Epidemiology and Outbreak of Animal Leptospirosis in Thailand

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Outline

• Background
• Situation of leptospirosis in animal (Thailand)
• Example of Outbreak Investigation

Leptospirosis in Animal (1)

• Comprising 18 Leptospira species e.g. L. alexanderi, L. alstonii, L. borgpetersenii, L. inadai, L. interrogans, L. fainei, L. kirschneri, L. licerasiae, L. noguchii, L. santarosai, L. terpstra, L. weilii, L. wolffii
• >300 serovars. Most of pathogenic serovars are in L. interrogans and L. borgpetersenii
• Inapparent infection with relate to host resistance can be found in animal
  — Canicola in dogs
  — Bratislava in horses and pigs

Leptospirosis in Animal (2)

• Clinical sign in animal
  — Dog: icteric, hemorrhagic, uremic, reproductive problem
  — Pig and cattle: reproductive problem
  — Horse: uveitis, reproductive problem
• Animal can be asymptomatic carrier after recovering from disease
• Rat and mice can serve as reservoir for some serovars

Leptospirosis in Animal (3)

• The carriers may be wild or domestic animals, especially rodents and small marsupials, cattle
• Most of the carrier animals have low antibody titer
• Leptospires do not survive well in acid urine. So, herbivores and animals whose diet produces alkaline urine are relatively more important as shredders than are producers of acid urine.
• Vaccine in animal is available but it is partial effective due to variation of serovars.

Source of picture: Leptospirosis in the Asia Pacific Region, BMC Infectious Diseases 2009, 9:147
**Situation of Animal Leptospirosis Reported in 2009: Global Situation (1)**

- Most of reports in animal is from survey activities and clinical manifestation is not available
- Two reports of clinical case is in USA (horse) and Brazil (dog)
- Survey activity was conducted in Thailand (elephant in 2004 and dog, NA for year of survey), Korea (pig, cattle, dog, horse, 2005-2006), Brazil (cattle), USA (raccoon, 2004-2005), Japan (raccoon, 2002-2003), Sweden (horse, 1997-1998)

**Situation of Animal Leptospirosis Reported in 2009: Global Situation (2)**

<table>
<thead>
<tr>
<th>Animal</th>
<th>Country</th>
<th>Year</th>
<th>Type of study</th>
<th>Seroprevalence</th>
<th>Serovar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elephant</td>
<td>Thailand</td>
<td>2004</td>
<td>Survey</td>
<td>58%</td>
<td>Sejroe Bataviae</td>
</tr>
<tr>
<td>Dog</td>
<td>Brazil</td>
<td>2008-2009</td>
<td>Case report</td>
<td>NA</td>
<td>Noguchii</td>
</tr>
<tr>
<td>Pig, Cattle, Dog, Horse</td>
<td>Korea</td>
<td>2005-2006</td>
<td>Survey</td>
<td>17%</td>
<td>Sejroe Bratslava Autumnalis</td>
</tr>
<tr>
<td>Horse</td>
<td>USA</td>
<td>2007</td>
<td>Review second any data</td>
<td>NA</td>
<td>Kennewicki to Bratslava</td>
</tr>
</tbody>
</table>

**Situation of Animal Leptospirosis, Thailand (1)**

- The most recent nationwide survey of domestic animal leptospirosis in Thailand was in 2001
  - Seroprevalence of leptospirosis is 10%
  - Dominant serovars are Bratslava, Mini, Sejroe
- Publishing in 2009, survey of leptospirosis in stay dog found high seroprevalence of leptospirosis (84%), Dominant serovar is Bataviae

**Situation of Animal Leptospirosis Followings Human Outbreak, Thailand (2)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Year</th>
<th>Type of study</th>
<th>Predisposing factor</th>
<th>Association with animal</th>
<th>Serovar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nan</td>
<td>2006</td>
<td>Outbreak investigation</td>
<td>Flooding</td>
<td>Domestic animals (detected high titer and same serovars)</td>
<td>Bratslava Autumnalis, Cynopteri, Hebdosmadi, Sejroe, Shermani</td>
</tr>
<tr>
<td>Saraburi</td>
<td>2006</td>
<td>Outbreak investigation</td>
<td>Flooding and rat hunting</td>
<td>Rat (bacterial detection)</td>
<td>Bratslava</td>
</tr>
<tr>
<td>Phangnga</td>
<td>2007</td>
<td>Case investigation</td>
<td>Recreational activities</td>
<td>No</td>
<td>Canicola (detected bacteria)</td>
</tr>
<tr>
<td>Nan</td>
<td>2007</td>
<td>Case investigation</td>
<td>Fishing</td>
<td>NA</td>
<td>Australis</td>
</tr>
<tr>
<td>Nakhon Nayok</td>
<td>2008</td>
<td>Outbreak investigation</td>
<td>Fishing after flooding</td>
<td>Domestic animals (detected high titer and same serovars)</td>
<td>Bratslava Shermani, Sejroe</td>
</tr>
</tbody>
</table>
Outbreak Investigation

Leptospirosis Outbreak Investigation in Thong Phabhum district, Kanchanaburi province, September 2008

Rochana Wattanarangsan et al.
FETP and DLD

Thong Phabhum District, Kanchanuburi Province

Results of Investigation

- On 27th August 2008, SRRT of Thong Phabhum notified BOE that an increased number of leptospirosis cases reported in the hospital
- There were 31 cases diagnosed in August, 2008
- 8 confirmed cases and 23 suspected cases
- 10 cases have a history of fish catching at Tao Than and Pong Chang swamp area during July – August
- Many cattle and rodents were observed in those 2 swamp area

Water Reservoirs, Thong Phabhum District, Kanchanaburi Province

Fish Catching in Beginning of Rainy Season
Number of suspected leptospirosis cases by onset date in Thong Phabhum District, Kanchanaburi Province, April-September 2008

Results of MAT, NIAH, DLD

<table>
<thead>
<tr>
<th>Sample</th>
<th>Leptospira Serovar</th>
<th>Number (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>Shermani</td>
<td>29 (96.6)</td>
</tr>
<tr>
<td></td>
<td>Bratislava</td>
<td>11 (36.6)</td>
</tr>
<tr>
<td></td>
<td>Sejroe</td>
<td>4 (13.3)</td>
</tr>
<tr>
<td></td>
<td>Ranarum</td>
<td>29 (96.6)</td>
</tr>
<tr>
<td>Dog</td>
<td>Shermani</td>
<td>4 (44)</td>
</tr>
<tr>
<td></td>
<td>Bratislava</td>
<td>7 (77.7)</td>
</tr>
<tr>
<td></td>
<td>Sejroe</td>
<td>2 (22.2)</td>
</tr>
<tr>
<td>Human</td>
<td>Shermani</td>
<td>10 (22.2)</td>
</tr>
<tr>
<td></td>
<td>Bratislava</td>
<td>4 (31.1)</td>
</tr>
<tr>
<td></td>
<td>Sejroe</td>
<td>6 (13.3)</td>
</tr>
</tbody>
</table>

Possible Risk factor of Leptospirosis in Villagers

- We suspect animal is reservoirs
- Swamp area contaminate leptospirosis via urine shedding
- Fish-catching activity of villagers
  - Expose to water for 6 hours/day
  - Leptospirosis can penetrate skin

Actions Taken

- Public Health
  - Health education to reduce risk of getting leptospirosis for villagers
  - Installed warning sign at the suspected water reservoirs
  - Conducted leptospirosis survey in human to define risk factors
- DLD
  - Health education and recommend villagers to manage area for cattle and for human activity