Letter to the Editor, Resuscitation, June 2014

To be permissive or not to be, is it the question?

Michael Tipton

Sir,
Resuscitation following submersion (head under) remains a matter of some debate and a stumbling block to achieving a common policy between rescue services. We have suggested that survival/resuscitation is extremely unlikely if submerged longer than 30 min in water warmer than 6 °C and, survival/resuscitation is extremely unlikely if submerged longer than 90 min in water 6 °C or below. [1] and [2]
We have been criticised for being insufficiently permissive by suggesting limiting a search to 30 min in water warmer than 6 °C.[3] Given this, I was encouraged to read the paper by Quan et al.4[4] and their support for our position for water warmer than 6 °C. However, Quan et al. also state that "this statement is also true for water temperatures of 6 °C or below". This is in contrast to our conclusion, indeed Quan et al. state that "Tipton's statement that "survival/resuscitation is extremely unlikely if submerged longer than 90 minutes in 6 °C or below" isoverly permissive".

The differences are due to the questions asked and the cases examined. Quan et al. asked, "is there a relationship with water temperature, submersion duration and outcome?" Given that drowning can result from many factors the lack of a strong relationship with a single factor (water temperature) is understandable. Knowing that people can survive prolonged submersion we asked "is there a relationship with age, temperature etc. in those surviving prolonged submersion?" That we only found a small number of cases of survival with good outcome following submersion of longer than 30 min is we believe, more a statement of fact than a "methodological limitation"; prolonged underwater survival is very rare. This conclusion is supported by Quan et al. who found no submerged survival times longer than 27 min in 1094 submerged drowning cases over 21 years.

For the reasons stated, there is no linear relationship between submerged survival time and water temperature. However, a "threshold water temperature" of about 6 °C appears to exist below which resides the remote possibility of prolonged submerged survival. We suspect that such cold water is required to significantly cool and therefore protect the brain selectively during drowning before cardio-respiratory arrest. Quan et al. could not interrogate such data as they had no suitable cases of survival in their database (i.e. submersion >30 min with good outcome).

This topic has important practical implications; if you base a rescue policy on the paper of Quan et al. you would consider switching from "search and rescue" to "body recovery" at 30 min in all water temperatures. If you consider the actual accounts of those who have survived longer than 30 min you would keep searching; we recommend up to 90 min if water temperature is 6 °C or below. As this recommendation is based on actual incidents we would not regard it as "overly permissive" but, as we stated originally, it is for others to decide whether the risk and cost of extending searches is justified by the likelihood of a successful outcome.

---

[1] M. Tipton, F. Golden Decision-making guide for the search, rescue and resuscitation of submerged (head under) victims, Resuscitation, 82 (2011), pp. 819–824
[2] M. Tipton, F. Golden Drowning: guidelines extant, evidence-based risk for rescuers? Resuscitation, 84 (2013), pp. e31–e32 http://dx.doi.org/10.1016/j.resuscitation.2012.08.339 [Epub 13.10.12]
[3] C. Deakin Drowning: more hope for patients, less hope for guidelines (editorial), Resuscitation, 84 (2012), pp. e31–e32
[4] L. Quan, C. Mack, M. Schiff Association of water temperature and submersion duration and drowning outcome, Resuscitation (2014) http://dx.doi.org/10.1016/j.resuscitation.2014.02.024 PII: S0300-9572(14)00114-2