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Rabies Day Special: Bridging the Gap between Science and Safety

Popular Article

## Rabies: A Deadly Infection Needs Control

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### Introduction:

Rabies has been reported to be the oldest viral infection affecting humans through animal. Although vaccine was developed but due to different reservoirs (wild and domestic animals like dog, foxes, raccoons, skunks, Coyotes, yellow mongoose, Indian mongoose, bats) and different incubation period and new infection pattern, control has become difficult. About 95% human deaths due to rabies have taken place in Asia and Africa.

### Pathogenesis:

Human being can become infected by bite of rabid animal or by mucosal exposure. When we are bitten by animal, virus gets entry by muscle endplates or nerve fibres which are unmyelinated and travels by retrograde axonal transport to motor or sensory neurons which are in ganglion dorsal root or spinal cord anterior horn region and replicates there. Later virus returns to site of bite using orthograde axonal transport or goes to brain using corticospinal tract to infect neurons. In case of aerosol infection, virus present in air accidentally enters body using nose olfactory epithelium and gets transported to olfactory bulb neurons to multiply there, spreading further to brain. Later virus returns to periphery through neuronal pathway and so can be detected in skin, adrenals, tears and salivary gland. It's surprising that virus is undetectable in blood cells /blood. The incubation period varies from several days (4 days) to six years. Mostly in infected individual death occur due to cardiac arrest/respiratory failure. Usually, brain inflammation is reported on post mortem of human rabies patient.

### Symptom:

At first symptoms are non-specific including fever, letharginess, tingling occurs at site of exposure, vomiting, anorexia. With advance of time cranial nerve dysfunction, weakness, cerebral dysfunction, ataxia, paralysis, water hydrophobia, breathing and swallowing problems, seizures, excessive salivation, aggression, abnormal behavior and self-mutilation, coma are noted. Violent movements, confusion, loss of consciousness and inability to move body parts are visible. Acute encephalitis is reported in warm blooded hosts. In final stages symptoms progress to delirium, coma and even death. Usually, death occur 2-10 days of first symptom appearance. Even under intensive care, survival chances are rare.

**Cause:**

Rabies virus, Australian bat lyssavirus are main causative agent. It can spread through infected animal (dog/bat/rodents) bite/scratches on human body or through contact of infected animal saliva with eye, mouth or nose of healthy individual. Duvenhage lyssavirus is also capable of causing rabies like infection.

**Diagnosis:**

Tissues from brain stem and cerebellum are taken for rabies virus antigen detection in animals using direct fluorescent antibody test (DFA). In humans samples of serum, saliva, skin biopsies, spinal fluid etc. are taken. Virus isolation and RT-PCR is done using saliva while antibodies to rabies virus are tested in serum and spinal cord. Rabies antigen in cutaneous nerves which are present at hair follicle base are examined in skin biopsy specimens.

**Treatment:**

Once exposed to infection, treatment within ten days may help in prevention of disease. Vaccine is effective 100 % if given at earliest. It is recommended that people should receive human rabies immunoglobulin HRIG (atleast one dose) and rabies vaccine (four doses) over fourteen day's period. Doses needs to be injected around bites while the remainder should be given using deep injection intramuscularly at a distance from vaccination site. If vaccinated earlier only post exposure vaccinations needed on day 0 and 3. Earlier in nerve-tissue based vaccination, multiple injections were required to be put in abdomen using large needle but now World Health Organization intradermal-vaccination are given in deltoid area while in children aged less than a year, injection is given in lateral thigh.

**Prevention:**

1. Keep your pets (dog, ferret, cat) vaccinated for rabies.
2. Strict supervision and control needed of pets.
3. Stray animal's entry and exposure to pets and humans need to be checked.
4. Immunization of people before exposure to rabies is must in high-risk zones.
5. Washing scratches and bites using soap and water, alcohol, detergent or povidone-iodine help in reducing viral particles and in preventing transmission.

"World Rabies Day" is celebrated every year on 28 September to promote the information, educate people for prevention and elimination of the deadly disease "RABIES"