Trazodone as a Mediator of Transitional Stress in a Shelter: Impact on Rates of Illness, Length of Stay, and Outcome

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ANIMAL SHELTER CHALLENGES

Stress
- Emotional: fear, aggression escalated; shut down
- Physical: suppressed immune system

Contagious illness
- Individual health
- Herd health
SHELTER SETTING

- Strange noises and odors (Hennessy, 2013; Shiverdecker et al., 2013)
- Separated from attachment figures (Hennessy, Davis, Williams, Mellott, & Douglas, 1997; Hennessy, 2013; Protopopova, 2016; Shiverdecker et al., 2013)
- Disrupted routines (Hennessy, 2013)
- Social isolation and spatial restriction (Beerda, et al., 1999; Coppola et al., 2016; Hennessy et al., 1997; Hennessy, 2013; Protopopova, 2016; Shiverdecker et al., 2013; Wells, 2004)
- Undesirable behavior changes (Beerda et al., 1999; Wells, 2004)
- Increased cortisol levels (Beerda et al., 1999; Wells, 2004)
CAN PHARMACOLOGY HELP?

How can we further reduce stress levels?

- Improve immunity $\rightarrow$ Decrease contagious illness
- Improve behavior $\rightarrow$ Reduce behavioral deterioration & improve accuracy of behavior assessments
- Do more than just diminish the physical signs of stress
Animal Care Centers of NYC (ACC)  
- 7,000-9,000 dogs/year

Trazodone  
- Atypical antidepressant (Gruen et al., 2017; Gruen & Sherman, 2008; Betti et al., 2018)  
- Serotonin receptor antagonist and reuptake inhibitor (SARI)  
  (Ciribassi & Ballantyne, 2014; Gruen & Sherman, 2008)  
- Indicated to treat anxiety & stress, induce calm behavior in dogs & cats  
  (Gruen et al., 2017)
THE STUDY

• Pharmacological intervention pilot
  • Two doses (5 mg/kg) PO given during “transition period”
    (first 48 hours in the shelter)

• Is there an effect?

• Compare pilot year to previous years
  • Trazodone: November/December 2018
  • No Trazodone: Nov/Dec 2016 & Nov/Dec 2017
  • Brooklyn (BACC) & Manhattan (MACC) Animal Care Centers
RECORD REVIEW

Records identified (n = 2,734)

Records excluded for:
- LOS < 3 days
- Repeat stays with absence < 20 days (n = 805)

2018 exclusions for trazodone schedule:
- Did not receive 1 dose in 24 hours or 2 doses in 48 hours (n = 163)

Records included (n = 1,766)
**DEMOGRAPHICS**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Sex</th>
<th>Lifestage&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Size&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Junior</td>
</tr>
<tr>
<td>No Trazodone</td>
<td>769</td>
<td>588</td>
<td>193</td>
</tr>
<tr>
<td>Trazodone</td>
<td>242</td>
<td>167</td>
<td>38</td>
</tr>
<tr>
<td>Total number</td>
<td>1011</td>
<td>755</td>
<td>231</td>
</tr>
</tbody>
</table>

<sup>1</sup> Per ACC guidelines, dogs are categorized into lifestages at intake based on a combination of age and size

<sup>2</sup> Size small = 0-20 lbs, medium = 21-50 lbs, large = 51+ lbs
• Pearson chi-square test comparing the three schedules found no significant difference, \( \chi^2 (2, N = 409) = .43, p = .81 \)

<table>
<thead>
<tr>
<th>2018</th>
<th>Sick</th>
<th>Not sick</th>
<th>Total</th>
<th>Percent sick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideal, 2 doses in 24 hrs</td>
<td>69</td>
<td>158</td>
<td>227</td>
<td>30.4%</td>
</tr>
<tr>
<td>Delayed, 2 doses in 48 hrs</td>
<td>16</td>
<td>41</td>
<td>57</td>
<td>28.1%</td>
</tr>
<tr>
<td>Single, 1 dose on day 1</td>
<td>34</td>
<td>91</td>
<td>125</td>
<td>27.0%</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>119</strong></td>
<td><strong>290</strong></td>
<td><strong>409</strong></td>
<td><strong>28.6%</strong></td>
</tr>
</tbody>
</table>

• Therefore, all three of these schedules were included in the trazodone pilot data set
ILLNESS RATE

No differences found between locations or between baseline years:

• Locations: Brooklyn vs Manhattan, no significant difference
  \[ \chi^2 (1, N = 1357) = .002, p = .968 \]

• Years: 2016 vs 2017, no significant difference
  \[ \chi^2 (1, N = 1357) = 2.9, p = .09 \]

• Therefore, data from BACC & MACC 2016 & 2017 were combined (No Trazodone group)
ILLNESS RATE

Pearson chi-square test comparing No Trazodone and Trazodone groups →

significant drop in illness rates in the Trazodone group,

$\chi^2 (1, N = 1766) = 19.4 \ p < .001$

• Average illness rate: 41.2% → 29.1%
LENGTH OF STAY (LOS)

Independent samples t-test (two-tailed) comparing No Trazodone \((M = 10.47, SD = 8.53)\) and Trazodone \((M = 9.23, SD = 6.57)\) groups → significantly shorter average LOS for the Trazodone group, \(t(1764) = 2.71, p = .007\)

- Average LOS 10.47 days → 9.23 days
- No differences seen within the ‘sick’ and ‘not sick’ conditions
OUTCOME

Series of Pearson chi-square tests (with Bonferroni correction) →

significant increase in adoption rates in the Trazodone group,
\( \chi^2 (1, N = 1766) = 19.4, p < .001 \)

• Average adoption rate: 30.4% → 42.1%
DISCUSSION

• Decreased stress levels → improved resistance to CIRDC?
• Decreased stress levels → improved behavior, kennel presence, engagement?
  • More frequent & faster adoptions, shorter LOS
• Possible new practical use for trazodone
LIMITATIONS

• Correlational not causal
• Changes at ACC: adoption policy, kennels, feeding times, lights out, removal of breed labels, staffing changes, enrichment program expansion
FUTURE DIRECTIONS

- Alternative pharmacological options
- Experimental paradigm with control group
- Behavioral study: masking vs decreasing anxiety
THANK YOU TO

Animal Care Centers of NYC (ACC)
https://www.nycacc.org/

Thinking Dog Center, Department of Psychology, Hunter College, City University of New York
https://www.facebook.com/HunterTDC/

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LET’S CHAT!

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