CLINICAL PRACTICE STANDARD — Aeromedical Operations
AO.CLI.24 – Helicopter Water Rescue

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Contents	**Work Instruction**	AO.CLI.24 – Helicopter Water Rescue
	Appendices	N/A
Associated Policy Directive/s and/or Operating Procedures/s	N/A	
Directorate	Aeromedical Operations	
Author Branch		
Branch Contact	Executive Assistant, Aeromedical Operations Phone: 02 8396 5012	
Summary	Directs the helicopter cabin setup and procedures for water winch rescue and the medical care of patients following drowning.	
Applies to	All helicopter paramedics and doctors	
Review Date	February 2026	
Previous Reference	Nil	
Status	Active	
Approved by	Executive Director, Aeromedical Operations	

Related Legislation	Nil
Related Documents	HELI.OPS.23 – Water Rescue Winching PPE HELI.CLI.01 – Defibrillation

Compliance with this work instruction is **mandatory.**

CLINICAL PRACTICE STANDARD — Aeromedical Operations
HELI.CLI.24 – Helicopter Water Rescue

1. Introduction

Drowning is defined as the process of experiencing respiratory impairment from submersion / immersion in liquid[1].

2. Purpose

Directs the helicopter cabin setup and procedures for clinicians during water winch rescue and the medical care of patients following drowning.

3. Procedure

3.1 Water Rescue and Recovery

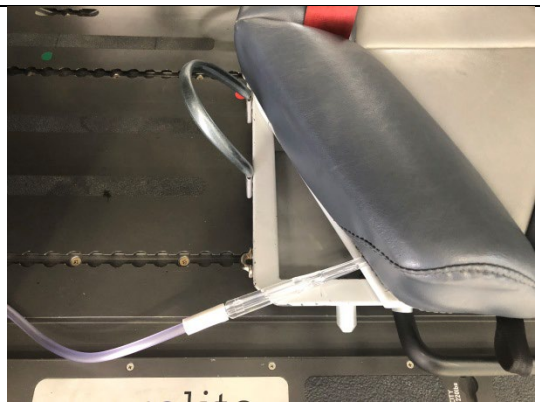
3.1.1 PPE for Water Missions

See HELI.OPS.23 – Water Rescue Winching PPE.

3.1.2 Cabin Setup for Water Missions

Pre- departure

1. DEA kit removed from IAM and secured to floor restraint next to Front Left cabin seat. DEA remains closed.
2. Any equipment taken out of DEA (BVM/SGA/OPA) needs to be secured during rescue and open door operations (use BVM lanyard to secure to floor, OPA/SGA in zipped pocket of doctor).
3. In-cabin consumables loaf with towels, gloves etc secure to floor restraint near doctor seat
4. Whilst paramedic is getting suited into wet suit doctor should help ACM set up cabin:
   - Take and secure paramedic phone and drug pouch
   - Unclip wander leads and leave hanging (do not loop)
   - Water strop and Y-piece out and secured onto bed for Para (use stretcher seat belt)
   - Doctor's Harness checked and y-piece attached
   - Blood and US secured as per normal ops.
   - Place monitor in IAM facing cabin
5. Doctor sitting in normal seat, facing aft. Seat belt secured.

En-route 1. Oxygen system turned on 2. Suction tested.	
On scene. Search w/- open left door 1. Doctor remain in belt (or on wander lead if approved by pilot.)	
On scene. Patient located. Left door shut. 1. Doctor transfer to wander lead with permission from pilot 2. Position suction under head of mattress 3. Doctor to assist recovery of patient onto stretcher as required 4. Follow Clinical CPS as below.	

BLS will be performed by the medical team once the patient is recovered in to the cabin.

Once the right door is closed the DEA may be opened to aid in resuscitation. If BVM/SGA/OP taken out and secured via lanyard these can be used in flight to aid resuscitation

3.1.3 Water Winching Procedures

To be conducted in line with Toll Helicopters AW139 Medical Equipment Management Manual section 9.9 Water Winch Procedures

3.2 Medical Care of Patients following drowning

3.2.1 Patients in cardiac arrest

Hypoxaemia is the likely cause of cardiac arrest. Ventilation of the patient with 100% oxygen should be commenced as soon as possible. Use five rescue breaths for paediatrics and adults. [2]

Commence closed chest compressions/ventilation and make plans to land as soon as possible. Compression only CPR is not recommended. [2]

Airway

Initial airway management will concentrate on oxygenation and ventilating via I-Gel until endotracheal intubation can be done. Do not interrupt CPR to suction secretions or gastric contents unless impeding ventilation, as they may be copious and re-accumulate immediately. [2]

Breathing

High pressures (>40cmH2O) may be required for ventilation. [7] It may be impossible to ventilate with a supraglotic airway. This may be used in the immediate aftermath of recovery from the water but should be exchanged for a cuffed tracheal tube as soon as possible. End-tidal CO2 should be used to confirm I-gel and endotracheal tube placement and monitor the effectiveness of resuscitation and ROSC.

