Tetracycline Drug Class
Post-Implementation Review

Implemented August 2017
Selected Slides from Feb 2017 Review
Tetracycline, minocycline, and doxycycline are all effective in the treatment of moderate to severe acne and rosacea.

Professional treatment guidelines for papulopustular rosacea recommend doxycycline 50 mg to 100 mg, minocycline 50 mg to 100 mg, or doxycycline 40 mg IR/DR (Oracea) as second-line therapy following topical medications, but there are concerns of conflict of interest with the guideline’s authors.

A 2015 Cochrane review evaluating doxycycline for treating rosacea found no significant difference in effectiveness between doxycycline 100 mg and 40 mg IR/DR (Oracea). There were significantly fewer adverse effects with the 40 mg lower dose; however, the results were based on low quality evidence and the clinical relevance of these results is questionable. There was high quality evidence to support efficacy of generic doxycycline 100 mg.
Clinical Conclusions from February 2017 Class Review Minutes

- Solodyn was originally developed as an extended-release (ER) minocycline formulation to reduce potential vestibular adverse effects associated with rapid absorption of generic minocycline IR formulations. However, pharmacokinetic studies showed the absorption profile for Solodyn does not differ significantly from that of minocycline IR.

- There are no head-to-head trials comparing the efficacy or safety of minocycline ER (Solodyn) with generic minocycline IR products for treating acne. A Cochrane review from 2015 concluded there was no data to support minocycline ER formulations are safer than standard minocycline IR preparations.

- Overall, there is little evidence to support advantages of the newer doxycycline and minocycline products over the traditional generic formulations in terms of salt (monohydrate versus hyclate), dosage form (tablet versus capsule versus scored tablets), release mechanisms (IR versus ER versus DR), or dosing strategy (1 mg/kg dosing with minocycline ER versus traditional 50 mg or 100 mg dosing).
# Tetracyclines, BRAND

<table>
<thead>
<tr>
<th>BRAND NAME</th>
<th>GENERIC NAME</th>
<th>STRENGTH (mg)</th>
<th>SALT</th>
<th>GENERICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acticlate</td>
<td>doxycycline</td>
<td>75, 150</td>
<td>Hyclate</td>
<td>NO</td>
</tr>
<tr>
<td>Doryx MPC</td>
<td>doxycycline</td>
<td>60*, 120*</td>
<td>Hyclate</td>
<td></td>
</tr>
<tr>
<td>Solodyn</td>
<td>minocycline</td>
<td>55*, 65*, 80*, 90*, 105*, 115*</td>
<td>HCl</td>
<td></td>
</tr>
<tr>
<td>Demeclocyclin</td>
<td>demeclocycline</td>
<td>150, 300</td>
<td>HCl</td>
<td></td>
</tr>
<tr>
<td>Adoxa</td>
<td></td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monodox</td>
<td></td>
<td>100</td>
<td>Monohydrate</td>
<td></td>
</tr>
<tr>
<td>Oracea</td>
<td></td>
<td>40*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doryx</td>
<td>doxycycline</td>
<td>50*, 100*, 150*, 200*</td>
<td>Hyclate</td>
<td>YES</td>
</tr>
<tr>
<td>Targadox</td>
<td></td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibramycin</td>
<td></td>
<td>50, 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibra-tabs</td>
<td></td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minocin</td>
<td>minocycline</td>
<td>50, 75, 100</td>
<td>HCl</td>
<td></td>
</tr>
<tr>
<td>Achromycin V, Sumycin</td>
<td>tetracycline</td>
<td>250, 500</td>
<td>HCl</td>
<td></td>
</tr>
</tbody>
</table>

*Delayed Release
# Tetracyclines, GENERIC

<table>
<thead>
<tr>
<th>BRAND NAME</th>
<th>GENERIC NAME</th>
<th>STRENGTH (mg)</th>
<th>SALT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declomycin</td>
<td>demeclocycline</td>
<td>150, 300</td>
<td>HCL</td>
</tr>
<tr>
<td>Doxycycline IR-DR</td>
<td>doxycycline</td>
<td>40*</td>
<td></td>
</tr>
<tr>
<td>Doxycycline</td>
<td>doxycycline</td>
<td>50, 50*, 75*, 100, 100*, 150*, 200*</td>
<td>Hyclate</td>
</tr>
<tr>
<td>Morgidox</td>
<td>doxycycline</td>
<td>50, 100</td>
<td></td>
</tr>
<tr>
<td>Doxycycline</td>
<td></td>
<td>50, 75, 100, 150</td>
<td></td>
</tr>
<tr>
<td>Mondoxyne NL</td>
<td></td>
<td>75, 100</td>
<td>Monohydrate</td>
</tr>
<tr>
<td>Minocycline ER</td>
<td>minocycline</td>
<td>45*, 90*, 135*</td>
<td>HCL</td>
</tr>
<tr>
<td>Minocycline</td>
<td>minocycline</td>
<td>50, 75, 100</td>
<td></td>
</tr>
<tr>
<td>Achromycin V, Sumycin, Tetracycline</td>
<td>tetracycline</td>
<td>250, 500</td>
<td>HCL</td>
</tr>
</tbody>
</table>

