Results in southern Spain, from 2012 to 2018. virological failure with a regimen with INI, at Virgen de la Victoria Hospital, reference center in southern Spain, from 2012 to 2018. Drug resistance mutations were determined with Viruses® HIV Integrase system. The resistance mutations were predicted using Stanford algorithm v7.1.1. We also collected demographic, clinical and immunovirological data.

Material and Methods

- We considered all the HIV-1 integrase genotype resistance tests performed to patients with virological failure with a regimen with INI, at Virgen de la Victoria Hospital, reference center in southern Spain, from 2012 to 2018.
- Drug resistance mutations were determined with Viruses® HIV Integrase system.
- The resistance mutations were predicted using Stanford algorithm v7.1.1.
- We also collected demographic, clinical and immunovirological data.

Conclusions

1. Over a quarter of patients in VF selected resistance mutations to integrase.
2. The most frequently mutations selected were 140ACS+148H, 92Q+97A, and 263K plus other mutations for patients treated with RTG, EVG and DTG respectively.
3. Almost three out of four patients presented resistance to RTG and EVG whereas resistance to DTG did not reach ten percent.
4. DTG continues maintaining activity against many of the isolates resistant to first generation INI.

Table 1. Characteristics of the patients with virological failure with a regimen with INI

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of patients</th>
<th>Age (years)</th>
<th>Viral load</th>
<th>Lymphocyte CD4 count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>236</td>
<td>49</td>
<td>3.34</td>
<td>363</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td>IQR 16-72</td>
<td>IQR 2.01-6.22</td>
<td>IQR 6-1926</td>
</tr>
<tr>
<td>Viral load</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lymphocyte CD4 count</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Sex                       | Male   | 176 | 74.6% |                      |
|                          | Female | 60  | 25.4% |                      |
| Subtype                  | B      | 199 | 84.3% |                      |
|                          | No B   | 37  | 15.7% |                      |
| Treatment                | RTG    | 138 | 58.5% |                      |
|                          | EVG    | 35  | 15.7% |                      |
|                          | DTG    | 61  | 25.8% |                      |
| Failure                  | First  | 68  | 28.8% |                      |
|                          | Two/more | 151 | 64%  |                      |
|                          | Discontinued | 17 | 7.2% |                      |
| Patients with mutations  | 64     |     | 27%   |                      |

Viral load is expressed in log copies/mL and the CD4 count in cells/μL. The quantitative variables are expressed as median and IQR or mean and the qualitative variables as n (%).

Table 2. Patients with selected mutations at virological failure with a regimen with INI

<table>
<thead>
<tr>
<th>Failure</th>
<th>Mutations</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>First (68)</td>
<td>No</td>
<td>52</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>16</td>
<td>25%</td>
</tr>
<tr>
<td>Two/more (151)</td>
<td>No</td>
<td>104</td>
<td>68.9%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>47</td>
<td>31.1%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>16</td>
<td>94.1%</td>
</tr>
<tr>
<td>Discontinued (17)</td>
<td>No</td>
<td>1</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

Fig. 1. Cases of failures with INI in our area over time

Table 3. Characteristics of the patients with virological failure with a regimen with RTG

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of patients</th>
<th>Age (years)</th>
<th>Viral load</th>
<th>Lymphocyte CD4 count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>138</td>
<td>49</td>
<td>3.34</td>
<td>363</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td>IQR 16-53</td>
<td>IQR 2.01-6.22</td>
<td>IQR 6-1926</td>
</tr>
<tr>
<td>Viral load</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lymphocyte CD4 count</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Sex             | Male   | 101 | 73.2% |                      |
|                 | Female | 37  | 26.8% |                      |
| Subtype         | B      | 118 | 85.5% |                      |
|                 | No B   | 20  | 14.5% |                      |
| Failure         | Two/more | 104 | 75.4% |                      |
|                 | Discontinued | 7 | 5.1% |                      |
| Patients with mutations | 43 | 31.2% |                      |
| Most frequent pattern  | 140ACS+148H | 7 | 5.1% |                      |
|                     | 138K-148H | 4 | 2.8% |                      |
|                     | 138K+other | 15 | 5.1% |                      |
|                     | 143HCR+other | 6 | 4.3% |                      |
|                     | Other mutations | 11 | 7.9% |                      |

Table 4. Characteristics of the patients with virological failure with a regimen with EVG

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of patients</th>
<th>Age (years)</th>
<th>Viral load</th>
<th>Lymphocyte CD4 count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>37</td>
<td>45</td>
<td>3.72</td>
<td>336</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td>IQR 15-55</td>
<td>IQR 2.04-6</td>
<td>IQR 6-1673</td>
</tr>
<tr>
<td>Viral load</td>
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<td></td>
</tr>
<tr>
<td>Lymphocyte CD4 count</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Sex             | Male   | 33  | 89.2% |                      |
|                 | Female | 10  | 10.8% |                      |
| Subtype         | B      | 30  | 81.1% |                      |
|                 | No B   | 7   | 14.5% |                      |
| Failure         | First  | 21  | 56.8% |                      |
|                 | Two/more | 13 | 37.8% |                      |
|                 | Discontinued | 3 | 8.1% |                      |
| Patients with mutations | 12 | 32.4% |                      |
| Most frequent pattern  | 92Q+97A | 4 | 10.8% |                      |
|                     | 92Q+other | 4 | 10.8% |                      |
|                     | 159H+other | 2 | 5.4% |                      |
|                     | 148H | 1 | 2.7% |                      |
|                     | Other mutations | 1 | 2.7% |                      |

Table 5. Characteristics of the patients with virological failure with a regimen with DTG

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of patients</th>
<th>Age (years)</th>
<th>Viral load</th>
<th>Lymphocyte CD4 count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>61</td>
<td>51</td>
<td>3.15</td>
<td>363</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td>IQR 25-63</td>
<td>IQR 2.03-5.64</td>
<td>IQR 7-1516</td>
</tr>
<tr>
<td>Viral load</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lymphocyte CD4 count</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Sex             | Male   | 42  | 68.9% |                      |
|                 | Female | 19  | 31.1% |                      |
| Subtype         | B      | 51  | 83.6% |                      |
|                 | No B   | 10  | 16.4% |                      |
| Failure         | First  | 20  | 32.8% |                      |
|                 | Two/more | 34 | 55.7% |                      |
|                 | Discontinued | 7 | 11.5% |                      |
| Patients with mutations | 9 | 14.7% |                      |
| Most frequent pattern  | 263K+other | 3 | 5.1% |                      |
|                     | 138K+148H | 2 | 2.8% |                      |
|                     | 159H | 1 | 5.1% |                      |
|                     | 138K | 1 | 4.3% |                      |
|                     | Other mutations | 2 | 7.9% |                      |

Table 6. Drug Resistance Interpretation to INI

<table>
<thead>
<tr>
<th>Drug</th>
<th>Susceptible</th>
<th>Intermediate Resistance</th>
<th>High Level Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raltegravir</td>
<td>75.4%</td>
<td>4.7%</td>
<td>19.9%</td>
</tr>
<tr>
<td>Elvitegravir</td>
<td>76.7%</td>
<td>2.5%</td>
<td>20.8%</td>
</tr>
<tr>
<td>Dolutegravir</td>
<td>91.5%</td>
<td>2.5%</td>
<td>5.9%</td>
</tr>
</tbody>
</table>