Guideline

Management of children presenting with potential Lyssavirus (rabies) exposures - Emergency Management in Children

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Applicable to	All Children's Health Queensland Clinical staff				
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Purpose

This guideline provides recommendations regarding best practice for the evaluation and management of potential Lyssavirus exposures (including rabies and Australian bat lyssavirus).

Scope

This guideline applies to all staff involved in the care and management of children with potential Lyssavirus exposure

Guideline

Background

Rabies remains a significant public health problem globally, causing approximately 60,000 deaths per year. The majority of cases occur in Asia and Africa where transmission from dog bites predominates. Australians travelling abroad also frequently report potential exposures to rabies.

Classical rabies has not been found in Australia, but Australian Bat Lyssavirus (ABLV) is present within the Australian bat population and has caused at least three fatal human infections.[1-3]

Transmission to humans occurs through direct inoculation of saliva from an infected primary host, typically via a bite or scratch. Mammals often lick their paws/nails in order to groom or saliva contaminates paws (or nails) during feeding. In the United States of America (USA) bat rabies has been diagnosed in cases without a clear history of bat inflicted injury, reinforcing the need for a risk averse approach in the setting of potential exposures.[4]

The incubation period following significant exposure to lyssavirus can range from a few days to several years. Post-exposure prophylaxis (PEP) is almost universally effective if administered in full prior to onset of clinical symptoms. Clinical disease manifests with encephalitis and brain stem dysfunction and is almost invariably fatal.

Potential Lyssavirus exposures

In the context of a potentially significant exposure, a careful history should include:

- Nature of the exposure
- Country of the exposure
- First aid management
- Immunisation history (including precise details of any rabies vaccine or immunoglobulin given pre-exposure or post-exposure, as well as tetanus vaccination status)
- Allergies to vaccine components (the vaccine Rabipur® contains egg protein)
- Immune suppression – whether through illness or treatment
- Potential exposure of any other persons

A potential exposure to lyssavirus is defined by the Communicable Disease Network of Australia (CDNA) as:

- Any bite or scratch from, or mucous membrane or broken skin contact with the saliva or neural tissues of a bat in Australia or elsewhere in the world, or a wild or domestic terrestrial mammal in a rabies-enzootic country.
- Where there is laboratory confirmation of infection with any lyssavirus from any wild or domestic terrestrial mammal in Australia, any bite or scratch from, or mucous membrane or broken skin contact with the saliva or neural tissues of that animal should be regarded as a potential exposure.[5]

Further information about the worldwide epidemiology of rabies can be found at Rabies Status: Assessment by Country | Resources | CDC.

Rabies is considered enzootic in mammals throughout Africa, Asia, parts of Europe and North and South America. Bats, of any species, anywhere in the world are considered to be carriers of bat rabies. In addition, all Australian flying foxes and microbats should be considered to be carrying ABLV unless proven otherwise through testing of the animal's brain.

All exposures (even minor) to bats should be considered significant. Nibbling, minor scratches or abrasions without bleeding; or playing with dead bats should all be considered potentially significant.

Activities that are not considered to pose significant risk of lyssavirus transmission include: touching or feeding animals, licks to intact skin, exposure to blood, urine or faeces and exposure to animals which have been dead for several hours. In these situations, post-exposure prophylaxis (PEP) is not generally required[5], however each case should be assessed on it's own merits. Please contact Public Health for advice.

There are a range of other encounters where potential exposure to lyssavirus may be difficult to exclude, for example an unattended young child found with a bat in a room.

ALERT
Seek advice from consultant ID paediatrician and Public health for all potential Lyssavirus exposures

Public Health Notification

All potential lyssavirus exposures should be notified verbally to the relevant public health unit, who will also facilitate supply of rabies vaccine and immunoglobulin when indicated. Depending upon the patient's address, for cases managed at the Queensland Children's Hospital, potential exposures should be notified by telephone to:

Metro North Public Health Unit - phone 07 3624 1111; After hours 07 3646 1699

Metro South Public Health Unit - phone 07 3156 4000; After Hours 07 3176 2111

Emergency Department Management

Children presenting with a potential lyssavirus exposure should be triaged according to clinical evaluation and reviewed promptly by a senior medical officer.

- Priority should be given to wound first aid management and analgesia.
- The management of all potential lyssavirus exposures requires consultation with Public Health and Paediatric Infection Management consultant.
- The initial management of a potential lyssavirus exposure will be carried out in the Emergency Department, with follow-up management co-ordinated between the patient's General Practitioner (GP) and Public Health.
- To facilitate management of potential lyssavirus exposures an Emergency Department checklist is available.

Wound Management

Use Droplet precautions, including protective eyewear, gloves, gowns and masks during procedures where contact with patient respiratory secretions is likely, provide adequate protection against the theoretical possibility of human to human transmission in a healthcare setting.

Wash all wounds thoroughly for at least 5 minutes with soap and water. Apply a virucidal antiseptic solution such as povidone-iodine or alcohol. Avoid suturing wounds if possible, at least until after commencement of post-exposure prophylaxis. Consideration should also be given to the possibility of tetanus and other wound infections, and appropriate measures taken.

