Metolazone Use in End of Life HF
“Just a Whiff”

Presented by
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Educational Objectives

1. Discuss HFSA guidelines for HF management and diuretic use in end of life HF
2. Define "Whiff" (1.25mg) and the clinical process for dosing Metolazone in end of life HF
3. Discuss Metolazone data use in end of life HF (n=46) in terms of
   clinical intervention
   outcomes: readmission
   length of stay on hospice
Graph 14: Average Allowed Cost per HF Member by Site of Death 30/60/90 Days Prior to Death

- Hospital
- SNF
- Other With Hospice
- Other Without Hospice
- Total

$0 - $60,000

Total Cost in Last 30 Days
Total Cost in Last 60 Days
Total Cost in Last 90 Days

Source: Milliman Analysis of Medicare 5% Sample 2011-2012 (2012 index year, 2011 look back year)
Place of death determined by death within 1 day of discharge. “Other” category includes home, non-SNF facilities and emergency departments. Allowed cost includes patient cost sharing. Costs have been trended to 2014.

Graph 14: Key Points
- Costs in the last 90 days of life are highest for those dying in a hospital.
- Costs in the last 90 days of life are lower for those dying outside of a SNF or IP hospital.

Graph 15 provides the average cost in the 30, 60 and 90 days prior to death for the HF compared to the non-HF population.
Table 10 provides the distribution of site of death for those HF beneficiaries that die in a given year.

<table>
<thead>
<tr>
<th>Place of Death</th>
<th>Deaths</th>
<th>Percent</th>
<th>Allowed Cost of Last Admit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>10,561</td>
<td>31%</td>
<td>$25,016</td>
</tr>
<tr>
<td>SNF</td>
<td>2,620</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Other with hospice</td>
<td>11,358</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>Other without hospice</td>
<td>9,957</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>34,496</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Milliman Analysis of Medicare 5% Sample 2011-2012 (2012 index year, 2011 look back year)
Place of death determined by death within 1 day of discharge
“Other” category includes non-IP hospital or non-SNF facilities, emergency departments, and home
Allowed cost includes patient cost sharing. Costs have been trended to 2014.

Table 10: Key Points

- 31% of HF beneficiaries that died in 2012 died in a hospital, while 8% died in a skilled nursing facility. This compares to only 17% of non-HF beneficiaries that died in 2012, dying in a hospital.
End of Life HF Management

HFSA Guidelines

It is recommended that end-of-life care strategies be individualized and include core Heart Failure pharmacologic therapies for effective symptom management including:

- Opiates, anxiolytics, PO diuretics and / or IV diuretics
- Inotropes: Dobutamine, Milrinone, Dopamine
- Comfort measures

Diuretics in End Stage HF

Intravenous administration of diuretics (Lasix / Bumetanide) may be necessary to relieve congestion.

Addition of chlorothiazides or Metolazone, once or twice daily, to loop diuretics should be considered in patients with persistent fluid retention despite high-dose loop diuretic therapy.

Figure 2  Schematic representation of relationship between administered loop diuretic dose and achieved level of diuresis (water and sodium secretion) in healthy controls (green curve) and heart failure (HF) subjects (red curve). For both cohorts, there is an optimal dose range, depicted by the near-linear ascending middle section of the curves, for which any given dose would conceptually induce predictable amounts of urine production. In HF, markedly higher doses are required for same absolute amounts of diuresis, and maximum diuretic response is often reduced. In addition, many HF patients show minimal further diuretic response after dose increase in the high-dose portion of the curve, a clinical phenomenon termed diuretic resistance (depicted by shaded gray arrow).
Define “Whiff”

ORIGIN: 1585-95; aspirated variant of Middle English weffe whiff (of steam or vapor)

N. whiff (wĭf, hwĭf) A very small trace: a whiff of self-pity in her remarks.

V. whiff (wif) Baseball Slang. (of a batter) to strike out by swinging at and missing the pitch charged as the third strike.

N. whiff= (1.25mg) ½ of lowest dose of Metolazone po prn or 1-2xs week
Assessment

Clinical information needed:
1. Recent history and physical / 2 D Echo
2. Pre hospice lab: BUN/Cr and K+
3. Pre hospice diuretic management
   PO
   IV

Challenges: limited clinical information
Assessment

Consistent with Class IV Stage D warm wet hypervolemia; SOB, DOE, nausea, peripheral edema, + JVD, +HJR, + abdominal distention +/- fluid wave

1. Review of systems
2. Vital signs T BP P RR 02 Sat Pain
3. Medication review
1. Physical exam including cardiopulmonary assessment:
   - JVD
   - Lung sounds
   - HJR + ascites
   - Peripheral edema

   THEN

2. Rapid Assessment of Hemodynamics

   - Signs/Symptoms of Congestion
     - Shortness of breath
     - Anxiety
     - JV distention
     - HJR
     - Ascites
     - Edema
     - Rales

   - Signs/Symptoms of Low Perfusion
     - Decreased LOC
     - Narrow pulse pressure
     - Nausea / vomiting