Circulation

Commence closed chest compressions and make plans to land as soon as possible. As per ARC cardiac compressions should be done at 100-120 beats/min. Rescuer fatigue following water rescue can impair the quality of CPR. [6] Consideration should be made to switching operator and/or changing to mechanical CPR as soon as possible.

Defibrillation

Only 6% of drownings have a shockable rhythm with 79% asystole and 13% PEA. [5] After water rescue the aircraft will have an excess of water in the cabin. Defibrillation should be deferred until the aircraft is on the ground and all crew members are clear of current leakage. Wet clothes should be removed and a towel used to dry the chest to aid adherence of pads (HELI.CLI.01 - Defibrillation).

Decision to cease CPR

Cessation of resuscitation will be influenced by patient factors (higher threshold for transferring paediatric patients with ongoing CPR), duration of submersion, water temperature (typically warm in NSW), patient's body temperature, ETCO2 and cardiac

activity on ultrasound. If CPR ceased on-scene remember to complete the Coroner's Form A and leave with attending police.

Debrief

These missions often involve multiple rescuers including paramedics, lifesavers, police and other beach users. Take time to debrief with all involved as for many rescues (especially lifeguards) this may be their first experience of CPR and death.

3.2.2 Patients not in cardiac arrest

Assessment

Drowning may be the principal or secondary diagnosis in patients. Water sport incidents, falls, being washed from rocks, surf dumps, and medical events may be associated with drowning both in the ocean and inland waterways. In our service a higher incidence of drownings are also associated with traumatic injuries though simple immersion is very unlikely to be associated with a cervical spine injury (reported incidence of 0.5%). [11,12]

Initial assessment must take the mechanism of injury into account.

Even "apparently well" victims should be encouraged to attend ED where they may be held for a period of observation. [14]

Monitoring

Finger pulse oximeters may fail due to peripheral vasoconstriction, equally, accurate low readings may be wrongly disregarded as 'artefact'. Hypoxaemia should be expected, and signs such as high respiratory rate or respiratory crackles on chest exam are significant. Oxygen should be applied as soon as practicable. Tympanic thermometers are unreliable after ear immersion.

Prehospital Emergency Anaesthesia

In the prehospital setting, anaesthesia and artificial ventilation may be required for respiratory or neurological compromise (both often co-exist).

Respiratory compromise may be caused by aspiration causing acute lung injury, aspiration pneumonitis +/- infection, pneumonia, particulate aspiration (sand/mud/algae), diaphragm splinting from distended stomach, and pulmonary oedema from cardiogenic shock (left ventricular dysfunction from catecholamine storm), as well as subsequent aspiration of vomit/regurgitated gastric contents. Respiratory compromise is usually evident immediately but late presentations (so-called secondary drownings) are described. [14]

Pre-oxygenation should be aggressive as oxygenation will likely be PEEP dependent. BVM with adequate PEEP and good facemask seal is essential. Actively ventilating the patient during apnoeic phase of induction may also be necessary. Care should be taken to avoid further inflating the stomach by use of gentle ventilation.

Laryngoscopy can be challenging, complicated by copious fluid flowing freely from the lungs submerging glottic structures. Effective suction is essential, consider two suction sources if available.

Post intubation, gastric tube placement is warranted to decompress the stomach.

Ventilation

Ventilatory parameters should follow ARDS principles with high PEEP. [13] Interruptions to ventilation should be kept to a minimum, resisting the temptation to tracheal suction frequently. Once recruitment is established ensure tube is clamped for all ventilator or oxygen change-overs, or for filter changes. Bronchoscopic washout of particulate matter may be indicated on ICU.

The possibility of ECMO for ventilatory failure may influence the receiving hospital destination for inter-hospital transfers.

In the inter-hospital setting, respiratory compromise in an alert patient may respond to non-invasive ventilation [13] to both oxygenate and reduce work of breathing.

In inter-hospital transfers of near-drowning patients, electrolytes, core temperature and associated injuries or medical condition should be attended to, in addition to the core concerns of ventilation, cardiovascular stability and neurological status.

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APPENDICES

1. N/A

REVISION HISTORY

Version (Document #)	Amendment notes
Version 2.1	Minor typos only
Version 2.0 WI2020-113 Issued 15 October 2020	Transition to new format and naming convention. Altered name of CPS Updated procedures / literature review. Approved by A/Executive Director, Aeromedical Operations
Version 1 10 April 2018	Approved by Executive Director, Health Emergency & Aeromedical Services