medical sciences

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THYROID ACTIVITY

Resolving the discrepancy

One of the commonest ways to determine thyroid activity is to measure the uptake of radioactive iodine by the blood. However, in pregnant women, finds Dr. Ira Godwin of Northern Virginia Pathology Laboratories, Fairfax, Va., misdiagnosis may result if only one such standard test is used. Increased thyroxine-binding protein levels resulting from pregnancy or taking oral contraceptives are responsible. Thyroxine is the thyroid's chief hormone.

An examination of 166 women showed that if one type of test (T-3) is used, the patient almost always has a low thyroid reading while if another test (T-4) is used, the result is high.

A way out of this dilemma is offered by Dr. Godwin. All that is required is to multiply the T-3 and T-4 values. The product, it turns out, gives a truer picture of thyroid activity than either the T-3 or T-4 alone since it reflects the level of free thyroxine in the blood.

RADIOGRAPHY

Better scanning device

There are a number of instruments that can photograph the body's internal organs with the aid of emissions from radioactive drugs. Results with the newly developed tomographic scanner, a gamma-ray detector that gives multiple images focused at different levels in the body, show distinct advantages over other types.

In tests to visualize the brain, liver, kidney, lung and pancreas of 161 patients, the tomoscanner detected every lesion that the other instruments did, reports Dr. Joseph A. Volpe of Letterman General Hospital, San Francisco. Furthermore, the resolution, or sharpness, was superior to the scintillation camera, one of the commonest types in use. In liver and kidney scanning, its sharper resolution of space-occupying lesions, such as cysts and tumors, enabled the detection of lesions that were missed with the scintillation camera.

NEURONUCLEAR MEDICINE

Evaluating stroke treatments

Three types of treatment for victims of stroke are increasing blood pressure, hyperventilation (and its corollary, hypocarbia, or decreased carbon dioxide) and removal of cerebrospinal fluid. All three theoretically could result in blood flowing to brain tissue damaged by stroke.

To evaluate these techniques medical scientists must know the regional blood flow in the brain. However, the present method of measuring such flow requires special, expensive detecting equipment because a probe is needed for each area of the brain to be examined.

Researchers at the Washington University School of Medicine, St. Louis, Mo. have solved the problem, says Dr. B. Leonard Holman, by electronically dividing the Anger camera, a nuclear counter which converts gamma rays into electronic pulses, into an 8 x 8 matrix so it is the equivalent of 64 separate probes. In this way, 20 areas of the brain can be covered at once. The data from the camera are fed into a computer, which analyzes them to give the rate of blood flow in any of the 20 areas.

RADIOACTIVE MICROSPHERES

Voyage in the blood stream

Medical scientists at Johns Hopkins Hospital in Baltimore in collaboration with the 3M Co. have devised a new way to study the human circulatory system. By injecting radioisotopically tagged microspheres made of human serum albumin into the patient's blood stream, they can trace and map the distribution of blood throughout the body, explains Dr. Henry N. Wagner Jr. The microspheres are about four times the size of human red blood cells and are labeled just prior to injection with technetium 99. This substance has a short half-life (six hours) and so poses a reduced radiation hazard.

Once in the blood stream, the course of the microspheres can be charted with a radioisotope scanner, or scintillation camera. Because of their size, they can point up areas where disease has impaired circulation. Studies have been made of the effects of anesthesia and exercise with them, adds Dr. Wagner.

FLUORESCENT SCANNING

Eliminating radioactivity

In scanning the thyroid gland, radioactive medicine is taken. But now a team of scientists at the University of Chicago and the Argonne Cancer Research Hospital, Chicago, led by Dr. Paul B. Hoffer, has developed a method of thyroid scanning which requires no radiopharmaceuticals.

Called fluorescent thyroid scanning, it employs a narrow beam of X-rays which penetrate the patient's neck. The beam is on for a short time, and the radiation emitted by the thyroid is measured and recorded. The important feature is that the patient is exposed to far less radioactivity than he would be with radioisotope scanning.

RADIONUCLIDES

Potentially valuable isotope

Investigators at the Upstate Medical Center, Syracuse, N.Y., are studying the radioisotope ruthenium 97, which they believe will be extremely valuable in medical diagnosis. However, it has not been used on humans, reports Dr. John G. McAfee, because its radiochemical properties are still largely unknown.

The isotope has a half-life of three days and so is similar to indium 111 and gallium 67. It emits gamma radiation without any undesirable beta rays, and so is ideal for external imaging of body organs. A great asset is that it can be made in either a reactor or a cyclotron.