Rabies

Assoc Prof Mike Starr
Paediatrician, Infectious Diseases Physician,
Head of RCH Travel Clinic
Royal Children’s Hospital, Melbourne
University of Melbourne
Rabies

- Occurs in more than 150 countries and territories
- Caused by members of RNA virus genus *Lyssavirus*
- Lyssaviruses have been found in all continents, except Antarctica
- Essentially universally fatal
- > 55 000 people die of rabies every year - mostly in Asia and Africa
Rabies, countries or areas at risk

In countries of categories 1, 2 and 3, contacts with suspect rabid animals including bats should be followed by rabies post-exposure prophylaxis.

No risk: no risk at all.
Low risk: pre-exposure immunization recommended for people likely to have contact with bats.
Medium risk: pre-exposure immunization recommended for travellers and other people for whom contact with bats and other wildlife is likely.
High risk: pre-exposure immunization recommended for travellers and other people for whom contact with domestic animals particularly dogs and other rabies vectors is likely.

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.
Incubation period

- Incubation period varies from 2 weeks to > 1 year
  - 4 days to many years reported
  - mean 1-2 months

- Shorter incubation period favoured by
  - Proximal bites
  - Large inoculum
Clinical

• Onset usually rapid
• Fever, anxiety, insomnia and pain/irritation or parasthesia at bite site
• Painful spasms of trunk muscles leads to hydrophobia, then other muscles, terror
• May present as basal encephalitis - fever, altered personality, periodic extreme agitation
• Paralytic rabies - ascending paralysis
• Death occurs usually within a week - paralysis and resp arrest - often copious saliva -foaming at mouth
Rabies!!

Relax, we're having a pint!
Children

• 40% of all human rabies occur in kids < 14 yo

• More often bitten on head, neck or upper limbs
  ⇒ increased disease severity and mortality

• Kids may not report
Rabies transmission

- Animal to human transmission
- Most occur after bites
- Rare cases after scratches, licking of open wounds, contact of saliva with intact mucous membranes
- Inhalation of aerosolised guano
Rabies transmission

• Human to human
  – Sexual transmission recorded
  – Rare cases of iatrogenic transmission, corneal grafts, solid-tissue grafts
Rabies cases in Australia

• 1987:
  – 9 yo boy developed rabies 9 mths after returning from India where he’d been bitten by a monkey
  – Died after 23 day illness

• 1990:
  – 10 yo Vietnamese girl living in Australia for 5 yrs, following 2 yrs in a refugee camp in HK
  – Died after 21 day illness
Australian Bat Lyssavirus

• 1996

• A black flying fox with neurological illness tested positive for ‘rabies’

• 92% homologous to rabies virus

• Shown to be present in fruitbats and some microbats
ABLV cases

• 1996: 39 yo animal carer scratched by Yellow-Bellied Sheath-Tailed Bat. Onset of rabies-like illness 4-5 weeks later – died 20 days later. ABLV identified from brain tissue

• 1998: 37 yo woman bitten by flying fox while trying to remove it from a child it had landed on. Post exposure treatment advised 6 mths later but never given. 27 mths after bite, developed illness – died 19 days later

• 2013: 8 yo boy bitten by bat – sick 3 weeks later - died after 3 week illness
Risk of rabies in travellers

• Recent estimate of risk of exposure in travellers of 0.4% (0.01–2.3%) per month
• Risk of disease after bite of infected dog up to 50%
• Good wound care reduces risk by up to 40%
• Risk falls to <5% if PEP administered but global availability variable
• No known deaths for fully immunised people who had proper PEP (but recorded deaths in unimmunised people despite PEP)
Risk of rabies in travellers

• Risk factors
  • men > women
  • children > adults
  • bicycle > car ride
  • budget > luxury
  • Prolonged stay? (Recent study showed travel duration was only 15-20 days for those seeking care related to rabies)
Rabies vaccine

• 2 inactivated rabies cell culture-derived vaccines available in Australia (others available elsewhere)
  • Mérieux Rabies Vaccine - human diploid cell vaccine
  • Rabipur - purified chick embryo cell vaccine

• Interchangeable

• No lower age limit
Rabies vaccine

- 3 doses – Day 0, 7, 21-28
- Should be given in deltoid area - neutralising ab titres may be reduced if given elsewhere
- Should never be given in buttock - failure of pre-exposure prophylaxis has been reported
- Anterolateral aspect of thigh is recommended in <1yo
Intradermal rabies vaccination

- Acceptable alternative to IM (WHO)
- 0.1 mL on days 0, 7, 21-28
- No need for antibody testing
- Must not be administered to immunodeficient or those on mefloquine
- Used for post-exposure prophylaxis in many countries
Boosters?