   - Warm & Dry
     - Continue PO medications
   - Cold & Dry
     - Inotropes IV Diuretics
     - Medication Down Titration
   - Warm & Wet
     - PO / IV Diuretics
     - Medication titration
   - Cold & Wet
     - SL Morphine
     - SL Lorazepam
     - Comfort

(Adapted from Stevenson LW. Eur J Heart Fail. 1999;1:251)
Guideline Based Medical Therapy (GBMT)  
AKA Heart Failure Medications

**Beta Blocker:** Carvedilol / Metoprolol  
**ACE Inhibitor / ARB:** Lisinopril / Losartan  
**Aldosterone inhibitor:** Spironolactone  
**Vasodilator:** Hydralazine / Nitrate combination  
**Diuretics:** Furosemide / Torsemide / Bumetanide  
Metolazone (IV / PO)  
**Antiarrhythmic: Rhythm:** Digoxin Amiodarone  
**Rate:** Beta Blocker / CCB  
**Inotropes:** Milrinone / Dobutamine / Dopamine
Patient / Family Education

1. Increased diuresis, increased weakness and fatigue after dosing

2. Potentially improved breathing, cognition, functional ability and quality of life

3. Instructed patient and family NOT to administer Metolazone without the assessment of cardiac trained hospice case manager /MD / NP
Dosing Protocol

1. Metolazone 1.25mg ½ hour before am diuretic xs 1 dose

2. Initial one time dose with 24 hour RN case manager / MD / NP follow up
   Repeat symptom assessment & physical exam, diuresis

3. Dosing per clinical response:
   Example 1 time prn
Metolazone Intervention  
n=46

Dosing is personalized based on:

Assessment – review of systems
Physical exam
Labs
Discussion between CM and MD/NP

PRN = 15
Q week= 5
2xs week = 20
3xs week = 6
Metolazone Use in End of Life HF (n=46)

Demographic Information

Gender: M/F 26/20

Age
1. Male: 78.34 (range 24 – 99)
2. Female: 79.3 (range 52- 101)

Ethnicity
- Caucasian: 30/46 65%
- African American: 11/46 23%
- Hispanic: 5/46 10%
Metolazone Use in End of Life HF (n=46)

Residence: Home: 34/46 73%
   ALF/PCH / GIP 11/46 23%

Marital Status: Married: 24/46 52%
   Widowed: 15/46 32%
   Divorced / Single 7/46 15%
Metolazone Use in End of Life HF (n=25)

HFpeF vs HFreF by 2D echo

HFpeF= 9 (ave= 61.6% )

HFreF= 18 (ave= 17.7% )

Unknown= 15
**Hospice Statistics (n=46)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stayed on Hospice</td>
<td>39 / 46</td>
<td>85 %</td>
</tr>
<tr>
<td>Revocation</td>
<td>4 / 46</td>
<td>8 %</td>
</tr>
<tr>
<td><em>(readmission to hospital)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live Discharge / transfer</td>
<td>3 / 46</td>
<td>6 %</td>
</tr>
<tr>
<td><em>(extended prognosis)</em></td>
<td></td>
<td></td>
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</tbody>
</table>
# Hospice Statistics (n=46)

## Length of Stay

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>&lt;100</td>
<td>22</td>
<td>48%</td>
</tr>
<tr>
<td>100-200</td>
<td>8</td>
<td>17%</td>
</tr>
<tr>
<td>200-300</td>
<td>4</td>
<td>9%</td>
</tr>
<tr>
<td>300-400</td>
<td>6</td>
<td>13%</td>
</tr>
<tr>
<td>&gt;400</td>
<td>5</td>
<td>11%</td>
</tr>
</tbody>
</table>

- **Metolazone n=46**
  - Total days = 7912
  - Ave LOS : 187.4  (5-793)

- **+ Inotropes n=6**
  - Total days = 417
  - Ave LOS = 69.5

- **ALIVE n=7**
  - Total days = 3634
  - Ave LOS = 605
Hospice Statistics

BNP 15 /46 32%
ave= 1438.7 (range 188 - 3029)

Inotropes= 6 / 46 13%

PPM= 6 /46 13%

ICD= 13/46 28%
<table>
<thead>
<tr>
<th>BUN / Creat / K+</th>
<th>BUN ave: 41.24</th>
<th>31/46</th>
<th>67.3%</th>
</tr>
</thead>
<tbody>
<tr>
<td>(range 10-125)</td>
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</tr>
<tr>
<td>Creat ave: 0.79-2.9</td>
<td>31/46</td>
<td>67.3%</td>
<td></td>
</tr>
<tr>
<td>(range 0.79 -2.9)</td>
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</tr>
<tr>
<td>K+= ave: 4.24</td>
<td>29/ 46</td>
<td>63%</td>
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</tr>
<tr>
<td>(range 2.8-5.7)</td>
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Comorbidities

Diabetes
ESRD
HTN
Atrial fibrillation
COPD
PVD
Arthritis
Dementia
Conclusion

Careful clinical assessment by heart failure trained nurses is important for timely and accurate use of diuretics in hospice HF patients to improve symptoms and quality of life.

Careful, timely dosing by MD / NP based on current clinical assessment, medication profile, past medical history, past laboratory results can decrease worsening symptoms and re-hospitalizations.
time for questions