Cysticercosis
Los Angeles County

Public Health Problem Identified

- LAC Cysticercosis hospitalizations
  - 10-15 cases in 1970's
  - 80 by early 1980's
  (F. Richards et. al. 1985, JAMA)

- Severe Disease
  - 56% Seizures, 21% hydrocephalus (N=238) among hospitalized cases (F. Scharf 1988, Arch Neurol)

- Cysticercosis is Preventable!

How to Prevent Cysticercosis
Review of Life Cycle

Public Health Opportunity

In 1988 LAC Public Health identified an opportunity for disease prevention:

- Add cysticercosis to the list of reportable diseases for LAC
- Public health nursing to screen close contacts of reported Cysticercosis cases for Taeniasis
- Refer Taeniasis cases for treatment

Public Health Results

- This intervention method has been successful in identifying cases
- Taeniasis cases were identified in 7% (5/72) of households tested (1988-1991).

What's Happening With Cysticercosis in LAC Today?

- Review available data sources:
  - Reported cases
  - Death Certificates
  - Hospital Discharge Data
  - Published Studies
Reported Cases, LAC

Figure 1 Cysticercosis Incidence Rates per 100,000, Los Angeles County

\[ y = -0.0366x + 0.7763 \]

\[ R^2 = 0.8124 \]

Reported Cases, LAC 1993-2006 (N=411)

<table>
<thead>
<tr>
<th>Racial Ethnicity</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latin</td>
<td>371</td>
<td>93%</td>
</tr>
<tr>
<td>Caucasian</td>
<td>17</td>
<td>4%</td>
</tr>
<tr>
<td>Asian</td>
<td>8</td>
<td>2%</td>
</tr>
<tr>
<td>African American</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Unknown</td>
<td>12</td>
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</table>

Gender

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
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<tbody>
<tr>
<td>Male</td>
<td>216</td>
<td>53%</td>
</tr>
<tr>
<td>Female</td>
<td>192</td>
<td>47%</td>
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</tbody>
</table>

Trends in Reported Cases, LAC
Early vs. Later Cases

<table>
<thead>
<tr>
<th>Health Department Cases</th>
<th>1988-1990 Study (N=138)</th>
<th>2003-2006 Study (N=60)</th>
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</thead>
<tbody>
<tr>
<td>Health District Cases</td>
<td>91%</td>
<td>84%</td>
</tr>
<tr>
<td></td>
<td>61%</td>
<td>48%</td>
</tr>
<tr>
<td></td>
<td>87%</td>
<td>80%</td>
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<tr>
<td></td>
<td>0%</td>
<td>7%</td>
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Latino Immigrant Born in Mexico

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</thead>
<tbody>
<tr>
<td></td>
<td>28</td>
<td>35</td>
<td>0</td>
<td>10</td>
<td>2</td>
<td>8</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
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Mean Age

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</thead>
<tbody>
<tr>
<td>Mean</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>31</td>
<td>30</td>
<td>29</td>
<td>28</td>
<td>27</td>
<td>26</td>
<td>25</td>
<td>24</td>
<td>23</td>
<td>22</td>
<td>21</td>
<td>20</td>
<td>19</td>
</tr>
</tbody>
</table>

Reported Cases by Health District
LAC, 2004-09 (n=59)

<table>
<thead>
<tr>
<th>Health District Impacted</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL MONTE HD/Pomona HC (23)</td>
<td>8</td>
<td>14%</td>
</tr>
<tr>
<td>SAN ANTONIO HD/Compton HC (58)</td>
<td>8</td>
<td>10%</td>
</tr>
<tr>
<td>ANTELOPE VALLEY HD/Antelope Valley HC (6)</td>
<td>4</td>
<td>7%</td>
</tr>
<tr>
<td>POMONA HD/Pomona HC (54)</td>
<td>4</td>
<td>7%</td>
</tr>
<tr>
<td>EAST VALLEY HD/North Hollywood HC (19)</td>
<td>4</td>
<td>7%</td>
</tr>
<tr>
<td>SAN FERNANDO HD/Pacoima HC (59)</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>SOUTH HD/South HC (69)</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>SOUTHEAST HD/Huntington Park HC (72)</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>WEST VALLEY HD (76)</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>BELLEFLOWER HD/Bellflower HC (6)</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>CENTRAL HD/Central HC (9)</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>Other Health Districts (2 or fewer cases)</td>
<td>15</td>
<td>3%</td>
</tr>
</tbody>
</table>

Mortality
Cysticercosis Mortality

- **National Mortality**
  - 221 Deaths 1990-2002 (17 per year)
  - 60% occurred in CA
  - 32% occurred in LAC
  - F. Sorvillo et. al. 2004, EID

- **LAC Mortality**
  - Slight decrease over time
  - Demographics
    - 96% Latino
    - Mean age 41.2 years
    - 62% male

Hospitalizations

**Hospitalizations 1991-2008 (18 years)**

- 7,169 Cysticercosis hospitalizations (398 per year)
- 3,937 NC* Hospitalization (218 per year)
- 1,488 NC* Hospitalization with primary Dx cysticercosis (82 per year)

*NC=neurocysticercosis

Hospitalization Demographics

LAC, 1991-2008 (n=3937)

- 91.6% Latino
- Male: Female = 1.1:1
- Mean age 38.4 years
  - 31.3 years in 1991
  - 43.1 years in 2008

Hospitalizations 1991-2008

- Economic Burden over 18 years
  - $136.2 million total hospitalization charges
    - Averaging $7.9 million per year
    - Average charge per patient was $37.6 thousand
    - Most common payment method
      - Medicaid (43.9%)
      - Private insurance (24.5%)

- The average length of stay was 7.2 days.

- 3,937 neurocysticercosis hospitalizations identified
  - 72.8% seizure or convulsion (2,866)
  - 30.9% hydrocephalus (1,217)
  - 6.2% cerebral cyst (244)
  - 2.2% cerebral edema (866)
  - 2.0% death (77)
Cysticercosis Trends
1993-2006 (16 years)
Cysticercosis in Los Angeles County

Reported cases down 49%
Mortality down 37%
Hospitalizations up 5%
NC hospitalizations up 5%
NC hospitalizations (primary diagnosis) down 12%

NC = neurocysticercosis

Other Published Studies

Cysticercosis and Taeniasis are Still Prevalent In and Around LAC

The sero-prevalence in a mostly Hispanic immigrant population in Ventura County approximates the prevalence in some endemic areas of Latin America.

DeGiorgio C, et al 2005

METHOD
- Obtain finger pick blood samples from 1) Select persons living in a federally funded, predominantly Hispanic residential community 2) and in two migrant farm worker camps in rural Ventura County, California
- Test serum immunoblots for both cysticercosis and taeniasis.
DeGiorgio C, et al 2005

RESULTS (N=449)

– 1.8% positive for *T. solium* cysticercosis

– 1.1% Positive for *T. solium* taeniasis

Conclusion

• Cysticercosis remains a public health problem in LAC

• The disease is severe and represents a significant economic burden to LAC

• The disease can be prevented through detection and treatment of taeniasis cases

• Implementing improved testing methods for taeniasis will increase the likelihood of detection

Questions ?

References


