Cold shock, hypothermia and drowning

Water temperature off the UK coast can be as low as 5°c in February and rarely rises above 18°c in a good summer. It is not surprising therefore that there are a substantial number of fatalities every year caused by a sudden fall into cold water.

Most of these deaths are probably caused by falling into docks near night clubs, driving into dykes in the Fens, or when walking back to the boat from the pub. But RYA courses are run throughout the year, so cold shock and drowning must be considered a risk for anyone falling into the water.

Hypothermia may overwhelm a casualty where rescue is delayed and can dangerously reduce the capabilities of crew exposed in a dinghy or yacht cockpit.

What happens during immersion?

The initial response to immersion is cold shock. It only lasts a few minutes but is the cause of many deaths. On contact with cold water the blood vessels in the skin constrict and increase the blood flow back to the heart. This, together with an increased heart rate and hydrostatic squeeze from the water, raises the blood pressure dramatically. This dangerous combination can lead to death from cardiac arrest or stroke in susceptible individuals.

In a fitter casualty the inability to breath-hold and a phase of rapid, uncontrollable breathing may lead to the inhalation of water.

Avoidance is the best defence. Simple steps such as the use of a harness on a lifejacket or wearing a drysuit in a dinghy could be enough to save a life.

In the second phase of immersion the heart and breathing rate decrease and a gradual decline of muscular strength begins. The ability to swim fades and hands become useless as the body temperature falls.

A sprayguard used with a lifejacket can reduce water inhalation by 50%, but deploying it or any other lifesaving equipment must be done before dexterity is lost. Without a splashguard the casualty in cold water is likely to drown, not living long enough to develop hypothermia.

Getting the casualty out of the water is the priority.

Hypothermia is unlikely to develop in less than 30 minutes in a fit, clothed adult if the head is out of the water. The slide into unconsciousness is gradual but once this happens, without a splashguard, drowning is likely as the waves wash over the face of the deeply hypothermic casualty. Even out of the water, in a liferaft, the body temperature may continue to fall until cardiac arrest occurs.

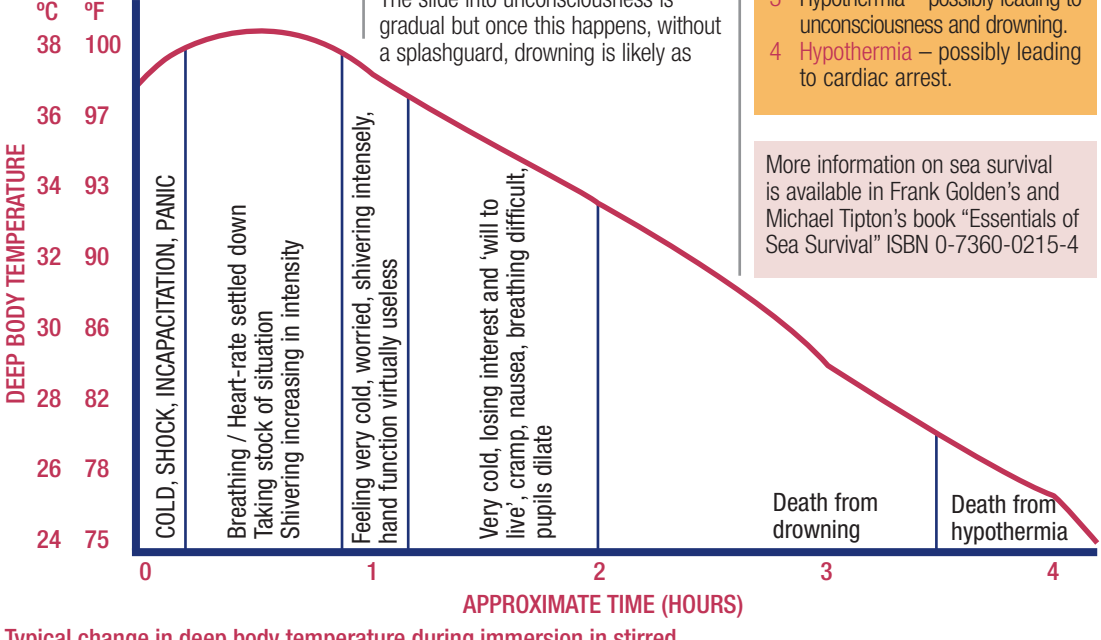
After rescue the reduction of further heat loss is vital. "Space blankets" reflect radiant body heat and are useless in this situation. A full bag type TPA (thermal protection aid) will be most effective, especially if it is possible to get the casualty inside. Insulate from any cold surface beneath the body to prevent conductive heat loss. The casualty needs to be treated gently, kept lying down to minimise the load on the heart. A rapid rise in temperature can cause re-warming collapse.

In summary

The stages of immersion:

1. Cold shock – possibly leading to drowning or cardiovascular problems.
2. Muscle and peripheral nerve cooling – possibly leading to weakness and drowning.
3. Hypothermia – possibly leading to unconsciousness and drowning.
4. Hypothermia – possibly leading to cardiac arrest.

More information on sea survival is available in Frank Golden's and Michael Tipton's book "Essentials of Sea Survival" ISBN 0-7360-0215-4



Typical change in deep body temperature during immersion in stirred water at 10°C (50°F) for an average clothed individual (F. Golden).

Data from Frank Golden & Michael Tipton