Post-exposure Prophylaxis (PEP)

Most children with a potential exposure to lyssavirus will fall into one of the following categories. They should be managed according to specific CDNA National Guidelines for Public Health Units and the recommendations found in the Australian Immunisation Handbook, in consultation with the Public Health Unit and the on-call paediatric infection management consultant. For bites to the head and neck, give post-exposure prophylaxis as soon as possible, even if the animal has been sent for testing [5, 6]

Children who are deemed to have had a potential exposure should commence one of the following PEP regimens as soon as possible after the exposure according to their history of previous rabies vaccination:

If no prior rabies vaccination - management	
1. Wound Management	Wash the wound(s) thoroughly as described above
2. Wound infiltration with human rabies immune globulin (HRIG)	**Wound infiltration: HRIG dose = 20 international units x weight (kg)** • **Use exact calculated dose** • It is imperative that as much of the calculated dose of HRIG as possible be injected into the wound(s). • If insufficient volume HRIG can be diluted with sodium chloride 0.9% if necessary. • Any remaining HRIG that cannot be safely infiltrated in and around the wound (the whole dose in cases with mucosal exposure only) can be given by IM injection into the ipsilateral deltoid muscle or anterolateral thigh • **The infiltration of HRIG is painful.** • Consideration needs to be given to appropriate analgesia and if necessary, procedural sedation. • Topical and local anaesthetic (LA) infiltration into the wound is contra-indicated, as it may dilute HRIG and lessen its effectiveness. • Consider proximal nerve blockade (e.g. ring block) if applicable.
	Comments: • During periods of national shortage of Imogam ® HRIG, as an alternative product *Kamrab*® may be used. This has Section 19 approval to use in Australia during periods of shortage and additional forms are no longer required. Both Imogam and Kamrab® are sourced by Public Health and supplied directly to the Emergency department/Pharmacy.
3. Rabies vaccine administration	**Check patient allergies** • **Rabies vaccine *Rabipur*® is egg-based**. • For children with a known or suspected egg allergy, the alternate vaccine *Merieux*® can be utilised. **Administer rabies vaccine 1mL by IM injection into contralateral deltoid or anterolateral thigh. It must be administered away from the site of HRIG or in a separate limb.** • The vaccine dose is the same for infants, children and adults, regardless of age or weight. **Four doses of rabies vaccine are given in total (on days 0, 3, 7 and 14).** • **Immunosuppressed children may require an additional fifth dose on Day 28 and should be discussed with the on-call paediatric infection management consultant in every case.** **Area of injection is subject to age of the child** – refer to Guidelines for Maximal Amounts of solutions to be Injected into Muscle Tissue in CHQ-PROC-01039 Medication – Administration. • In infants under 12 months of age, administration into the anterolateral aspect of the thigh is recommended. • For children one year of age or older, the rabies vaccine should be administered into the deltoid area, as administration in other sites may result in reduced neutralising antibody titres.

If previously received a full documented course of rabies vaccination (either Pre exposure prophylaxis (PrEP) or Post Exposure Prophylaxis (PEP))	
1. Wound Management	• Wash the wound thoroughly as described above. • Documentation of a completed recommended PreP or PEP rabies vaccine regimen is required. • This is irrespective of the time period since the last dose was administered. • This may either be a completed primary pre-exposure course or post-exposure course and includes those where subsequent boosting has occurred, or documented rabies antibody (VNAb) titres of more than or equal to 0.5 international units/mL.
2. Rabies vaccine administration	**Check patient allergies** • Rabies vaccine Rabipur® is egg-based. • For children with a known or suspected egg allergy, the alternate vaccine Merieux® can be utilised. **Administer rabies vaccine 1mL by IM injection into contralateral deltoid or anterolateral thigh. Two doses of rabies vaccine are given in total (on day 0 and 3).** • The vaccine dose is the same for infants, children and adults, regardless of age or weight. • **Area of injection is subject to age of the child** – refer to Guidelines for Maximal Amounts of solutions to be Injected into Muscle Tissue in CHQ-PROC-01039 Medication – Administration. • In infants under 12 months of age, administration into the anterolateral aspect of the thigh is recommended. • For children one year of age or older, the rabies vaccine should be administered into the deltoid area, as administration in other sites may result in reduced neutralising antibody titres. **HRIG must NOT be administered to anyone with a previous full documented course of rabies vaccination (as above), regardless of the time that has lapsed.**

If post exposure treatment has been commenced overseas	
1. Check patient's records	Patient will often have a vaccine record card or receipt. Place a copy in their chart and include in fax to Public Health Unit.
2. Contact Public health unit and Paediatric infection management team	Manage in consultation with the Public Health Unit and on-call paediatric infection management consultant.

Follow-up

The initial management of potential lyssavirus exposures may be carried out in the Emergency Department (ED), but in most cases subsequent vaccinations and follow-up should be arranged through the General Practitioner, with the assistance of the Public Health Unit.

