Cost impact of an HIV MDT for managing anti-retroviral switch

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Overview

• Background
• Aim
• Methods
• Results
  – Patient demographics
  – Cost effective changes in ART regimens
  – Cost savings according to reason for switch
  – Analysis of most costly ART combinations
• Conclusion
• Summary
• Acknowledgments & References
Background

• Managing patients on ART can present complex challenges

• HIV MDT meeting
  – Forum for discussion and education
  – Approval process for ART in context of agreed algorithms
Aim

Analysis of the cost impact of the MDT on ART switch decisions

Model MDT arrangements for HIV drug prescribing: HIV CRG Jan 2016

The MDT membership should include representation from, or access to, the following:

- Clinical Leads with a minimum requirement of:
  - HIV physicians (3)
  - Specialist HIV nurse (1)
  - Specialist HIV pharmacist (1)
- Any of a range of other specialists involved in the care of persons with HIV
Methods

- February – November 2015

- Retrospective service evaluation 199 cases
  - MDT records
  - Demographic data
  - Pharmacy data
  - Case note review

- Patients primarily managed at other organisations were excluded due to insufficient information

- Data were analysed using SPSS
Results

Demographics

Gender

- 36% (n=72) Female
- 64% (n=127) Male

Ethnicity

- 50% (n=9) Caucasian
- 42% (n=84) Other
- 12% (n=6) Asian
- 4% (n=2) Black African

Sexual orientation

- 50% (n=98) Heterosexual
- 33% (n=67) MSM
- 17% (n=34) Unknown

Age distribution

Mean = 43 yrs (15-81 yrs)
Results
Cost change per month

Total decrease in cost per month = £3155

Mean decrease pp per month = £111
n=117

Mean increase pp per month = £120
n=82

Total cost decrease per month £13,006
Total cost increase per month £9,851
Results

ART regimens prior to and post MDT
Results

Cost effective change in ART regimens

41/71 Truvada -> Lamivudine/Abacavir

Mean saving £118 pp per month
Mean saving £4873 per month

40/71 -> Triumeq

1/71 -> Kivexa

Previous Regimen = Truvada
Results

Cost effective change in ART regimens

46/79 PI containing regimen -> regimens without PIs

Mean saving £64 pp per month
Mean saving £3305 per month
Results

Reasons for ART switch

<table>
<thead>
<tr>
<th>Reason for switch</th>
<th>Total cost change per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adherence</td>
<td>£2043</td>
</tr>
<tr>
<td>Side effects</td>
<td>£1340</td>
</tr>
<tr>
<td>DDIs</td>
<td>£991</td>
</tr>
<tr>
<td>Resistance</td>
<td>£1221</td>
</tr>
</tbody>
</table>

Key
DDIs = Drug Drug Interactions
## Results

### Reasons for ART switch

<table>
<thead>
<tr>
<th>Side effect</th>
<th>Total change in cost per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>GI</td>
<td>£1136</td>
</tr>
<tr>
<td>Renal</td>
<td>£745</td>
</tr>
<tr>
<td>Hepatic</td>
<td>£44</td>
</tr>
<tr>
<td>CNS</td>
<td>£356</td>
</tr>
<tr>
<td>Other</td>
<td>£140</td>
</tr>
</tbody>
</table>

**Key**
- GI = Gastrointestinal
- CNS = Central Nervous System

**Graph**
- The graph shows the percentage of patients experiencing different side effects and the corresponding number of patients (n) for each side effect.
- GI: 22% (n=25)
- Renal: 22% (n=25)
- Hepatic: 9% (n=11)
- CNS: 29% (n=33)
- Other: 18% (n=21)
Results

Cost change per month - excluding resistance

Total cost decrease per month £9,987

Mean decrease pp per month = £95
n=105

Total cost increase per month £5,612
Mean increase pp per month = £84
n=67

Total saving per month = £4375
### Results

#### Costly regimens

- **9 patient’s regimens cost > £1000 per month** (mean cost £1298 pp)
- **Reasons:**
  - 7 resistance
  - 2 side effects
- **7 required Dolutegravir BD**
- **5 required Maraviroc**

<table>
<thead>
<tr>
<th>Patient no</th>
<th>Truvada</th>
<th>Dolutegravir BD</th>
<th>Rilpivirine</th>
<th>Ritonavir BD</th>
<th>Tripanivir BD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Dolutegravir BD</td>
<td>Rilpivirine</td>
<td>Ritonavir BD</td>
<td>Tripanivir BD</td>
</tr>
<tr>
<td>2</td>
<td>Darunavir</td>
<td>Dolutegravir BD</td>
<td>Maraviroc</td>
<td>Ritonavir</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Darunavir</td>
<td>Dolutegravir</td>
<td>Maraviroc</td>
<td>Ritonavir BD</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Atazanavir</td>
<td>Dolutegravir BD</td>
<td>Maraviroc</td>
<td>Ritonavir</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Darunavir</td>
<td>Dolutegravir</td>
<td>Truvada</td>
<td>Ritonavir BD</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Abacavir</td>
<td>Dolutegravir BD</td>
<td>Maraviroc</td>
<td>Tenofovir</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Darunavir</td>
<td>Dolutegravir BD</td>
<td>Maraviroc</td>
<td>Ritonavir</td>
<td>Etravirine</td>
</tr>
<tr>
<td>8</td>
<td>Darunavir</td>
<td>Dolutegravir BD</td>
<td>Maraviroc</td>
<td>Ritonavir BD</td>
<td>Tenofovir</td>
</tr>
<tr>
<td>9</td>
<td>Darunavir</td>
<td>Dolutegravir BD</td>
<td>Maraviroc</td>
<td>Ritonavir BD</td>
<td></td>
</tr>
</tbody>
</table>
Summary