*Delayed Release

Source: PDTS, Longitudinal File, Prime Vendor File, MCPF, WAC File

Date Range: 1 Jan 2015 - 31 Oct 2016

From Feb 2017 review
From Feb 2017 review

“Common” versus “Boutique”

■ “Common” Drugs
  □ Lower cost per unit compared to other agents in the class
  □ Common usage compared to other agents in the class
  □ Standard dosage forms/strengths compared to other agents in the class

■ “Boutique” Drugs
  □ High cost per unit compared to other agents in the class
  □ Niche/atypical usage compared to other agents in the class
  □ Unusual dosage forms/strengths compared to other agents in the class

<table>
<thead>
<tr>
<th></th>
<th>RX</th>
<th>TSIC (RA)</th>
<th>Blended Cost/RX</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Common”</td>
<td>93%</td>
<td>56%</td>
<td>$70</td>
</tr>
<tr>
<td>“Boutique”</td>
<td>7%</td>
<td>44%</td>
<td>$644</td>
</tr>
</tbody>
</table>

Source: PDTS, Longitudinal File, Prime Vendor File, MCPF, WAC File
Date Range: 1 Jan 2015 - 31 Oct 2016
From Feb 2017 review

Overall Utilization

“Common” versus “Boutique”

Source: PDTS, Longitudinal File, Prime Vendor File, MCPF, Formulary Strategy Dataset, ESI DoD, FY16Q3
Date Range: 1 Jan 2015 - 31 Oct 2016
Overall Cost
“Common” versus “Boutique”

Total Submitted Ingredient Cost by Month

Source: PDTS, Longitudinal File, Prime Vendor File, MCPF, Formulary Strategy Dataset, ESI DoD, FY16Q3
Date Range: 1 Jan 2015 - 31 Oct 2016
From Feb 2017 review

Generics - CURRENT

Standardized Market Share
MTF 35%  Retail 59%  Mail 6%

Source: PDTS, Longitudinal File, Prime Vendor File, MCPF, WAC File
Date Range: 1 Jan 2015 - 31 Oct 2016
BIA Model Results

One Year

From Feb 2017 review

Baseline
$48.5M

$60 M

Total Estimated Cost

SAVINGS
$16.9M

BEFORE

“Common” UF

$11

“Common” UF

$31.7

“AFTER

“Boutique” NF

$19

$1.9

“Boutique” UF

$20

$2.0

$33.8

Tetracycline - designated UF/exempt from step therapy
Demeclocycline - designated UF/exempt from step therapy

MTF  Retail  Mail  All POS
Post-Implementation Results

Implemented CY17Q3 (Aug 2017)
Tetracyclines
Total Prescriptions Dispensed

Source: PDTS. Excludes patients with other health insurance.
Tetracycline Class Review
Total Patient Count for Selected Quarters

Source: PDTS. Excludes patients with other health insurance.
Tetracyclines
Net MHS Cost

Source: PDTS. Excludes patients with other health insurance.
Tetracyclines
Net MHS Cost

Source: PDTS. Excludes patients with other health insurance.
Tetracyclines
Net MHS Cost

Source: PDTS. Excludes patients with other health insurance.
Tetracyclines
Net MHS Cost

Source: PDTS. Excludes patients with other health insurance.
Tetracyclines
Net MHS Cost per Day

Source: PDTS. Excludes patients with other health insurance.
Drivers of Changes in Utilization and Cost

TCN Common Agents
TCN - Common Agents Utilization

Source: PDTS. Excludes patients with other health insurance.
TCN - Common Agents
Net MHS Cost

Source: PDTS. Excludes patients with other health insurance.
Drivers of Changes in Utilization and Cost

TCN Boutique Agents
TCN – Boutique Agents Utilization

Source: PDTS. Excludes patients with other health insurance.
TCN – Boutique Agents
Net MHS Cost

Source: PDTS. Excludes patients with other health insurance.
TCN – Boutique Agents (All)
Net MHS Cost per Day

Source: PDTS. Excludes patients with other health insurance.
Tetracyclines
Summary of Cost and Patient Count

Source: PDTS. Excludes patients with other health insurance.
Tetracycline UF Class Review

Summary

- Tetracycline class review resulted in **significant and sustained cost avoidance** for the MHS
  - Post-implementation review shows that annual cost avoidance exceeded the conservative BIA estimate
- Utilization moved from more costly “boutique” agents to less costly “common” agents
- Also, within the “boutique” segment, market share **shifted from higher-cost to lower-cost agents**
- Patient count and total prescriptions were not negatively impacted from this UF class review