- Increasing evidence that modern cell-derived vaccines induce long-lasting immune responses
- Thai study Suwansrinon. *Vaccine* 2006;24:3878-80
  - 118 subjects vaccinated 5-21 years before, all had abs
  - Given 0.1ml ID boosters on D0 and 3, 117 showed accelerated immune responses at day 5
Post-exposure management

• Wound cleansing and immunisation within a few hours after contact with a suspected rabid animal can prevent onset of rabies and death

• >15 million people per year worldwide receive a post-exposure vaccination to prevent the disease – estimated to prevent hundreds of thousands of rabies deaths annually
Post-exposure management

• Commence ASAP - postpone suturing, tet tox, antis

• If not immunised - RIG plus vaccine on Day 0, 3, 7, 14 (add 5th dose on D28 if immunosuppressed)

• If pre-immunised – vaccine only on Day 0, 3

• In developing world, WHO recommend ID vaccine for PEP, but not in Australia
Post-exposure management

• Infiltrate RIG around wound and into depth of wound (any remainder given IM at different site)

• In Australia, Imogam (France) supplied at 150 IU/ml

• 20 IU/kg: Can be diluted to permit thorough wound infiltration

• Overseas – different formulations (incl equine) - often shortages of RIG/vaccine supply problems
Resources

Download these materials free of charge

As the world’s foremost organization working for the prevention of rabies, we are proud to curate this library of materials and research into the disease and make it freely available.

This section is here for you to use.

Please follow the links below to the information most suited to you.

Search resources

more

Videos

more

Teaching children

more

Factsheets

more

Scientific resources

more

Posters

more
Rabies and Australian Bat Lyssavirus post exposure prophylaxis

This guideline has been adapted for statewide use with the support of the Victorian Paediatric Clinical Network

Background

- Rabies: a virus that primarily causes disease in animals (wild or domestic animals especially dog-species). It is not endemic in Australia.
- Rabies is still endemic in Asia (in particular Philippines, Thailand, Indonesia and India), Africa, North and South America and parts of Europe.

Note: Information regarding global distribution of rabies can be found [here](#).

- Australian bat lyssavirus is closely related to rabies and is found in bats.
- These viruses are shed in the saliva of animals.
- Transmission from animals to humans can occur as a result of bites or scratches from animals. Transmission between humans has not been proven.

- Clinical features:
  - The incubation period varies from 5 days to many years.
  - The virus infects the nervous system and infection eventually results in encephalitis and brain stem dysfunction. This is invariably fatal.

Assessment

History:

- History of exposure:
  - Nature of exposure (exposure to animal saliva through bite, scratch or mucous membrane exposure)
  - Animal
  - Country of exposure
  - First aid administered

- Immunisation history of the patient (rabies pre-exposure prophylaxis, tetanus)
- Information on any rabies treatment given overseas - document as much detail as possible about the treatment received including:
  - Date of rabies immunoglobulin and vaccine
  - Volume of rabies immunoglobulin
  - Type of vaccine used
  - Route of administration

Management

Management of rabies-prone wound
Pediatrics

- Chair: Mike Starr, Australia
- Chair Elect: Stefan Hagmann, United States of America
- Past Chair: Phillip R. Fischer, United States of America
- John Christenson, United States of America
- Sarah Kohl, United States of America
- Eyal Leshem, Israel
- Shiloh Mackell, United States of America
- Harunor Rashid, Australia

We are delighted to welcome you to the home page of the new ISTM Pediatrics Interest Group. Pediatrics is an integral part of travel medicine, and we hope you will indicate your willingness to join the group during the 2014 membership renewal process.

All travel medicine practitioners, regardless of their primary specialty and areas of interest are frequently confronted with pediatric-related issues. Many perhaps most travel health practitioners, see children in their office as part of families going overseas. Parents are increasingly taking their children on work assignments in remote areas of the world or on pleasure trips to high altitude destinations and safari, and teenagers travel by themselves or in groups to developing countries to do community work, for example.

A large body of pediatric-oriented travel health information has come into existence, much of it from non-traditional travel medicine sources and the data is often not available in the travel medicine literature. These sources include international health, overseas adoptions, and vaccination projects in developing countries, to mention just a few. Some pediatricians in the forefront of such programs are members of the ISTM.

Informal surveys of ISTM members show that many, probably most, want more pediatric-oriented travel medicine information to better serve the families who seek their counseling.

The Pediatric Interest Group Charter

- Promote visibility and support of pediatric travel medicine within the ISTM.
- Provide a forum within ISTM for members interested in pediatric travel medicine to communicate with each other.
- Communicate with ISTM sub-groups and other professional and interest groups on issues where pediatric aspects are of special importance.
- Advance the science of pediatric travel medicine and provide professional education about pediatric travelers
- Alert non-travel medicine health care providers who deal with infants and children to the importance of travel-related issues.
- Facilitate the development of timely, evidence-based, peer-reviewed information regarding the health and safety aspects of infants and children in the pre, during, and post travel phase which includes potential impacts on their physical and mental development.
- Establish effective means to disseminate pediatric-related travel health information to ISTM members, to other health
Rabies vaccine

• No lower age limit

• Consider ID vaccine for family

• Boosters only recommended for those at continual or frequent risk of exposure
OH MY, FOR ME?

AND ALL I GOT YOU WAS RABIES