• Introduction of HIV MDT resulted in savings of >£4300 per month

• Most cost increases arose due to resistance

• Cost of resistance offset by switches to more cost-effective and better tolerated regimens
Conclusion

• The HIV MDT was highly effective in
  – Providing a forum for discussion
  – Allowing approval of ART switches
  – Managing the cost of complex cases
Acknowledgments & References

• Model MDT arrangements for HIV drug prescribing: HIV CRG Jan 2016
Questions?
Truvada & Kivexa Pre MDT discussion

**Kivexa backbone &**
- PI 16/39 (41%)
- NNRTI 10/39 (26%)
- Integrase 11/39 (28%)
- >than 2 3rd agents 2/39 (5%)

**Truvada Backbone &**
- PI 38/71 (54%)
- NNRTI 10/71 (14%)
- Integrase 17/71 (24%)
- >than two 3rd agents 6/71 (8%)
### PI containing regimen

#### Pre MDT discussion

**PI &**

<table>
<thead>
<tr>
<th><strong>33/79 Truvada (42%)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>12/79 Kivexa (15%)</strong></td>
</tr>
<tr>
<td><strong>3/79 PI monotherapy (4%)</strong></td>
</tr>
<tr>
<td><strong>Others – E.g. nuc sparing regimens</strong></td>
</tr>
</tbody>
</table>
Examples of ‘other’ ART regimens

1. Darunavir600/Maraviroc/Raltegravir/Ritonavir-1b/Tenofovir
2. Combivir/Darunavir600/Maraviroc/Ritonavir-1b
3. Darunavir/Etravirine/Ritonavir
4. Atazanavir/Etravirine/Ritonavir
5. Darunavir/Raltegravir/Ritonavir/Tenofovir
6. Etravirine/Lamivudine-liq50/Raltegravir
7. Abacavir, Lamivudine, Raltegravir
8. Darunavir/Ritonavir/Maraviroc/Tenofovir/Raltegravir
9. Darunavir/Ritonavir/Maraviroc-150bd/raltegravir/tenofovir/entecavir
10. D/R/LAM
11. Abacavir/Emtricitabine/Efavirenz
12. Atazanavir/Ritonavir/Lamivudine
13. 3tC/D/R/RAL
14. Tenofovir/Zidovudine/Raltegravir
15. Tenofovir/Maraviroc/raltegravir
16. Darunavir/Ritonavir/Maraviroc-od
17. Darunavir600/Ritonavir-1b/Maraviroc150bd/Dolutegravir-od
18. Tenofovir/Lamivudine/Etravirine
19. Darunavir/Ritonavir/Etravirine/Raltegravir
20. Darunavir/Ritonavir/Etravirine/Raltegravir
21. Tenofovir/Lamivudine/Raltegravir
22. Atazanavir/Ritonavir/Maraviroc/Raltegravir  (total of 27, some repeated)
# ART switches

## Post MDT

<table>
<thead>
<tr>
<th>Prior to MDT</th>
<th>Truvada backbone</th>
<th>Kivexa backbone</th>
<th>Atripla</th>
<th>Eviplera</th>
<th>Triumeq</th>
<th>Other</th>
<th>PI monotherapy</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truvada backbone</td>
<td>14</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>40</td>
<td>7</td>
<td>1</td>
<td>71</td>
</tr>
<tr>
<td>Kiveaxa backbone</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>29</td>
<td>2</td>
<td>2</td>
<td>39</td>
</tr>
<tr>
<td>Atripla</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>16</td>
<td>1</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>Eviplera</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>13</td>
<td>1</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>Stribild</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Triumeq</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>19</td>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td>PI monotherapy</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>28</strong></td>
<td><strong>6</strong></td>
<td><strong>1</strong></td>
<td><strong>2</strong></td>
<td><strong>107</strong></td>
<td><strong>30</strong></td>
<td><strong>6</strong></td>
<td><strong>199</strong></td>
</tr>
</tbody>
</table>
## Follow up

117 patients had follow up at 6 months

<table>
<thead>
<tr>
<th>Remained on original regimen</th>
<th>98/117 (83%)</th>
</tr>
</thead>
</table>

**Reasons for changes to regimens:**

<table>
<thead>
<tr>
<th>Reason</th>
<th>Count</th>
<th>patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didn’t start discussed regimen</td>
<td>3/117</td>
<td></td>
</tr>
<tr>
<td>Deterioration in renal function due to other co-morbidities</td>
<td>2/117</td>
<td></td>
</tr>
<tr>
<td>Increases CVS risk</td>
<td>2/117</td>
<td></td>
</tr>
<tr>
<td>Intensified</td>
<td>2/117</td>
<td></td>
</tr>
<tr>
<td>Simplified</td>
<td>3/117</td>
<td></td>
</tr>
<tr>
<td>Side effects of regimen</td>
<td>7/117</td>
<td></td>
</tr>
</tbody>
</table>