SUCCESS OF HYPERBARIES IN MODERN MEDICINE

By PAUL VAUGHAN

EXPERIMENTS with a form of medical treatment that promises to make a substantial contribution to the fight against disease are going on in a number of countries.

The treatment, which has been described as one of the major developments in medicine of the last five years, is known as hyperbaric medicine, or, more simply, hyperbaries. It involves bringing oxygen to the site of the disease and saturating the diseased tissues with the gas at a pressure two to three times normal rate.

To give just a few examples of its successes:

A patient crippled for 40 years with osteomyelitis (a severe bone disease) whose sore limb healed and who could walk again unaided;

A man of 53 with a chronic ear discharge since a mastoid operation at the age of eight, whose symptoms suddenly stopped for the first time in 45 years;

Thirteen patients seriously ill with emphysema (extensive lung damage) who found they could breathe freely again.

Experimental work on the uses of hyperbaric medicine is going on intensively in many centres in Europe and North America. Britain has been, and is, one of the leaders in the field, not only in the basic research but in the development of the sophisticated equipment which hyperbaries demands.

This includes pressure chambers, for if gas is used at high pressure the containers must withstand the force with which the gas will attempt to escape. And the chambers used in hyperbaric medicine must be big enough to take not only one patient, but the patient’s attendants as well.

As long as 300 years ago, an English doctor called Henshaw experimented with a pressure chamber in which he hoped to cure acute disease with high-pressure air. What Henshaw began was taken up intermittently later on.

Scientists in the 19th century devised pressure chambers with elaborately elegant Victorian decor like a Jules Verne submarine. But in the minds of the English scientist J.S. Haldane put forward the fundamental ideas which led to the present developments in hyperbaries.

Haldane showed that if mice were exposed to carbon monoxide gas, they died because the gas combined with the haemoglobin of the blood—the substance which produces the blood’s red colour and which carries oxygen to the body’s tissues. The mice died because they were starved of oxygen. But if they were put into oxygen at three times the normal pressure (i.e. at three atmospheres) the mice survived.

It was still more than 50 years before this work was followed up. But one of the earliest modern developments came when it was shown that this use of extra oxygen could have an effect on cancer. Scientists found that if the cells in a tumour were short of oxygen, they resisted the effect of X-ray therapy. So it seemed that if one could step up the supply of oxygen to these cells their defence against X-rays would be weakened.

At St. Thomas’s Hospital, London, one of Britain’s best-known teaching hospitals, doctors began to treat cancer patients with radiotherapy, while they breathed oxygen at three to four atmospheres.

Treatment on these lines has now become a standard practice at St. Thomas’s and other teaching hospitals, and it has been found that the extra oxygen does indeed improve—sometimes dramatically—the effect of X-rays in certain types of tumour.

In Amsterdam, and a little later in Glasgow, doctors tried out the oxygen treatment when doing surgical operations on the heart. And in other centres more and more attention was being paid to hyperbaries and its implications.

A variety of medical conditions are marked by a local shortage of oxygen—due, for example, to injury or to diseased blood vessels. Wherever lack of oxygen was shown to be a complicating factor, it seemed likely that hyperbaries might help.

Although this is still a relatively new branch of medicine, it has already been applied successfully to diseases of the bones, the joints, the lungs and the heart. It has been strikingly beneficial in treating gas gangrene—a grave condition which can follow a serious accidental injury and is caused by a germ which does not like oxygen.

Pressure chambers used in hyperbaries are either very large or small enough for one person. One, recently installed at Glasgow’s Western Infirmary, was built by Clyde-side engineers and its inside cubic measures 15 feet by 18 feet. It can take two patients at once, plus the surgical team, and will be used for heart surgery.

One Glasgow doctor has experimented with a miniature pressure chamber: it is 30 inches long but it is for mice, not men. For human patients there are hyperbaric beds in which the patient can be nursed for long periods in a highly oxygenated environment. In these, the patient lies under a Perspex dome and is completely encased in the bed. He keeps in touch with the outside world by an “intercom” and can watch television or listen to the radio, while the heat and humidity of the bed can be controlled automatically.

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