Rabies

Description

Rabies is a viral infection of the central nervous system that can affect all mammals, including humans. It primarily affects carnivores and insectivorous bats. The rabies virus is transmitted through saliva from the bite of an infected animal. If treatment is not administered in time and the disease becomes fully established, rabies is almost always fatal. The World Health Organisation (WHO) estimates that between 40,000 and 70,000 people die from rabies every year.

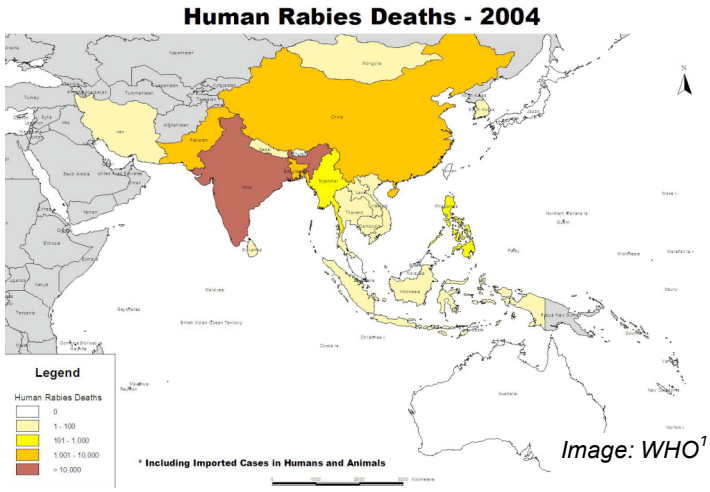

Image: WHO[1]

Distribution

Rabies is endemic in all continents except Antarctica and Australasia, although individual countries (often peninsulas or islands) are reported to be rabies free. The reservoir of infection varies globally:

- Dogs: Africa, Asia, Latin America, Middle East
- Skunks, raccoons & foxes: North America and Europe
- Vampire bat: Central & South America, Mexico, parts of the Caribbean

Recently, bat rabies has emerged as an important epidemiologic reservoir in some parts of the world (i.e. the Americas and Australia). In North America, most documented human rabies deaths occur as a result of infection from the Silver Haired Bat rabies virus variant and in Australia at least two human deaths have occurred from exposure to a previously unrecognized rabies virus.[1] In South America, wildlife rabies, especially bat rabies, is increasing.

Transmission

Rabies is transmitted by a bite or scratch in which virus-laden saliva is inoculated into the wound. Rarely rabies can be contracted when saliva from an infected animal comes into contact with mucous membranes or broken skin. Aerosol spread through this route is also thought to be possible, and may have occurred in people exploring caves inhabited by rabid bats. The virus may be present in the infected animal's saliva 3-5 days before the animal shows any signs of the disease.

Rabies presents in two forms:

- *Furious* rabies
  - The animal is irrational and aggressive
  - Loss of caution and fear of natural enemies – wild animals may enter into urban areas
- *Dumb* rabies
  - Paralysis of throat and chewing muscles with profuse salivation and inability to swallow
  - The animal is not vicious or aggressive – in fact the animal often makes a pitiful sight

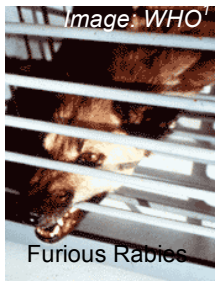
Image: WHO[1]
Furious Rabies

Pathogenesis

The virus initially replicates in the muscles local to the bite site, before travelling through the nervous system to the brain. The mechanism through which the viral infection causes the neurological disease is not well understood, although it is thought involve drastically inhibited neuronal protein production.

Symptoms

The initial incubation period usually lasts a few days, however cases with an incubation period of several years have been reliably reported. The first symptoms of rabies may be nonspecific flu-like signs – malaise, fever, or headache, which may last for days. There may be discomfort or paraesthesia (abnormal skin sensations) at the bite site, progressing within days to symptoms of cerebral dysfunction, anxiety, confusion and agitation; further progressing to delirium, abnormal behavior, hallucinations and insomnia.

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[1] Memorandum on Rabies Prevention and Control, UK Department of Health
http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4080657.pdf

The production of large quantities of saliva and tears coupled with an inability to speak or swallow are typical during the later stages of the disease; this can result in *hydrophobia*, where the patient has difficulty swallowing, shows panic when presented with liquids to drink, and cannot quench his or her thirst.

The acute period of disease typically lasts 2 to 10 days. Once clinical signs of rabies appear, the disease is nearly always fatal, and treatment is typically supportive. Non-lethal exceptions are extremely rare, although one case of survival of clinical rabies has recently been reported.[2]

Diagnosis

Currently there are no diagnostic tests available to confirm rabies infection in humans before the onset of clinical symptoms.[3] Therefore, rabies infection is usually identified and diagnosed by its clinical manifestations. The diagnostic process is the objective identification of sudden neurological illness in a patient with a known or likely exposure to a rabid animal.

Once clinical symptoms are present, there are several laboratory tests that can be performed to confirm the diagnosis of rabies. A definitive diagnosis allows the hospital to take measures to limit contact with the patient and permits reconstruction of a history in which others may have been exposed to the same infective animal, but is very unlikely to change the outcome for the patient.

Postmortem tests can be used to identify rabies infection in animals. This is useful to establish whether there is a genuine risk of contracting rabies and to collect data for the control and prevention of the disease. However, when the contact animal cannot be captured or where reliable diagnostic facilities are not available, continuation of post exposure vaccination regimes is essential.

Treatment

Medical advice should be sought immediately after any animal bite or when potentially innoculative contact has been made with a rabid animal.

Immediately after being bitten, you should:

- Immediately **wash the wound with soap and running water for 5 minutes**
- If possible **apply an iodine solution or 40-50% alcohol** (whisky or other spirit can be used)[4]
- **Leave the wound open** – it should not be stitched[5]
- Seek medical advice about the need for **rabies vaccination, immune globulin treatment** and possible **antibiotics** for a bite wound infection as soon as possible
- **Tetanus** booster may also be required, if not already up-to-date
- Depending on the country you may be required to **notify local authorities**

Additional doses of post exposure vaccine will still be required as soon as possible for those who received rabies vaccination prior to travel. However, the number of doses required is reduced and the rabies immune globulin treatment is not required.

Prevention and Control

All contact with wild or domestic animals during travel should be avoided:

- Do not attempt to feed, touch or pick up unfamiliar animals
- Do not attract stray animals by being careless with litter or by discarding food

Pre-exposure vaccination consisting of 3 injections over the course of a month may be recommended for travellers. This recommendation will depend on the intended activity and duration of stay of the traveller, such as where medical help is more than 24 hours away, or where immunoglobulin post-exposure treatment is difficult to find. To maintain protection further booster injections every two years may be required, although many physicians will measure your immunity and give a booster vaccination only if levels are low.

[2] Recovery of a patient from clinical rabies - Wisconsin, 2004 MMWR. 53:1171-1173. 2004
[3] Wilde H, Briggs DJ, Meslin FX, et al.Rabies update for travel medicine advisors. Clin Infect Dis 2003; 37: 96-100.
[4] National Travel Health Network and Centre http://www.nathnac.org/travel/factsheets/rabies1.htm
[5] NHS Direct http://www.nhsdirect.nhs.uk/articles/article.aspx?articleId=308
World Health Organisation http://www.who-rabies-bulletin.org/Travel/Recommendations.aspx
UK Health Protection Agency http://www.hpa.org.uk/infections/topics_az/rabies/menu.htm