

M.V.Sc. 1st Year (2nd Semester) Class

Rabies in Livestock

Dr. Neelesh Sharma

Division of Veterinary Medicine

F.V.Sc. & A.H., SKUAST-J

R.S. Pura, Jammu

Facts about Rabies

Rabies is an acute highly fatal neurological disease of mammals that is almost invariably fatal once the clinical signs develop.

Rabies is caused by neurotropic Lyssa virus (RNA virus) belongs to Rhabdoviridae Type I, is bullet shaped virus.

It has zoonotic importance.

Incubation period is from few days to several years.

Many animals carry the virus in their saliva before they start to show clinical signs

Hosts

Primarily a zoonotic disease of warm blooded animals such dogs, wild cats, jackals, wolves etc.

Susceptibility of animals for rabies as below:

Extremely susceptibility: Fox, wolf, Jackles

Highly susceptibility: Mongoose, bat guinea pig, cattle, rabbit

Moderately susceptibility: Sheep, goat, dog, horse

Resistant: Poultry

Foxes, Racoons, dogs, bats work as carrier.

Transmission

Saliva is rich source of rabies virus.

It is transmitted either through direct bite by rabid animals or by licking on wound or injured part.

Saliva from a positive animal getting into a mucus membrane the eyes, gums or lips of another animal or human

Cattle are considered exposed to rabies if:

- A calf is nursing a rabid cow**
- A cow is nursing a rabid calf**
- A cow has been bitten by a rabid animal**

