RABIES IN CHILDREN
WHEN TO CONSIDER RABIES AND WHEN TO VACCINATE

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2017
WILL YOU VACCINATE AGAINST RABIES?

Mum, dad, children: 9 years old and 12 years old.

a. 3 weeks travel to Vietnam, Cambodia: beach and maybe trekking in the mountains

b. Six months to Tanzania – mother researcher

c. Family visit to the Philippines for 2 weeks - mother from the Philippines
AGENDA

• Rabies movie  3,5 min
• Epidemiology
• Prophylaxis
• https://www.youtube.com/watch?v=-moG6JDmJdc

No conflicts of interest
Louis Pasteur himself

- 1885 Rabies vaccine
RABIES FACTS

• Effective vaccines with very few side effects
• Ca. 30,000-55,000 people are dying worldwide each year – more than yellow fever
• 56% of the deaths in Asia and 44% in Africa
• Children below 15 years of age: 40% of cases
• With few exceptions it is a deadly disease
RESERVOIR
All mammals
Rabies, countries or areas at risk

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.
TIME FROM EXPOSURE (BITE) TO DISEASE 10 DAYS UP TO 8 YEARS

Most cases were diagnosed in Europe (56.7%)
<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>≤5 years</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td></td>
<td>5–15 years</td>
<td>4 (6.7)</td>
</tr>
<tr>
<td></td>
<td><strong>16–59 years</strong></td>
<td><strong>42 (70.0)</strong></td>
</tr>
<tr>
<td></td>
<td>≥60 years</td>
<td>8 (13.3)</td>
</tr>
<tr>
<td></td>
<td>Not documented</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>Male</td>
<td>45 (75.0)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>13 (21.7)</td>
</tr>
<tr>
<td></td>
<td>Not documented</td>
<td>2 (3.3)</td>
</tr>
<tr>
<td><strong>Reason for travel</strong></td>
<td><strong>Visiting friends and relatives</strong></td>
<td><strong>14 (23.3)</strong></td>
</tr>
<tr>
<td></td>
<td>Tourism</td>
<td>8 (13.3)</td>
</tr>
<tr>
<td></td>
<td>Migration (from low to high income country)</td>
<td>7 (11.7)</td>
</tr>
<tr>
<td></td>
<td>Expatriation (from high to low income country)</td>
<td>5 (8.3)</td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td>5 (8.3)</td>
</tr>
<tr>
<td></td>
<td>Medical evacuation</td>
<td>2 (3.3)</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>1 (1.7)</td>
</tr>
<tr>
<td></td>
<td>Volunteer work</td>
<td>1 (1.7)</td>
</tr>
<tr>
<td></td>
<td>Not documented</td>
<td>17 (28.3)</td>
</tr>
<tr>
<td><strong>Source of infection</strong></td>
<td><strong>Dog</strong></td>
<td><strong>51 (85.0%)</strong></td>
</tr>
<tr>
<td></td>
<td>Bat</td>
<td>3 (5.0%)</td>
</tr>
<tr>
<td></td>
<td>Fox</td>
<td>1 (1.7%)</td>
</tr>
<tr>
<td></td>
<td>Unknown animal or not documented</td>
<td>5 (8.3%)</td>
</tr>
</tbody>
</table>
Many cases were associated with short duration travel which challenges the common view that preventive vaccination against rabies should be preferentially given to long-term travelers to high risk areas.

Many of the rabies cases were in migrants traveling to their origin country who may lack the budget for pre-travel vaccination.
Her blev danskere livsfarligt bidt

156 danskere blev i 2014 bidt af dyr, som kan være syge med dødelig hundegalskab. I Danmark var bid fra flagermus årsag til, at 16 personer blev sat i behandling, heriblandt to børn. Én person blev sat i behandling efter bid fra en kat importeret fra Rusland.

I alt 139 danskere blev bidt i udlandet af dyr, som kan have rabies: 88 i Asien (heraf 52 i Thailand), 39 i Europa, syv i Afrika, én i Mellemosten, to i USA og to i Grønland.

Kilde: Statens Serum Institut Tekst: Mathias Sommer Grafik: Phillippe Falkesgaard
Scandinavians exposed and died of Rabies


- In June 2000, a 19-year-old woman, had been bitten by a dog in Thailand three months earlier. She was admitted with a 2-day history of pain and paresthesia at the exposure site (right arm), along with anxiety. She died 18 days after onset of symptoms. Tourists must be informed of the vital importance of post-exposure prophylaxis after suspected infection.

