The Girl with Everything: A diving incident

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I would like to report a combination of cold water mishap/scuba accident that
may be of interest to readers of the SPUMS Journal.

The patient is a twenty-five year old female who was diving in a sunken wreck,
in 60-120 feet of water, in the Straits of Mackinaw north of Michigan's lower
peninsular. She was at a depth of 60 feet, on the wreck when she lost her two
companions, struggled with a loose weight belt, and then found herself lost
inside the wreck. The water temperature was 40°F and by this time visibility
was near zero because of te stirred-up silt. She breathed the last of her air
and with very little panic began to breath water, resigning herself to die. She
then lost consciousness. Her diving companions surfaced and did not find her
on board the surface vessel. Only one had air remaining and began a search.
He found the victim face down in a stateroom with mouthpiece out and brought
her to the surface in an emergency ascent (much faster than 60 feet/minute).
Once at the surface CPR was begun expertly as both diving companions were CPR
instructors. The patient regained consciousness enroute but remained cyanotic,
cool to the touch, and "not herself". Pulse and respiration had returned within
two minutes of surfacing.

US Coast Guard assistance arrived and transported the victim to the recompression
chamber two hours away using pressurised fixed wing aircraft. On arrival the
patient was semiconscious, blue and breathing with difficulty. She complained
of increasingly severe abdominal pain and shortness of breath. Examination
showed no subcutaneous emphysema although there were previous reports of this.
She had diffuse rales, rhonchi and wheezes universally. A Hammans sign was
present over the heart. The abdomen was tender to palpate and there were no
audible bowel sounds. Her admission chest x-ray showed acute pulmonary oedema.
EKG showed non specific T wave changes. She was recompressed using US Navy Table
6, with complete resolution of abdominal pain and improved respiratory function.
During pressurisation she turned pink and mentation became normal, though she
was much troubled by coughing massive amounts of pink frothy pulmonary oedema
fluid.   On examination there was reduction of the rales, rhonchi and
bronchospasm.

She recovered entirely within one week and was discharged from the hospital.
it was learned that she had asthma before the accident and the initial physical
examination had revealed diffuse wheezing. She was advised not to scuba-dive
again, advice she reluctantly agreed to follow.

One question asked of our team was why recompress to only 60 feet (US Navy Table
6). I would have preferred 165 feet (US Navy Table 6A), but the patient had
intolerable ear discomfort and her symptoms were already improving at 60 feet.

This patient had a ten minute airless period in 40°F water, was found, and was
brought to the surface in a head tilted upward rapid ascent. She owes her life
to the skilled action of her diving companions and the other personnel, full
recovery being obtained. Our impression is that she suffered from:

    Freshwater near drowning
    Cold water submersion
    Decompression sickness
    pulmonary barotrauma , suspected air embolism
    Status post cardiopulmonary arrest

References

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Addendum

The following extract from *Sea Secrets*, Nov-Dec 1978, the International Oceanographic Foundation publication, is reprinted by kind permission. It is highly relevant to the above incident.

QUESTION: Is it true that a person who appears to have drowned in water may not actually be dead?

ANSWER: The results of a Sea Grant project carried out by Dr Martin J Nemiroff at the University of Michigan showed that people who have "drowned" in cold water 70°F or below) are not necessarily dead, even if they have been underwater for as long as 30 minutes. A number of such victims have lived, and Nemiroff believes that what saved them was the activation, after their faces were submerged, of an automatic response in mammals called the mammalian diving reflex, combined with the coldness of the water. The reflex allows sea-going mammals to exist and function underwater without breathing for up to 30 minutes. It reduces the blood supply to the skin, muscles, and other tissues which are resistant to oxygen-loss damage, and reserves the remaining blood oxygen for the brain. Cold water also reduces the oxygen need of the tissues, further lengthening survival time without external oxygen. Rescue workers and doctors are advised not to give up easily on clod-water drowning victims. According to Nemiroff, he or she may be cold, blue, not breathing, have no detectable pulse or heartbeat, and fixed and dilated pupils, but the victim should not automatically be presumed dead. He recommends the following procedures: resuscitation should be started immediately. External heart massage and ventilation with as near 100% oxygen as is available should b given. The body should be warmed gradually from the inside by raising the temperature of the oxygen to 100°F with a humidifier. Resuscitation should be maintained at least until the body temperature reaches normal. Defibrillations (shocking the heart into action) may not be successful until normal body temperature is reached. (7.70 3431)

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No Comment section

The Official Sponsor of Victoria's Sport Personality of the Year contest is a firm of funeral directors.

(MD 9 November 1978)

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Memorandum No 4 1979

It is the duty of the installation manager, the owner of the installation, and all persons on or near an installation to do nothing to endanger the safety of themselves or others.