with no laborious preparation and very minimal training required</td>
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<tr>
<td>Sample batching</td>
<td>Not required</td>
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<tr>
<td>Interpretation of results</td>
<td>Very user-friendly</td>
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<tr>
<td>Assay storage</td>
<td>Strict requirement for manual defrost freezer at ~20°C or below</td>
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<tr>
<td>Estimated cost (€ per assay)</td>
<td>Internal</td>
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Table 1: Qualitative comparison of assays used