

## From drowning to survival: A resuscitation case study

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A young man is found on the water's edge very close to death. He was rescued by an off-duty police officer and placed in the recovery position on the beach. When surf lifeguards arrive, he is unresponsive and not breathing; they commence resuscitation...

The assessment, treatment and aeromedical evacuation of this actual non-fatal drowning victim at New Zealand's Piha beach will be presented. This case is contrasted to the ILCOR 2010 Consensus on Science Treatment Recommendations for drowning. In addition, the role of supraglottic airways, right-sided recovery position and the use of space blankets will be discussed.

In 2003, a revised Utstein template with recommended guidelines for the uniform reporting of data from drowning was published. Included were new drowning definitions, the purpose of which was to standardise terminology and improve comparability of scientific investigations. Although endorsed by the World Health Organization, this terminology has not been fully adopted by all lifeguards, academics and health professionals working in the aquatic safety field.

From 1980–2010, drowning whilst attempting rescue accounted for 1.7% (n = 76) of all water-related deaths in New Zealand. This is an important consideration when educating the public in what to do if they observe a person in distress. In these situations, the priority is to provide some form of buoyancy to the victim; in most cases this will stop the drowning process. Research has identified however that onlookers, and even some lifeguards may not be able to recognise the early and very late signs of drowning.

The 'Wet Chain of Survival' promotes initial ventilations as more important than early defibrillation in improving patient outcomes. In a retrospective study of in-water resuscitation, mortality was lower (15.8% vs. 85.2%,  $P < 0.001$ ) for patients resuscitated in-water compared to those who were not. However, in a separate pooled analysis of drowning victims (n = 2,678), of the 10–12% that required full CPR, mortality on-scene was 88–93%. Mortality of 100% is associated with patients: submerged  $\geq 25$  minutes, resuscitated for  $>25$  minutes, pulseless on arrival at the emergency department, and unconscious at the scene and on arrival at hospital.

Although now widely recommended for use in resuscitation, no evidence exists to support the use of supraglottic airway devices (such as laryngeal masks) in drowning. The high inspiratory pressures often required to ventilate patients can result in ineffective ventilation from air leaking around the cuff or entering the stomach. Early endotracheal intubation therefore remains a key component of advanced cardiac life support guidelines for drowning, although its role in improving patient outcomes from cardiac arrest (compared to bag-mask ventilation) has not been determined.

Space blankets are commonly used in aquatic first aid to prevent or treat hypothermia despite inconsistent results of studies into their effectiveness. In 2003, a randomised controlled trial showed space blankets were less effective than two thin cotton blankets at maintaining normal body temperature perioperatively. In contrast, the Mediwrap blanket has been shown to be as effective as a forced air warmer at maintaining normal body temperature before and during surgery, and more effective after surgery. It is the author's opinion having reviewed the literature and used both devices in the field, that lifesaving agencies consider removing the space blanket from service and replacing it with a clinically proven alternative.

In drowning, the majority of lives are saved through rapid removal of the patient from the water, and good basic life support. A much smaller number of lives are saved through advanced life support. Without question, the prevention of drowning will always be a better cure than resuscitation from it.

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