Technological advances in scuba diving do not always increase safety

Annually in the United Kingdom there are 10–20 deaths of sport divers. In half of the cases, inadequate information or failure to recover the body prevents determination of the cause of the accident. When causes are known, cases are equally divided between deaths due to coincidental medical conditions (usually cardiac) and cases where divers drowned because they failed to follow recommended safety procedures—for example, solo diving and wreck penetration without running a safety line to enable the return route procedures—for example, solo diving and wreck penetration without running a safety line to enable the return route. Decompression illness resulted in death, but can cause serious neurological illness, including paraplegia. There are about 100 cases requiring treatment annually. 

Information collected by the British Sub-Aqua Club suggests that there are a larger number of mild cases where treatment is not sought. Some cases of decompression illness are also the result of predisposing medical conditions and others result from poor technique. There is evidence that some cases are caused by malfunction of equipment designed to prevent decompression illness.

The technological sophistication of sport diving has increased with the popularity of the sport. Most sport divers now use one of a large variety of decompression computers meant to reduce the chance of divers suffering decompression illness. Decompression illness has four principle manifestations: cardiorespiratory (chest pain, dyspnoea, cardiogenic shock) which is rare but may be fatal; neurological, which is common in sport divers and may leave permanent sequelae including paraplegia; joint pains, which is more common in caisson workers; skin rashes. It has long been known that the risk of decompression illness increases with the depth and duration of the dive. Observations of rates of decompression illness (in military and commercial divers) after particular depth-time profiles allowed development of mathematical algorithms, which give an “acceptable” risk of decompression illness. Acceptable risk varies with the situation—for example, military use in wartime versus recreational use—and from poor technique. There is evidence that some cases are caused by malfunction of equipment designed to prevent decompression illness.

A popular decompression computer model has recently been withdrawn because of unreliable operation. I have seen three cases where the stories suggested that other makes of computers malfunctioned. In each case the diver had decompression illness after a dive within “safe profiles” according to the computer. None of the divers had any of the recognised physical causes of decompression illness. Each did a dive that required long decompression stops according to decompression tables (checked later), but their computers permitted them to go directly to the surface or required only a brief stop. One diver tested his computer in a hyperbaric chamber against seven identical models on a dive profile similar to that on which he had suffered decompression illness. His computer indicated that it was safe to surface when all the others of the same make required eight or nine minutes of stops. The other two divers also had their computers chamber tested and their computers required considerably fewer stops than those that they were tested against. Two of the divers sent their computers back to the manufacturers. The makers replied that no fault had been found with the computers, but that they had accidentally been broken during testing, so the diver was sent a new replacement. We live in a technological age, but scepticism about the infallibility of some types of computer may be healthy.

PETER WILMSHURST
Consultant Cardiologist, Royal Shrewsbury Hospital, Shrewsbury SY3 8XG, United Kingdom