

Guideline

Management of water-immersed wound infections in children

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Applicable to	All Children's Health Queensland staff				
Authorisation	Executive Director Clinical Services (QCH)				

Purpose

This guideline is to provide a standardised approach to the management of water-related wound infections in children.

Scope

This guideline provides information for Children's Health Queensland (CHQ) staff caring for paediatric patients with suspected water related wound infections.

Related documents

Procedures, Guidelines, Protocols

- [CHQ-GDL-01023 Tetanus Prophylaxis in Wound Management](#)
- [CHQ-PROC-01035 Antimicrobial Restrictions](#)
- [CHQ Antimicrobial restrictions](#)
- [CHQ-GDL-01202 Children's Health Queensland Paediatric Antibiocard: Empirical Antibiotic Guidelines](#)

Guideline

Clinical considerations for patients presenting with a skin infection / cellulitis or sepsis following immersion of a wound in water, where cuts and other abrasions are the likely the portal of entry for infection.

Water immersed wound exposure and treatment can be distinguished by severity of injury (localised significant infection; deep tissue injury / established infection) and type of water exposure (seawater exposure; fresh, brackish or aquarium water exposure; soil or sewage contaminated water (e.g. flood or natural disaster) and marine animal bite).

Background

For cellulitis and deeper skin infections in patients exposed to water the usual bacterial causes should be considered (*Staphylococcus aureus* and *Streptococcus pyogenes*) and empiric antibiotic therapy, where indicated should be targeted against them.

However, a number of less-commonly encountered water-dwelling organisms may cause infection eg. *Aeromonas* species in fresh or brackish water or mud, *Mycobacterium marinum* from fish tanks, *Shewanella putrefaciens* and *Vibrio vulnificus* or *Vibrio alginolyticus* from salt or brackish water.

Infection with these organisms may range from a superficial skin infection, to more deep, serious or systemic manifestations (myositis, sepsis +/- metastatic complications). Patients with underlying systemic illness are particularly prone to develop the more serious manifestations.

Pre-emptive / preventative therapy following a severe wound sustained with salt or fresh water exposure - no established infection and empiric therapy of established infection

- A. Careful cleaning and surgical debridement of wounds that have been immersed in water is important to prevent infection. Take wound swabs (for microbiological culture) if wound infection suspected.
- B. Consult orthopaedics / other surgical specialties where required for surgical management of severe wounds contaminated by water following significant injury such as muscular, skeletal and soft-tissue trauma, crush injuries, penetrating injuries, stab wounds and marine animal bites.
- C. Assess the need for tetanus vaccination. Refer to [CHQ-GDL-01023 Tetanus Prophylaxis in Wound Management](#).
- D. Antibiotics are not routinely required for all wounds. They are used as pre-emptive treatment for severe wounds contaminated by water following significant injury such as muscular, skeletal and soft-tissue trauma, crush injuries, penetrating injuries, stab wounds and marine animal bites.
- E. Administer antibiotics for 5 to 7 days total, oral route is preferable if feasible or switch to oral formulation as soon as possible (e.g. after surgery at approximately 48 hours).
- F. Intravenous therapy is indicated if there are systemic features or if injury involves deeper tissues such as bones, joint or tendons. It can also be considered for children with risk factors for severe disease (e.g. immunocompromise or diabetes)