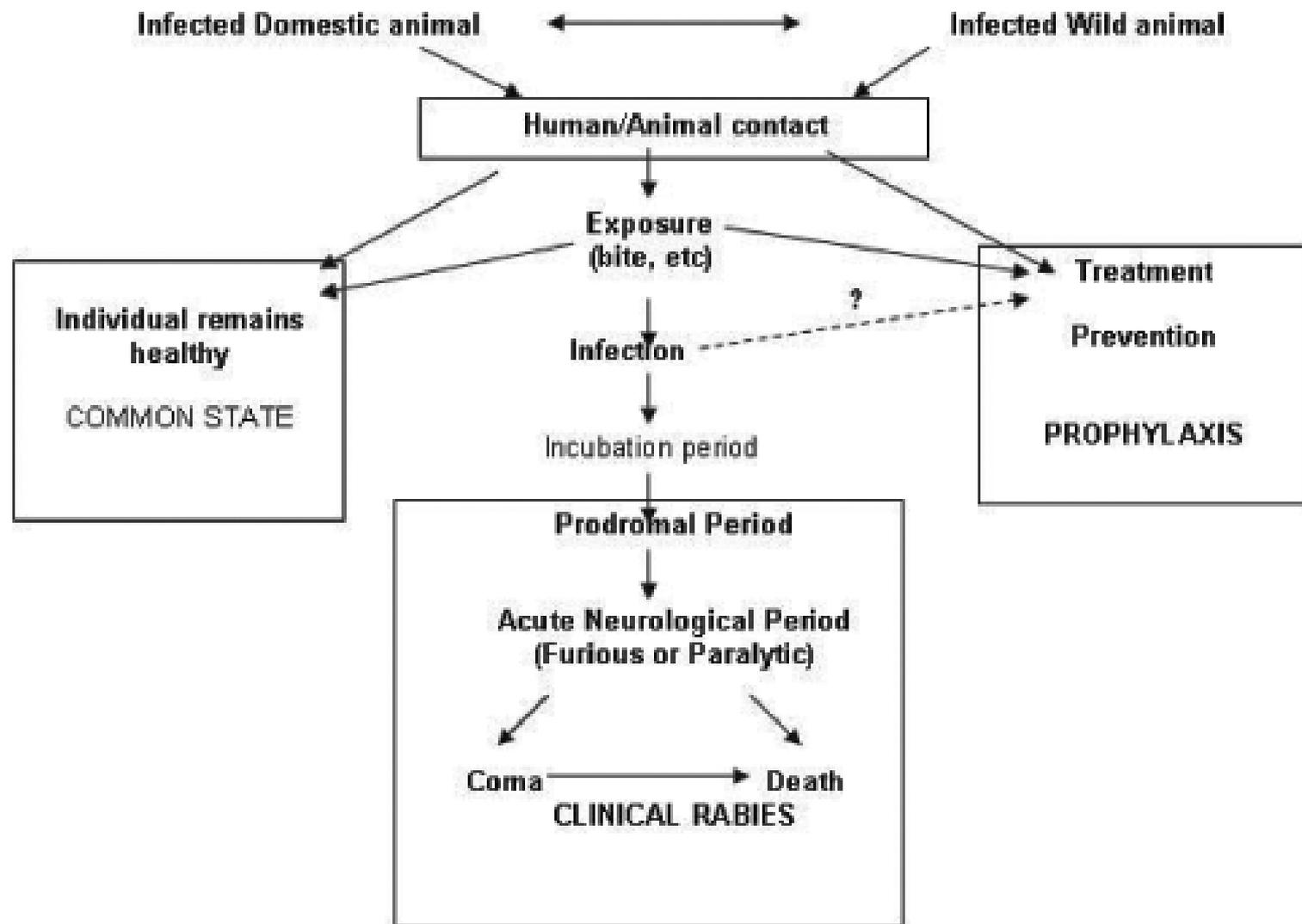


Figure 1: Course of rabies transmission. The first step is the transmission of the disease following exposure. The incubation period varies greatly. It ends when the virus begins to spread from the bite site to the surrounding peripheral nerves. Adapted from Baer *et al.*, (2).

Epidemiology

Rabies has worldwide distribution.

Moreover, India and Pakistan has a major public health problem due to presence of a large number of stray dogs.

Various countries are free from Rabies such as Japan, Australia, China, Ireland, New Zealand.

It is estimated that each rabid animal will infect only 1.2 other animals, and so even when there are multiple bite victims, not all of them will become infected.

Pathogenesis

Bites on the head, face, neck and hands with bleeding offer the greatest risk and are generally associated with shorter incubation period due to decreased length and greater number of neurons.

Virus gets attached through G-protein coupled receptors to the target cells (myocytes, local sensory and motor neurons) and amplifies in the muscle cells and macrophages and then through nerve spindles of sensory nerves or neuromuscular junction of motor nerves the virus ascends centripetally along the nerves to reach the central nervous system.

Virus travels by rapid retrograde fast axonal transport at a rate of 12-100 mm per day towards the CNS.

Spread of rabies virus away from the CNS (centrifugal spread) along neuronal pathways, particularly via the parasympathetic nervous system, which is responsible for infection of the salivary glands and skin.

Clinical Signs

Rabies has two forms: Furious (Encephalitic) and Dumb (Paralytic) form

Furious (Encephalitic) Form:

The infected animal will attack inanimate objects, such as tractors, feed bunks and fences.

They will also attack animate objects, including other animals and humans.

Animal show aggressiveness, restlessness, hyperexcitability.

For clinical presentation of a cow, you can watch below video:

<https://www.youtube.com/watch?v=MvknT2sDR4w>

Dumb (Paralytic) form:

Animals act like they are not aware of their surroundings. They are quiet. They stand off, and they may head press. Often, they will start drooling at the mouth and have difficulty swallowing, and they might become slightly bloated.

Muscle weakness, profuse salivation, dropping of jaw and paralysis, coma, respiratory arrest and death.

Diagnosis

Sample:

Dead: Hippocampus, thalamus, cerebral cortex and medulla oblongata.

Live: Saliva is best sample from live animals.

All viral samples should be collected in virus transport media at 4 °C and for longer time it should be stored at -70 °C temperature

Virus detection:

Rabies virus from samples can be detected various techniques such FAT, RT-PCR, ELISA etc.

Virus culture and animal inoculation test.

Prevention and Control

It requires enhanced surveillance, accurate and timely diagnosis with proper reporting.

Awareness of public

Pre-exposure vaccination of dogs and cats, elimination of stray animals and public health education, etc. are the components of animal rabies control.

First dose- start at 12th week of age and booster after 21 days.
- Afterthat repeat annually.

Post-exposure management includes strict quarantine of animals for 6 months which are exposed to a confirmed or suspected rabid animal.

Post-bite immunization: 0, 3, 7, 14, 28 and 90 days after exposure.

Disinfection

The rabies virus can be inactivated by lipid solvents (soap solutions, ether, chloroform, acetone), 1% sodium hypochlorite, 2% glutaraldehyde, 45-75% ethanol, iodine preparations, quaternary ammonium compounds, formaldehyde or a low pH.

This virus is also susceptible to ultraviolet radiation or heat of 1 hour at 50°C.

It is rapidly inactivated in sunlight, and it does not survive for long periods in the environment except in a cool dark area.

Authors can also refer the below
review paper :

[https://www.tandfonline.com/doi/
full/10.1080/01652176.2017.1343](https://www.tandfonline.com/doi/full/10.1080/01652176.2017.1343)

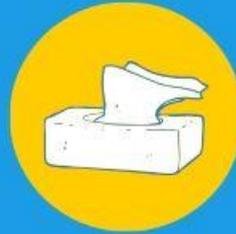
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THANK YOU

Coronavirus: How to stay safe



Wash your
hands
regularly



Sneeze/
cough into
a tissue



Bin it!
Throw your
tissues away
immediately



Sneeze/
cough inside
your elbow