Documentation of presentation to the ED:

- Clear documentation of assessment, treatment and follow up
- Complete a case report form which should be faxed to the Public Health unit which is attached to this guideline and also located on the department website
- Ensure discharge letter to GP and Public Health.

Other considerations

In children with wounds following contact with animals, other considerations include the risk of tetanus transmission and the risk of bacterial wound infections.

It should be determined if any other individuals (for example family members) have had potential lyssavirus exposure requiring assessment and/or treatment.

If the bat is available, it may be able to be tested promptly for the presence of ABLV. This can be arranged as a priority through Public Health. The bat should be contained so as to avoid further injury to others.

Suspected Lyssavirus Infection

If lyssavirus infection is suspected on clinical grounds, the on-call paediatric infection management consultant will provide advice regarding appropriate investigations and management. Intensive care support will be required in every case. If lyssavirus is confirmed, survival is unlikely.

Human to human transmission has not been proven to occur.

Standard precautions, including protective eyewear, gloves, gowns and masks during procedures where contact with patient secretions is likely, provide adequate protection against the theoretical possibility of human to human transmission in a healthcare setting.

Infectious Disease Physicians and Public Health will provide advice on any post-exposure rabies vaccination requirements for any potentially exposed staff or visitors in contact with a child with suspected Lyssavirus infection.

Supporting Documents

Procedures and Guidelines

- Appendix 2 Post exposure management algorithm for potential exposure to rabies virus from a terrestrial animal overseas
- Appendix 3 Post exposure management algorithm for potential exposure to lyssaviruses from bats in Australia or overseas
- Queensland Health Fact Sheet on Australian Bat Lyssavirus
- Queensland Health Fact Sheet on Rabies
- Queensland Health Lyssavirus (Potential Exposure) Case Report Form (look for ABLV or rabies case report form)
- Queensland Health Information on Rabies vaccine and human rabies immunoglobulin
- CHQ-GDL-01023: Tetanus Prophylaxis in Wound Management
- Figure. Post-exposure prophylaxis algorithm for potential exposure to lyssaviruses from bats in Australia or overseas | The Australian Immunisation Handbook (health.gov.au)

Forms and Templates

- Potential Lyssavirus Exposure Checklist for Children Presenting to Emergency

Consultation

Key stakeholders who reviewed this version:

- Public health Medical Officers (Metro-North and Metro-South Public Health units)
- Paediatric Emergency Medicine Consultants, QCH
- Director, Infection Management and Prevention service, Immunology and Rheumatology, QCH
- Paediatric Infection Specialists, QCH
- Nurse Practitioner, QSIS, QCH
- Clinical Pharmacist Lead - Antimicrobial Stewardship, QCH
- Pharmacist Consultant, Poisons Information Centre, QLD

Definition of terms

Term	Definition
ABLV	Australian Bat Lyssavirus
CDNA	Communicable Disease Network of Australia
CHQ	Children's Health Queensland
ED	Emergency department
GP	General Practitioner
HRIG	human rabies immune globulin
ID	Infectious diseases
IU	International units
LA	Local Anaesthetic
PEP	Post exposure prophylaxis
PrEP	Pre exposure prophylaxis
QAS	Queensland Ambulance Service
QCH	Queensland Children's Hospital
SAS	Special Access Scheme
VnAB	Rabies Antibodies

References and suggested reading

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2. Hanna JN, Carney IK, Smith GA, Tannenberg AE, Deverill JE, Botha JA, et al. Australian bat lyssavirus infection: a second human case, with a long incubation period. Med J Aust. 2000;172(12):597-9. Epub 2000/07/29.

3. Francis JR, Nourse C, Vaska VL, Calvert S, Northill JA, McCall B, et al. Australian Bat Lyssavirus in a child: the first reported case. Pediatrics. 2014 Apr;133(4):e1063-7. doi: 10.1542/peds.2013-1782. Epub 2014 Mar 3.

4. De Serres G, Dallaire F, Cote M, Skowronski DM. Bat rabies in the United States and Canada from 1950 through 2007: human cases with and without bat contact. Clin Infect Dis. 2008;46(9):1329-37. Epub 2008/04/19.

5. Communicable Disease Network Australia. Rabies virus and other lyssavirus (including Australian Bat Lyssavirus) exposures and infections. 2014 [11 April 2019]; Available from: http://www.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-abvl-rabies.htm

6. The Australian Immunisation Handbook – Vaccine preventable diseases - Rabies and other lyssaviruses. 2018; 10th edition: Available from: https://immunisationhandbook.health.gov.au/vaccine-preventable-diseases/rabies-and-other-lyssaviruses

Guideline revision and approval history

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2.0 20/06/2019	Director Paediatric Emergency Department Director IMPS, Immunology and Rheumatology Public Health Medical Officer Pharmacist Advanced – Antimicrobial Stewardship Nursing Practitioner (QSIS)	CHQ Medicines Advisory committee	Executive Director Clinical Services (QCH)
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