Table 1. Empirical antibiotic recommendations for water immersed wound infections			
Prophylaxis for LOCALISED significant injury (e.g. muscular, skeletal and soft-tissue trauma, crush injuries, penetrating injuries and stab wounds) OR Empiric ORAL treatment of established infection		Prophylaxis for DEEP tissue injury (e.g. bones, joint or tendons) OR Empiric INTRAVENOUS (IV) treatment of established infection	
Seawater exposure			
No MRSA risk factors	Less than 8 years of age: Trimethoprim / Sulfamethoxazole orally 8 mg/kg 12-hourly (maximum 320 mg/dose Trimethoprim component)	8 years of age and older: Doxycycline orally Loading dose (Day 1): 4 mg/kg orally as a single dose (maximum 200 mg/day) Then maintenance dose (Day 2 onwards): 2 mg/kg orally 12-hourly (maximum 100 mg/dose) PLUS Flucloxacillin orally 25 mg/kg 6-hourly (maximum 1 g/dose)	Ciprofloxacin IV 10 mg/kg 12-hourly (maximum 400 mg/dose) PLUS Flucloxacillin IV 50 mg/kg 6-hourly (maximum 2 g/dose)
MRSA risk factors	As per recommendations above for no MRSA risk factors		Ciprofloxacin IV 10 mg/kg 12-hourly (maximum 400mg/dose) PLUS Lincomycin IV 15 mg/kg 8-hourly (maximum 1.2 g/dose).
Fresh, brackish or aquarium exposure			
No MRSA risk factors	All age groups: Trimethoprim/Sulfamethoxazole orally 8mg/kg 12-hourly (maximum of 320 mg/dose Trimethoprim component)		Ciprofloxacin IV 10 mg/kg 12-hourly (maximum 400mg/dose) PLUS Flucloxacillin IV 50mg/kg 6-hourly (maximum 2 g/dose)
MRSA risk factors	All age groups: Trimethoprim/Sulfamethoxazole orally 8 mg/kg 12-hourly (maximum of 320 mg/dose Trimethoprim component)		Ciprofloxacin IV 10 mg/kg 12-hourly (maximum 400mg/dose) PLUS Lincomycin IV 15 mg/kg 8-hourly (maximum 1.2 g/dose).
Soil or Sewage contaminated water (e.g. flood or natural disaster)			
	ADD Metronidazole orally 10mg/kg 8-hourly (maximum 400 mg/dose) to above seawater or fresh water regimens		Cefepime IV 50mg/kg 12-hourly (maximum 2 g/dose) PLUS Metronidazole IV 10 mg/kg 8-hourly (maximum 500 mg/dose)
Shark or crocodile bites			
	Cefepime IV 50 mg/kg 8-hourly (Maximum 2 g/dose) PLUS Metronidazole IV 10 mg/kg 8-hourly (Maximum 500 mg/dose)		
Medication administration information can be found in the Royal Children's Hospital Paediatric Injectable Guidelines , or SHPA Australian Injectable Drugs Handbook available online via the Clinicians Knowledge Network (CKN).			

Organism identified

Treat according to sensitivities. If atypical micro-organism or fungus cultured, seek Infectious Diseases team advice.

Consultation

Key stakeholders who reviewed this version:

- Director, Infection Management and Prevention Service, Immunology and Rheumatology (CHQ)
- Paediatric Infection Specialist team, Infection Management and Prevention Service (CHQ)
- Pharmacist Advanced - Antimicrobial Stewardship (CHQ)

References and suggested reading

1. Chao CM, Lai CC, Tang HJ, Ko WC, Hsueh PR. Skin and soft-tissue infections caused by *Aeromonas* species. *Eur J Clin Microbiol Infect Dis* 2013;32(4):543-7.
2. Chen SC, Lee YT, Tsai SJ, Chan KS, Chao WN, Wang PH, et al. Antibiotic therapy for necrotizing fasciitis caused by *Vibrio vulnificus*: retrospective analysis of an 8 year period. *J Antimicrob Chemother* 2012; 67 (2):488-93.
3. Elko L, Rosenbach K, Sinnott J. Cutaneous manifestations of waterborne infections. *Curr Infect Dis Rep* 2003;5(5):398-406.
4. Janda JM, Abbott SL. The genus *Aeromonas*: taxonomy, pathogenicity, and infection. *Clin Microbiol Rev* 2010;23(1):35-73.
5. Antibiotic Therapeutic Guidelines (16th Edition) Therapeutic Guidelines Committee, North Melbourne, Victoria (2019).

Guideline revision and approval history

Version No.	Modified by	Amendments authorised by	Approved by
1.0 (28/08/2015)	Dr Clare Nourse (Paediatric Infectious diseases consultant)	Antimicrobial Stewardship Team	EDMS, Chair Medicines Advisory Committee
2.0 (01/04/2019)	Infection Specialists (Infection Management and Prevention Service, CHQ) Antimicrobial Stewardship Pharmacist (CHQ)	Medicines Advisory Committee (CHQ)	Executive Director Clinical Services (QCH)
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Accreditation references	NSQHS Standards (1-8): <ul style="list-style-type: none">• Standard 3. Preventing and Controlling Healthcare- Associated Infections• Standard 4. Medication Safety