

MEDICINE

Heparin Used to Prevent Adhesions After Operations

Anti-Blood Clotting Substance From Lungs of Cows Used Successfully In a Few Human Cases as Preventive

ONE OF the greatest unsolved problems facing surgeons in their life-saving operations, the formation of peritoneal adhesions after operations inside the abdomen, may soon be conquered. Promising results in prevention of adhesions by heparin, the anti-blood clotting substance obtained from cows' lungs, were reported by Dr. Floyd Boys, assistant professor of surgery at the University of Virginia Medical School, at the meeting of the Virginia Academy of Science in Richmond.

Peritoneal adhesions, Dr. Boys pointed out, are one of the chief causes of the dangerous condition, intestinal obstruction. They result from the organization of an inflammatory exudate or juice lying between opposed injured surfaces of the peritoneum, which is the membrane lining the inside of the abdominal walls.

"At first the exudate is unclotted," Dr. Boys explained, "but it soon becomes co-

agulated and an adhesion composed of fibrin is formed. If, and when, the opposing peritoneal layers covering the organs in this zone are destroyed by inflammation, the exposed sub-peritoneal connective tissue and blood vessel elements are stimulated to proliferate (grow) over the fibrin which acts as a scaffolding. By this process, termed organization, the fibrinous adhesion is replaced by scar tissue and a permanent adhesion remains."

Between one and two of every 100 major abdominal operations, it is estimated, are performed for relief of intestinal obstruction due to such adhesions.

Many methods have been tried to prevent these adhesions during the 150 years since the condition has been known. None, however, proved satisfactory. When purified heparin was developed for prevention of dangerous clots within blood vessels, Dr. Boys and Dr. Edwin P. Lehman, professor of surgery at the

University of Virginia, believed it might prevent adhesions also by preventing the coagulation of the inflammatory peritoneal exudate which is the starting point of adhesion formation.

Studies on rabbits and dogs were so promising that the heparin treatment for prevention of adhesions was used in a "few cases of intestinal obstruction" in humans "without any untoward effects." Chief danger in the use of heparin lies in the possibility of hemorrhage within the abdomen but care during the operation to prevent bleeding from the small veins and arteries should eliminate this danger, Dr. Boys indicated.

"An enormous number of cases must be treated with heparin before a sufficient number of cases will come to re-operation or post-mortem to offer a basis for judging the efficiency of the method employed," Dr. Boys stated. "It would seem necessary, therefore, that primary acceptance of such a method must rest upon laboratory and animal assay evidence.

"If the experimental value of heparin in preventing peritoneal adhesions is confirmed by other investigators, its use should offer considerable promise for this heretofore essentially unsolved surgical problem."

Science News Letter, May 17, 1941

PSYCHOLOGY—PHYSIOLOGY

Human Guinea Pigs Test Poisonous Toluene Fumes

FUMES of toluene, chemical from which TNT is manufactured, are being inhaled regularly by three volunteer "human guinea pigs" at the National Institute of Health, to determine just how toxic it is when inhaled. Directing the research are Dr. W. F. von Oettingen, Dr. Paul A. Neal and Dr. D. D. Donohue.

With the rushing of the defense program, more and more toluene is being used in industry. Yet the possible hazards to workmen who are exposed to its fumes have never yet been exactly determined.

It is for this purpose that the three Public Health Service scientists who have volunteered for the experiment go twice a week at nine o'clock in the morning into a specially built gas chamber where they breathe the fumes until noon. After a half-hour luncheon recess, they return to the gas chamber and stay there until five.

Certain concentrations of the fumes are mildly intoxicating. It makes you feel as though you had had a couple of



GAS CHAMBER

In this chamber tests are being carried on to determine the toxicity of toluene. The atmosphere is charged with toluene of a predetermined concentration. In the foreground Dr. D. D. Donahue is preparing the apparatus used to analyze the exhaust air of one of the subjects. In the rear chamber Dr. J. W. Miller is taking a psychomotor test supervised by Dr. E. C. Hammond.