A case of supposed exposure Poulsen A et al Ugeskr Læger 2004;166:2676-2677

- A Danish woman in Guinea-Bissau was possibly exposed to rabies, when examining her dog for a foreign body in its throat. The vaccinated dog was not furious, but with progressing disease, it developed encephalitis, hydrophobia, and excess production of saliva, and finally died. Long-term expatriates in rabies endemic countries should be advised to consider rabies vaccination.
EXPERIENCE

• No intention to have a dog
  • Children were vaccinated
  • Dog vaccinated once
• Recognition - not my dog!
• Evacuation difficult
• Rabies IG accessibility difficult
• Hospital standards
• Finansiel costs
• Psychological distress

Head stuck between the bars during consultation
Evaluating the cost-effectiveness of rabies post-exposure prophylaxis: A case study in Tanzania

Eunha Shim, Katie Hampson, Sarah Cleaveland, and Alison P. Galvani.
HIGH RISK COUNTRIES- FOR EXAMPLE VIETNAM

- **WHO recommendations:**
  - pre-exposure immunisation for travellers and other people for whom contact to domestic animals especially dogs is likely

- **CDC:** Rabies can be found in dogs, bats, and other mammals in Vietnam, so **recommends** this vaccine for the following groups:
  - **Travelers involved in outdoor and other activities** (such as camping, hiking, biking, adventure travel, and caving) that put them at risk for animal bites.
  - **People who will be working with or around animals** (such as veterinarians, wildlife professionals, and researchers).
  - People who are taking **long trips** or moving to Vietnam
  - **Children,** because they tend to play with animals, might not report bites, and are more likely to have animal bites on their head and neck.

- **SSI:** mentioned as “**special risk**” if travelling 1-4 weeks or longer:
  - **possibility** to vaccinate
    - “(Man kan vaccineres før afrejse (3 doser), men i alle tilfælde skal man søge akut lægehjælp, hvis man bides af et lokalt pattedyr, uanset dyrets adfærd. )”
PROPHYLAXIS PRE-EXPOSURE

• Avoid "strange" animals

• Imovax /Verorab (Inactivated rabies vaccination)
  • 3 dosages day 0, 7 and 28. First booster after one year. Then a booster every 5. year (or measure titer to be more than 0,5 IE/ml).
  • Antibodies developes 7 to 14 dage after vaccination. Nearly 100 % of all immunised will develop protective antibody levels after 2 dosages of Rabies-Imovax.

• Relatively few adverse events
TREATMENT IF BITTEN

- Clean the wound with water and soap
- Or use 70% alcohol/1% povian-iodine
- Tetanus prophylaxis
TREATMENT POST EXPOSURE (PEP)

- **Non vaccinated individuals:**
  - 5 dosages of rabies vaccine day 0, 3, 7, 14 and 28.
  - At the same time as the first dosage should be given rabies immunoglobulin 20 IE/kg. Vaccine and immunoglobulin should be given in 2 different syringes and 2 different places at the body. If the risk for infected bite is big it is possible to give 2 dosages day 0.

- **Persons that are fully immunised within the last 5 years:** 2 dosages day 0 og 3.

- **Persons, immunised for more than 5 years or immunised incompletely:**
  - 5 dosages day 0, 3, 7, 14 and 28.

**Rabies Immunoglobulin is not available everywhere- evacuation might be necessary**

Denmark: SSI: phone: 41 317404 – open 24 hours
PROS ET CONS

Pros:

• Deadly disease
• Same number of death than for example Yellow fever and more than Japanese Encephalitis
• PEP is not available everywhere – quality of vaccines abroad? RIG should be given optimally within 3 days
• For not diseased - psykological stress in incubation period
• Logistic difficulties to get PEP – especially RIG
• You might not be able to avoid to be bitten - even if you avoid animals – and you might neglect the risk

Cons:

• Yet another vaccine – 3 injections ……
• Even if a vaccine is "safe" there is always a risk of adverse effects
• Price cirka 500 Danish crowns per vaccination =1500 DK (Verorab, Imovax)
• You can get PEP - effective, especially if given early
• Revaccination every 5th year ?
• Periodically shortage of vaccine – vaccinate where the risk is highest?
WHO WILL I VACCINATE AGAINST RABIES?

Mum, dad, children: 9 years old and 12 years old.

a. 3 weeks travel Vietnam, Cambodia: beach and trekking in the mountains

At least inform the family about the risk and to get PEP if bitten by mammal - vaccinate "investment ?"

b. Six months to Tanzania – mother researcher

Vaccinate all !

c. Family visit to the Philippines (village)

for 2 weeks - mother from there

Vaccinate the children – probably all ?

Following all bites from a mammal- consider the risk of rabies
TREATMENT

Symptomatic

- **Milwaukee protocol:**
  - ketamine, midazolam, and phenobarbital to suppress brain activity and the antiviral drugs – (ribavirin), amantadine
  - 14(15) survivors all with some sequelae

**Survival after Treatment of Rabies with Induction of Coma**

*Rodney E. Willoughby, Jr., M.D., Kelly S. Tieves, D.O., George M. Hoffman, M.D., Nancy S. Ghanayem, M.D., Catherine M. Amlie-Lefond, M.D., Michael J. Schwabe, M.D., Michael J. Chusid, M.D., and Charles E. Rupprecht, V.M.D., Ph.D.*

*New England Journal of Medicine 2005*
In Vietnam dog butchering and eating is regarded as a risk factor for rabies.
Differential diagnosis

it’s not rabies
it’s a shave.

(c)puvo
HTTPS://WWW.YOUTUBE.COM/WATCH?V=OTIYTBLJZQC

- https://www.youtube.com/watch?v=OtiytbJzQc
- https://www.youtube.com/watch?v=-moG6JDmJdc